



**4. EUROPEAN  
HALAL  
CONGRESS 2026**

**BOOK OF ABSTRACTS AND PAPERS  
FROM 4TH EUROPEAN HALAL CONGRESS**

*ZBORNİK SAŽETAKA I RADOVA SA  
4. EUROPSKOG HALAL KONGRESA*

**Sarajevo, 09 - 10. Juni 2026.**

Sarajevo, 09-10 June 2026.

**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

ZBORNIK SAŽETAKA I RADOVA  
SA 4. EUROPSKOG HALAL KONGRESA

**ZBORNİK SAŽETAKA I RADOVA SA  
ČETVRTOG EUROPOSKOG HALAL KONGRESA**

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# PROGRAM

of

**4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**PROGRAM OF 4<sup>th</sup> EUROPEAN HALAL CONGRESS**  
**Congress Center – Hotel Hills Sarajevo :: 9<sup>th</sup> – 10<sup>th</sup> June, 2026.**

**FIRST DAY - Tuesday, 09<sup>th</sup> June, 2026**

Time	Activity, Topic and Speaker Name
08:00 – 09:00	REGISTRATION & ACCREDITATION; Congress Center – Hotel Hills
09:00 – 09:15	CONTACT WITH MEDIA
09:30 – 10:15	OPENING CEREMONY OF THE CONGRESS (Hotel Hills)

- **Damir Alihodžić** Ph. D, president of 4<sup>th</sup> European Halal Congress Organization Committee, Bosnia and Herzegovina
- **Mustafa Hasani**, Ph. D, Dean of Faculty of Islamic Studies, University of Sarajevo, Bosnia and Herzegovina
- **Mian N. Riaz**; Ph. D, Associate Department Head and Holder of the Professorship in Food Diversity Dept. Food Science and Technology Texas A&M University; USA
- **Zafer Soyulu**, Chairman of BoD of Halal Accreditation Agency (HAK) Türkiye
- **H. E. İhsan Övüt**, Secretary General of OIC/SMIIC, Türkiye
- **hfz. Mensur-ef. Malkić**, Ph. D, Envoy of Grand Mufti of Islamic Community in Bosnia and Herzegovina
- 

10:15 – 11:15	PANEL DISCUSSION: HALAL GLOBAL MARKET: CHALLENGES AND OPPORTUNITIES FOR EUROPE
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**Moderator: Amir Sakić, MA**

- **Ihsan Ovut**, Secretary General of The Standards and Metrology Institute for Islamic Countries, Türkiye
- **Tomas Kuchtik**, European Commission DG TRADE, Brussels, Belgium
- **Yousuf Hasan Khalawi**, Secretary General of the Islamic Chamber of Commerce and Development
- **Damir Alihodžić**, Agency for Halal Quality Certification of Islamic Community in Bosnia and Herzegovina

11:15 – 11:45	COFFEE BREAK AND NETWORKING
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11:45 – 13:00	SESSION: HALAL INDUSTRY DIALOGUE
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**Session Chairs:** Ali Fanous Ph. D, Mihaela Brijak Gutierrez;

- **Implementation of Halal Requirements**  
**Rohaizad Hassan**, General Manager of Food Safety & Defense at Yildiz Holding, Türkiye
- **Halal Certification and the Challenges Facing It**  
**Ali Fanous**, Ph. D, Food technologist and manager of certification unit, HALAL CONTROL, Germany
- **Premium Raw & Plant-Based Halal Products – From Concept to Market: Bridging Health, Quality and Consumer Trust**  
**Mihaela Brijak Gutierrez**, Founder of Raw Cakes & Raw Sweets by Mihaela, Croatia
- **Alcohol free Hand and hard surface disinfectants**  
**Thomas Meneghini** Ph. D; Azett GmbH & Co KG / BactEX UG & Co. KG, Germany

13:00 – 14:00 LUNCH AND PRAYER TIME

14:00 – 15:00 PLENARY SESSION

**Session Chairs:** Mian N. Riaz, Ph. D, Çağrı Cankurtaran, MA

- **Navigating Halal Compliance in Pharmaceuticals and Nutraceuticals: Considerations for Halal Consumers**  
Mian N. Riaz, Ph. D, Associate Dept. Head and Holder of the Professorship in Food Diversity Dept. Food Science and Technology Texas A&M University; USA
- **Future of IFHAB and Türkiye Experience in Halal Accreditation**  
Zafer Soylyu, Chairman of BoD of Halal Accreditation Agency (HAK) Türkiye.
- **Towards a Globally Coherent OIC Halal Ecosystem: Positioning SMIC as Scheme Owner and IFHAB as MRA Platform**  
Çağrı Cankurtaran, MA, The Standards and Metrology Institute for Islamic Countries (SMIC), Türkiye
- **Advantages of SMIC Standard in Accreditation of Halal CBs in Pakistan**  
Ateeq-Ur-Rehman Memon, Director General, Pakistan National Accreditation Council (PNAC), Pakistan

15:00 – 16:00 SESSION: HALAL FOOD SAFETY AND QUALITY ASSURANCE

**Session Chairs:** Ema Obralić, Ph. D; Natalija Atanasova-Pancevska,

- **Integration of Islamic Ethical Principles into Business Strategies of Sustainable Economic Systems**  
Ema Obralić, Ph. D, Solana d.d. Tuzla, Bosnia and Herzegovina;  
**Co-authors:** Amela Semić, Belmin Poljić, Arman Hodžić
- **Integrating Halal Principles with HACCP and Global Standards; The Future of Safe Food.**  
Omeera Ayoba, Manipal Academy of Higher Education, Dubai Campus, Academic City, UAE;  
**Co-author:** Arif Hussaina
- **Microbiological Indicators and Hygiene-Based Approaches for Detecting and Preventing Halal Food Fraud**  
Natalija Atanasova-Pancevska, Ss. Cyril and Methodius University in Skopje, Faculty of Natural Sciences and Mathematics – Skopje, North Macedonia
- **Analytical Strategies for Porcine Detection in Halal Certification,**  
Raafqi Ranasasmitha, Lembaga Pengkajian Pangan, Obat-obatan dan Kosmetika MUI (LPPOM MUI), Indonesia

16:00 – 16:20 COFFEE BREAK AND NETWORKING

16:20 – 17:20 SESSION: HALAL CERTIFICATION, ACCREDITATION AND GOVERNANCE

**Session Chairs:** Riadh Soussi Ph. D; Muhammad Irhamudin Bin Ibrahim, Ph. D

- **Improving animal welfare compliance through a holistic Halal certification approach.**  
Awal Fuseini, Agriculture and Horticulture Development Board, United Kingdom
- **A Practical Model for Halal Slaughtering Demonstration and Research: Design Specification of a Heavy-Duty Cabin Facility**

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**Muhammad Irhammudin Bin Ibrahim**, Ph. D, International Institute for Halal Research and Training (INHART), International Islamic University Malaysia, Malaysia

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- **From Waste to Barakah: Halal Pathways for Transforming Food Waste into Sustainable Resources.**

**Amel Mohammed Abdallaha**, Ph. D, Technical advisor OIC - SMIIC; Türkiye

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- **Plain Language in Halal Standards: A New Approach to enhance Clarity and Compliance**  
**Riadh Soussi**, Ph. D; The Standards and Metrology Institute for Islamic Countries (SMIIC), Türkiye

**17:20 – 18:00**    **SESSION: HALAL, SUSTAINABILITY, ISLAMIC ECONOMY AND FINANCE**

**Session Chairs:** Midhat Jašić Ph. D; Ismet Kalić, Ph. D; Tharwat Mamdouh Al-Bataineh Ph. D

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- **Integration of ESG Principles and the Halal Market: From Profit to Ethical Business Model**  
**Kadrija Hodžić**, Ph. D; University of Tuzla, Faculty of Economy, B&H, Midhat Jašić, Ph. D.
- 

- **Future Foresight of Halal in the Context of Sustainable Technologies with Focus on Food and Animal Waste Index**

**Tharwat Mamdouh Al-Bataineh** Ph. D, Food Regulatory Specialist – Food Safety and Halal Regulations; CEO Food Excellence Center, Dubai – AlAin Road, Dubai, UAE;

**Co-authors:** Jood Osama Quran, Midhat Jašić

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- **Strategic Financial Management in the Function of Long-Term Sustainable Development of the Halal Industry in the Context of Digitalization and Artificial Intelligence**  
**Ismet Kalić**, Ph. D, University FINRA Tuzla, Bosnia and Herzegovina

**18:00 – 20:00**    **MEETING OF EUROPEAN HALAL CERTIFICATION BODIES**

**DINNER TIME 20:00 – 22:00**

## 4<sup>rd</sup> EUROPEAN HALAL CONGRESS

Congress Center – Hotel Hills Sarajevo :: 09 – 10<sup>th</sup> June, 2026

### SECOND DAY – Wednesday, 10<sup>th</sup> June, 2026

Time	Activity, Topic and speaker name
08:15 – 09:30	REGISTRATION Congress Center - Hotel Hills
09:30 – 10:15	<b>SESSION: HALAL TOURISM AND GASTRONOMY</b>  <b>Session Chairs:</b> Dino Selimović, MA, Waleed Jahangir, Moulana Muhammad Saeed Navlakhi  <ul style="list-style-type: none"><li>▪ <b>The Synergy Between Halal Gastronomy and Halal Tourism: Enhancing Muslim-Friendly Travel Experiences</b> <b>Waleed Jahangir</b>, Muslim Travel Show / Algebra Consulting</li><li>▪ <b>How Do Stakeholders Perceive the Role of Halal Certification in Market and Investment Attractiveness of Hotels? Evidence from Bosnia and Herzegovina</b> <b>Dino Selimović</b>, MA, International University of Sarajevo, Bosnia and Herzegovina</li><li>▪ <b>The Muslim Traveller Dilemma: When Halal Food is Available but Halal Confidence is Missing</b> <b>Moulana Muhammad Saeed Navlakhi</b>, Director at SANHA Halal Authority, South Africa</li></ul>
10:15 – 11:15	<b>SESSION: HALAL FOOD SCIENCE, NUTRITION AND ALTERNATIVE SOURCES</b>  <b>Session Chairs:</b> Saeed Hayek, Neira Fazlović, Ph. D, Farrah Payyadhah Binti Borhan, Ph. D  <ul style="list-style-type: none"><li>▪ <b>Halal Governance in Aesthetic Practice: A Maqasid Shariah-Based Framework for Quality and Ethical Compliance</b> <b>Farrah Payyadhah Binti Borhan</b>, Ph. D; Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA Shah Alam, Malaysia; <b>Co-author:</b> Ahmad Syukran Baharuddin</li><li>▪ <b>Alternative Sources of Protein: Technical Aspects and Halal Requirements</b> <b>Saeed Hayek</b>, Islamic Food and Nutrition Council of America, USA</li><li>▪ <b>Halal status of unconventional animal species as a source of human nutrition</b> <b>Neira Fazlović</b>, Ph. D, Veterinary faculty, University of Sarajevo, Department of Food Safety and Environmental Protection; <b>Co-authors:</b> Faruk Čaklović, Kenan Čaklović</li><li>▪ <b>Key Requirements for Halal Aquaculture Feed Production: A Shariah Perspective</b> <b>Nurulaina Saidin</b> Ph. D, Academy of Contemporary Islamic Studies, UiTM Shah Alam, Selangor, Malaysia; <b>Co-author:</b> Rafeah Saidon</li></ul>
11:15 – 11:45	COFFEE BREAK AND NETWORKING
11:45 – 12:15	<b>SESSION: HALAL IN PHARMACEUTICAL, COSMETIC AND HEALTHCARE SECTORS</b>  <b>Session Chairs:</b> Jawad Alzeer Ph. D; Nurzahidah binti Haji Jaapar, Ph. D  <ul style="list-style-type: none"><li>▪ <b>Halalopathy: A Systems-Based Bridge Between Modern Medicine and Prophetic Medicine</b> <b>Jawad Alzeer</b>, Ph. D, Swiss Scientific Society for Developing Countries, Zürich, Switzerland.</li></ul>

- **Halal Certification versus Shariah-Compliant Operations in Malaysia's Beautypreneurship Industry: A Thematic Literature Review**  
Nurzahidah binti Haji Jaapar, Ph. D, Senior Lecturer, Academy of Contemporary Islamic Studies (ACIS), UiTM, Malaysia

12:15 – 13:15

**SESSION: DIGITALIZATION AND INNOVATION IN HALAL CERTIFICATION**

**Session Chairs:** Muhamad Zubaidi, Ph. D; Muhammad Abubakar; Almir Halilčević

- **Digital Transformation of Halal Compliance: A Unified Web - Based Architecture for Global Accreditation Verification**  
Muhamad Zubaidi, Ph. D, Polish Institute of Halal, Poznan, Poland  
**Co-author:** Mohamed Salah Messikh
- **Sustainable Digital Traceability for Halal Food Safety and Supply-Chain Resilience**  
Muhammad Abubakar, Windsor Group, Pakistan
- **Application of Artificial Intelligence in Halal Certification: Opportunities, Challenges, and Practical Use Cases**  
Almir Halilčević, Moosheimer Str, Bad Saulgau, Germany  
**Co-authors:** Midhat Jašić, Benjamin Muhadbegović, Damir Alihodžić
- **From the Wisdom of Baghdad to the Halal Table: The Forgotten Scientific Heritage of Islamic Civilization**  
Stanko Blatnik, Ph. D; Inštitut IPAK, Velenje, Slovenia

13:15 – 14:15

**SESSION: CONTEMPORARY CHALLENGES IN HALAL CERTIFICATION AND MARKET PRACTICES**

**Session Chairs:** Rafeah Saidon, Ph. D; Farah Lynn Amira Binti Nor Zaidi

- **Evaluation of Halal Compliance in Market Transactions: A Case Study of Central Market in Mbale City, Uganda**  
Manswab Mahsen Abdulrahman Ph. D; Senior Lecturer-Department of Shariah; Islamic university in Uganda Uganda
- **When Access is Restricted: Understanding Interview Rejection by Halal Certification Agencies in Australia**  
Farah Lynn Amira Binti Nor Zaidi; International Institute for Halal Research and Training (INHART) Malaysia; **Co-Authors:** Mohammad Aizat Jamaludin, Anis Najiha Ahmad
- **Constitutional Issues in Halal Certification and Enforcement in Malaysia: Reassessing Federal-State Jurisdiction,**  
Rafeah Saidon, Ph. D Academy of Contemporary Islamic Studies (ACIS), Malaysia

Congress closing:: **CONGRESS RESOLUTIONS**

**SOCIAL EVENTS**

## POSTER SECTION

### Title of Poster Presentation, authors

1. The influence of *Lactobacillus* spp. on the hygienic safety of dry cheese - a traditional halal product of Bosnia and Herzegovina In vitro study of the antifungal activity of 10% propolis extract in propylene glycol on *Candida albicans*  
**Zinka Hojkurić Rahmanović, Berin Rahmanović, Adnan Alijagić, Kenan Muratović, Damir Alihodžić, Mehmed Sultanović, Kenan Čaklovica**
2. In vitro study of the antifungal activity of 10% propolis extract in propylene glycol on *Candida albicans*  
**Zinka Hojkurić Rahmanović, Berin Rahmanović, Adnan Čučuković, Mirela Čučuković, Adnan Alijagić, Damir Alihodžić, Mehmed Sultanović, Munevera Begić**
3. From Halal Compliance to Evidence-Based Assurance: The Role of ISO/IEC 17025 Accredited Laboratories in Controlling Haram Risks in Food Systems  
**Benjamin Čaušević, Amir Ibrahimagić, Emina Idrizović, Damir Alihodžić, Kemal Sejranović, Muamer Mandra**
4. Application of Allicin in Accordance with Halal and Tayyib Principles: Influence on Ascites Syndrome and Angiotensin II Type 1 Receptor Gene Expression in Broilers Reared in the Mexican Highlands  
**Elma Hrustemović, Artemio Jovanny Vargas-Galicia, Arturo Pro-Martínez, Fernando González-Cerón, Amalio Santacruz-Varela, Horacio Osorio-Alonso, Eliseo Sosa-Montes, Raúl Argüello-García**
5. Antimicrobial Resistance Dynamics of *Campylobacter* Species: The Impact of Environmental Reservoirs on the Integrity of the Halal Food Chain  
**Elma Hrustemović, Faruk Čaklovica, Marko Samardžija, Vesna Jaki Tkalec, Sanja Furmeg, Kenan Čaklovica, Marija Pajić, Usman Mir Khan, Marko Pećin, Oskar Nowak, Hafiza Saima, Raúl Argüello-García**
6. Biotechnological Advancements in Animal Husbandry: Risk Analysis and Ethical Imperatives Within Public Health and Halal Standards  
**Elma Hrustemović, Faruk Čaklovica, Marko Samardžija, Vesna Jaki Tkalec, Sanja Furmeg, Kenan Čaklovica, Marija Pajić, Usman Mir Khan, Marko Pećin, Oskar Nowak, Hafiza Saima, Raúl Argüello-García**
7. Improving Halal Integrity in Raw Material Intake Using Lean Six Sigma Methodology  
**Azra Sinanović, Ragib Spahic, Aldijana Omerović**
8. Enhancing Halal Compliance Through Artificial Intelligence and Machine Learning  
**Aldijana Omerović, Ragib Spahić, Azra Sinanović**
9. Halal Nutrition in Diabetes Management  
**Tarik Zolotić, Damir Alihodžić, Midhat Jašić**
10. Integration of Halal and Tayyib Standards Into Dairy Chain Biosecurity: Analysis of MRSA in Cows With Mastitis in Selected Regions  
**Elma Hrustemović, Faruk Čaklovica, Vesna Jaki-Tkalec, Sanja Furmeg, Zrinka Štritof, Lejla Kapur-Pojškić, Jasmin Ramić, Marija Pajić, Usman Mir Khan, Raúl Argüello-García**

## Predgovor

### Poštovani čitatelji,

Sa zadovoljstvom vam predstavljamo *Zbornik sažetaka Četvrtog Europskog halal kongresa*, održanog 9. i 10. juna 2026. godine u Sarajevu. Sažeci radova objavljeni u ovom izdanju rezultat su prezentacija i diskusija koje su se odvijale kroz usmena izlaganja i poster prezentacije tokom Kongresa.

Radovi okupljeni u ovom zborniku obrađuju savremena pitanja i izazove vezane za halal u različitim industrijskim sektorima, te značajno doprinose razvoju naučne i stručne misli u ovom specifičnom i sve važnijem polju.

Sažeci radova u ovom zborniku sistematizirani su prema sljedećim tematskim cjelinama:

- Halal sigurnost hrane i osiguranje kvaliteta.
- Halal certificiranje, akreditacija i upravljanje procesima.
- Halal, održivost, islamska ekonomija i finansije.
- Naučni aspekti halal hrane, prehrana i alternativni izvori.
- Halal u farmaceutskom, kozmetičkom i zdravstvenom sektoru.
- Halal turizam i gastronomija.

Četvrti Europski halal kongres, kao i broj pristiglih i prezentiranih radova, svjedoči o rastućem globalnom interesu akademske i stručne zajednice za integraciju halal koncepta u savremene naučne, društvene, privredne i ekonomske tokove. Ovaj zbornik nudi vrijedan uvid u multidisciplinarnu pristupe halal razvoju i otvara prostor za daljnje istraživanje, saradnju i inovacije.

S nadom da će ovaj zbornik poslužiti kao inspiracija za buduća istraživanja i doprinos razvoju halal sektora, želimo vam ugodno čitanje.

*Prof. dr. Midhat Jašić, odgovorni urednik*  
*Dr. sc. Mirsad Arnautalić, gost urednik izdanja*

## Foreword

**Dear readers,**

It is our great pleasure to present the *Book of Abstracts of the Fourth European Halal Congress*, held in Sarajevo on June 9–10, 2026. This volume brings together the abstracts of papers presented during the Congress through oral presentations and poster sessions, reflecting the diverse research, discussions, and insights shared by participants.

The works compiled in this book address contemporary issues and challenges related to halal across various industrial sectors, thereby contributing significantly to the advancement of scientific and professional thought in this specific and increasingly important field.

The abstracts in this volume are organized into the following thematic sections:

- Halal Food Safety and Quality Assurance
- Halal Certification, Accreditation and Governance
- Halal, Sustainability, Islamic Economy and Finance
- Halal Food Science, Nutrition and Alternative Sources
- Halal in Pharmaceutical, Cosmetic and Healthcare Sectors
- Halal Tourism and Gastronomy

The Fourth European Halal Congress, along with the number of submitted and presented papers, testifies to the growing global interest of the academic and professional community in integrating the halal concept into contemporary scientific, social, industrial, and economic frameworks. This volume provides valuable insights into multidisciplinary approaches to halal development and opens avenues for further research, collaboration, and innovation.

With the hope that this book will serve as an inspiration for future studies and contribute to the advancement of the halal sector, we wish you an enjoyable reading experience.

*Prof. dr. Midhat Jašić, Editor-in-Chief*  
*Dr. sc. Mirsad Arnautalić, Guest Editor*

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## **CHAPTER 1**

### **POGLAVLJE 1**



## **HALAL FOOD SAFETY AND QUALITY ASSURANCE**

Halal sigurnost hrane i osiguranje kvaliteta

[www.congress.halal.ba](http://www.congress.halal.ba)



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**TOWARDS A GLOBALLY COHERENT OIC HALAL ECOSYSTEM: POSITIONING SMIIC AS SCHEME OWNER AND IFHAB AS MRA PLATFORM**

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**ABSTRACT**

The global halal market has expanded into a multi-trillion-dollar ecosystem, yet the Organization of Islamic Cooperation (OIC) continues to face serious fragmentation in standards, conformity assessment and accreditation. Multiple national halal standards, competing halal certification bodies (HCBs) and overlapping accreditation arrangements create market confusion, non-tariff barriers and potential inconsistency with World Trade Organization (WTO) disciplines. Several studies underline the lack of a universally accepted halal standard and stress the need for a unified framework in which SMIIC, as an OIC institution, plays a central role in harmonization (Lutfika et al., 2022; Abdallah et al., 2021; Azam & Abdullah, 2021; Akbar et al., 2023; Abdallah, 2021; M.A.A. & M.M.M., 2012). Current practice in many OIC Member States, however, diverges from established international conformity assessment and accreditation models and weakens mutual recognition at the global level. This paper develops a conceptual and institutional model for a coherent OIC halal ecosystem based on international good practice in standardization, conformity assessment and accreditation. In the proposed model, SMIIC develops and maintains OIC/SMIIC halal standards and related conformity assessment documents and acts as the halal certification scheme owner; public or private halal certification bodies (HCBs) perform certification; national accreditation bodies conduct halal accreditation using OIC/SMIIC standards; and IFHAB provides a multilateral mutual recognition arrangement (MRA) under which accredited halal certificates are mutually recognized across participating states. SMIIC registers competent HCBs under a unique, IT-secured halal scheme logo and defends its scheme and marks across international platforms such as ISO, Codex and WTO TBT. The model aims to align OIC halal governance with global conformity assessment practice, reduce technical barriers to trade, protect Muslim consumers and enhance the credibility of OIC as the global reference for halal.

**Keywords:** *Halal standardization, OIC, SMIIC, accreditation, halal certification, mutual recognition (MRA), WTO TBT, harmonization of standards, halal ecosystem, conformity assessment.*

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## **PREMA GLOBALNO KOHERENTNOM OIC HALAL EKOSISTEMU: POZICIONIRANJE SMIIC-A KAO VLASNIKA ŠEME I IFHAB-A KAO MRA PLATFORME**

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### **SAŽETAK**

Globalno halal tržište se proširilo u višetrilionski ekosistem, ali Organizacija islamske saradnje (OIC) i dalje se suočava sa ozbiljnom fragmentacijom u standardima, ocjenjivanju usklađenosti i akreditaciji. Višestruki nacionalni halal standardi, konkurentska tijela za halal certificiranje (HCB), kao i preklapajući sistemi akreditacije stvaraju zabunu na tržištu, netarifne barijere i potencijalnu neusklađenost sa pravilima Svjetske trgovinske organizacije (WTO). Nekoliko studija naglašava nedostatak univerzalno prihvaćenog halal standarda i ističe potrebu za jedinstvenim okvirom u kojem SMIIC, kao institucija OIC-a, ima centralnu ulogu u harmonizaciji (Lutfika et al., 2022; Abdallah et al., 2021; Azam & Abdullah, 2021; Akbar et al., 2023; Abdallah, 2021; M.A.A. & M.M.M., 2012). Međutim, trenutna praksa u mnogim državama članicama OIC-a odstupa od međunarodno uspostavljenih modela ocjenjivanja usklađenosti i akreditacije, što slabi sistem međusobnog priznavanja na globalnom nivou. Ovaj rad razvija konceptualni i institucionalni model koherentnog OIC halal ekosistema zasnovanog na međunarodnoj dobroj praksi u standardizaciji, ocjenjivanju usklađenosti i akreditaciji. U predloženom modelu, SMIIC razvija i održava OIC/SMIIC halal standarde i povezane dokumente za ocjenu usklađenosti te djeluje kao vlasnik halal šeme certificiranja; javna ili privatna halal certifikacijska tijela (HCB) provode certificiranje; nacionalna akreditacijska tijela vrše halal akreditaciju koristeći OIC/SMIIC standarde; a IFHAB osigurava multilateralni sporazum o međusobnom priznavanju (MRA) u okviru kojeg se akreditirani halal certifikati međusobno priznaju među državama učesnicama. SMIIC registruje kompetentna HCB tijela pod jedinstvenim, IT-zaštićenim halal logotipom šeme i štiti svoju šemu i oznake na međunarodnim platformama kao što su ISO, Codex i WTO TBT. Ovaj model ima za cilj usklađivanje halal upravljanja OIC-a sa globalnom praksom ocjenjivanja usklađenosti, smanjenje tehničkih barijera u trgovini, zaštitu muslimanskih potrošača i jačanje kredibiliteta OIC-a kao globalnog referentnog autoriteta za halal.

**Ključne riječi:** *Halal standardizacija, OIC, SMIIC, akreditacija, halal certificiranje, međusobno priznavanje (MRA), WTO TBT, harmonizacija standarda, halal ekosistem, ocjenjivanje usklađenosti.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**ALCOHOL FREE HAND AND HARD SURFACE DISINFECTANTS**

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**ABSTRACT**

Azett and BactEX have spent over 4 years of research and have found a way to disinfect skin and hard surfaces based on standard raw materials commonly allowed in the EU for use in cosmetics, food, and medical applications. It has a broad spectrum of efficacy against gram negative and gram-positive bacteria, yeast, fungi, and enveloped viruses and is Halal certified by Halal Control Germany. The family of products are free of 1- and 2- propanol, ethanol, quats, phenolics, peroxides and peracids. We have tested the products to the highest EU medical standard (EN 14885); thus, it is safe to say that these products can be easily and safely used in the food, cosmetic and medical areas. The basic product is the hand and hard surface sanitizer will only reduce bacteria on skin and surfaces. It has been to the EN 13727 and EN 1500 medical standards. It kills bacteria in 30 s and only requires 2 ml of product. The product family comprises a hand disinfectant that perform to the current EU medical standards for hand disinfection. They are EN 13624, EN 13727, EN 1500 and EN 14476. All tests were passed in 60 seconds and achieve a kill rate of at least 99,99%. The hard surface disinfectant has also been tested to EU Medical EN 13624, EN 13727, EN 17387, EN 14476 and EN 16777 standards, these are effective against bacteria, yeast and enveloped viruses in 5 minutes and achieve a kill rate of at least 99,99%. The family also comprises as Fungicide that reduces A.Brasiliensis spores by more than 99,99% in 30 minutes on hard surfaces. As a special highlight we are the first and only washing and disinfecting liquid for corpses that have passed the EN norms and can be used as part of the ritual washing used in mosques. We have also been granted EU, Canada and Australian patents, the patents in India, Japan, Mexico, and USA still pending.

**Keywords:** *Halal disinfection, EU medical standards, antibacterial efficacy, alcohol-free, BactEX technology*

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## DEZINFEKCIJNA SREDSTVA BEZ ALKOHOLA ZA RUKE I TVRDE POVRŠINE

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### SAŽETAK

Azett i BactEX su proveli više od 4 godine istraživanja i pronašli način za dezinfekciju kože i tvrdih površina zasnovan na standardnim sirovinama koje su uobičajeno dozvoljene u EU za upotrebu u kozmetici, hrani i medicinskim aplikacijama. Proizvod ima širok spektar djelovanja protiv gram-negativnih i gram-pozitivnih bakterija, kvasaca, gljivica i ovojnatih virusa, te posjeduje halal certifikat Halal Control Germany. Porodica proizvoda ne sadrži 1- i 2-propanol, etanol, kvaterne amonijeve spojeve (QUATs), fenole, perokside i perkiseline. Proizvodi su testirani prema najvišem EU medicinskom standardu EN 14885, te se može sa sigurnošću reći da se mogu sigurno koristiti u prehrambenoj, kozmetičkoj i medicinskoj oblasti. Osnovni proizvod je dezinfekcijsko sredstvo za ruke i tvrde površine koje smanjuje bakterije na koži i površinama. Testiran je prema EN 13727 i EN 1500 medicinskim standardima. Uništava bakterije u 30 sekundi i zahtijeva samo 2 ml proizvoda. Porodica proizvoda uključuje dezinfekcijsko sredstvo za ruke koje ispunjava aktuelne EU medicinske standarde za higijenu ruku. Proizvodi su testirani prema EN 13624, EN 13727, EN 1500 i EN 14476. Svi testovi su uspješno prošli u roku od 60 sekundi i postižu stopu uništenja mikroorganizama od najmanje 99,99%. Dezinfekcijsko sredstvo za tvrde površine također je testirano prema EU medicinskim standardima EN 13624, EN 13727, EN 17387, EN 14476 i EN 16777. Efikasno je protiv bakterija, kvasaca i ovojnatih virusa u roku od 5 minuta, uz stopu uništenja od najmanje 99,99%. Porodica proizvoda također uključuje fungicid koji smanjuje spore *A. brasiliensis* za više od 99,99% u roku od 30 minuta na tvrdim površinama. Kao posebna novost, razvijen je i prvi i jedini tekući proizvod za pranje i dezinfekciju tijela umrlih osoba koji je prošao EN norme i može se koristiti kao dio ritualnog pranja u džamijama. Također su dodijeljeni EU, kanadski i australijski patenti, dok su patenti u Indiji, Japanu, Meksiku i SAD-u još u postupku odobravanja.

**Ključne riječi:** *Halal dezinfekcija, EU medicinski standardi, antibakterijska efikasnost, bez alkohola, BactEX tehnologija*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**Challenges in the trade of Halal products:  
Insights from WTO/TBT Obligations**

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**ABSTRACT**

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One of the challenges which Muslim countries encounter in the Halal sector is to get an international acceptance of the measures taken to control the Halal products in their markets. These measures whether technical regulations or conformity assessment procedures should be notified to WTO member countries under the WTO/TBT agreement obligation in order to fulfill the transparency principle. This challenge is exaggerated by the fact that Muslim countries works individually under the WTO umbrella. This study will cover the Halal related trade issues from WTO agreements perspectives, and will highlight how SMIIC standards could protect and control the Halal sector without creating unnecessary Technical Barriers to Trade. The methodology will be based on the analysis of WTO/ TBT notifications that are relevant to Halal products in addition to the analysis of the raised Specific Trade concerns in the period from 2000 - 2025. The study will also compare different halal sectors including Halal food and Halal cosmetics.

**Keywords:** *Halal food, Halal cosmetics, WTO/TBT, Specific Trade Concerns.*

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## **IZAZOVI U TRGOVINI HALAL PROIZVODIMA: UVIDI IZ OBAVEZA WTO/TBT SPORAZUMA**

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### **SAŽETAK**

Jedan od izazova s kojima se muslimanske zemlje susreću u halal sektoru jeste postizanje međunarodnog prihvatanja mjera koje se poduzimaju radi kontrole halal proizvoda na njihovim tržištima. Ove mjere, bilo da se radi o tehničkim propisima ili procedurama ocjenjivanja usklađenosti, trebaju biti notificirane državama članicama WTO-a u skladu s obavezama iz WTO/TBT sporazuma, kako bi se ispunio princip transparentnosti. Ovaj izazov dodatno je naglašen činjenicom da muslimanske zemlje djeluju pojedinačno pod okriljem WTO-a. Ova studija će obraditi trgovinska pitanja povezana s halal sektorom iz perspektive WTO sporazuma te će istaknuti na koji način standardi SMIIC-a mogu zaštititi i kontrolirati halal sektor, bez stvaranja nepotrebnih tehničkih prepreka trgovini. Metodologija će se temeljiti na analizi WTO/TBT notifikacija relevantnih za halal proizvode, kao i na analizi pokrenutih Specifičnih trgovinskih zabrinutosti (Specific Trade Concerns) u periodu od 2000. do 2025. godine. Studija će također uporediti različite halal sektore, uključujući halal hranu i halal kozmetiku.

**Ključne riječi:** *halal hrana, halal kozmetika, WTO/TBT, Specifične trgovinske zabrinutosti.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**MICROBIOLOGICAL INDICATORS AND HYGIENE-BASED APPROACHES FOR DETECTING AND PREVENTING HALAL FOOD FRAUD**

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**ABSTRACT**

Ensuring the integrity of halal food products is a critical requirement with religious, ethical, and public health implications. While most current approaches to halal authentication rely on molecular and analytical techniques for species identification, there is a growing need for practical, routine, and cost-effective methods applicable within food production environments. This study explores the role of microbiological monitoring as an indirect but essential tool for detecting and preventing halal food fraud, particularly in relation to cross-contamination risks. The paper examines key sources of contamination in food processing facilities, including shared equipment, inadequate sanitation, personnel handling, and environmental exposure. Emphasis is placed on the use of microbiological indicators—such as total viable counts, Enterobacteriaceae, *Escherichia coli*, *Staphylococcus aureus*, and yeasts and molds—as markers of hygiene failure and potential cross-contact between halal and non-halal materials. Environmental monitoring strategies, including air sampling, surface swabbing, and personnel hygiene assessment, are discussed as integral components of a comprehensive halal assurance system. Furthermore, the study highlights the role of biofilm formation in persistent contamination and its implications for cleaning validation and sanitation control. Culture-based microbiological methods and rapid hygiene assessment tools, such as ATP bioluminescence, are evaluated for their applicability in routine monitoring programs. Although microbiological techniques cannot directly confirm the presence of non-halal species, they provide critical insight into process control and contamination risks. The paper argues that integrating microbiological criteria into halal certification frameworks can significantly strengthen preventive control measures. A risk-based approach combining Good Manufacturing Practices (GMP), Hazard Analysis and Critical Control Points (HACCP), and structured environmental monitoring is proposed as an effective strategy to safeguard halal integrity.

**Keywords:** *halal food fraud, microbiological indicators, environmental monitoring, cross-contamination, biofilm formation, hygiene assessment*

# MIKROBIOLOŠKI INDIKATORI I HIGIJENSKI PRISTUPI ZA OTKRIVANJE I SPRJEČAVANJE HALAL PREHRAMBENIH PREVARA

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## SAŽETAK

Osiguravanje integriteta halal prehrambenih proizvoda predstavlja ključni zahtjev s vjerskim, etičkim i javnozdravstvenim implikacijama. Iako se većina postojećih pristupa halal autentifikaciji oslanja na molekularne i analitičke tehnike identifikacije vrsta, sve je veća potreba za praktičnim, rutinskim i isplativim metodama koje se mogu primijeniti u okruženjima prehrambene proizvodnje. Ova studija istražuje ulogu mikrobiološkog monitoringa kao indirektnog, ali ključnog alata za otkrivanje i sprječavanje halal prehrambenih prevara, posebno u vezi s rizicima unakrsne kontaminacije. Rad analizira ključne izvore kontaminacije u postrojenjima za preradu hrane, uključujući zajedničku opremu, nedovoljnu sanitaciju, rukovanje od strane osoblja i izloženost okolišu. Naglasak je stavljen na upotrebu mikrobioloških indikatora — kao što su ukupni broj živih mikroorganizama, Enterobacteriaceae, Escherichia coli, Staphylococcus aureus te kvasci i plijesni — kao pokazatelja higijenskih propusta i mogućeg kontakta između halal i ne-halal materijala. Razmatraju se strategije monitoringa okoliša, uključujući uzorkovanje zraka, brisanje površina i procjenu higijene osoblja, kao integralni elementi sveobuhvatnog halal sistema osiguranja. Nadalje, studija ističe ulogu formiranja biofilma u trajnoj kontaminaciji te njegove implikacije na validaciju čišćenja i kontrolu sanitacije. Evaluiraju se klasične mikrobiološke metode kulture i brzi alati za procjenu higijene, poput ATP bioluminiscencije, u pogledu njihove primjenjivosti u rutinskim programima monitoringa. Iako mikrobiološke tehnike ne mogu direktno potvrditi prisustvo ne-halal vrsta, one pružaju ključan uvid u kontrolu procesa i rizike kontaminacije. Rad zagovara da integracija mikrobioloških kriterija u okvire halal certifikacije može značajno ojačati preventivne kontrolne mjere. Predlaže se pristup zasnovan na riziku koji kombinuje Dobre proizvođačke prakse (GMP), Analizu opasnosti i kritične kontrolne tačke (HACCP) i strukturirani monitoring okoliša kao efikasnu strategiju zaštite halal integriteta.

**Ključne riječi:** *halal prehrambene prevare, mikrobiološki indikatori, monitoring okoliša, unakrsna kontaminacija, formiranje biofilma, procjena higijene*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**INTEGRATED HALAL–HACCP FRAMEWORK FOR SLAUGHTER-  
HOUSE OPERATIONS: ALIGNING RELIGIOUS COMPLIANCE WITH  
FOOD SAFETY STANDARDS**

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**ABSTRACT**

This presentation presents a technical framework for the systematic integration of Halal assurance protocols with Hazard Analysis Critical Control Point (HACCP) principles in slaughterhouse operations, aligned with international food safety and quality management standards, including ISO 22000 and GSO 2055-2. It delineates the critical requirements for Halal compliance, encompassing pre-slaughter animal welfare, ritual slaughter methods (dhabīhah), and mandatory blood drainage as defined by Islamic legal and regulatory benchmarks. The role of Prerequisite Programs (PRPs)—including sanitation standard operating procedures (SSOPs), facility hygiene, personnel practices, and traceability systems—is examined as foundational to both HACCP implementation and Halal certification integrity. A unified Halal-HACCP model is proposed, wherein critical control points (CCPs) are aligned with Halal critical limits to enable simultaneous control of food safety hazards and religious non-conformities. The presentation further emphasizes the necessity of structured training programs covering Halal ethics, GSO 2055-2 requirements, and HACCP principles to ensure operational consistency, minimize cross-contamination risks, and support certification continuity. This integrated approach enhances process control, regulatory alignment, and consumer confidence within global Halal meat production systems.

**Keywords:** *Halal assurance, HACCP, slaughterhouse, ISO 22000, GSO 2055-2*

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## **INTEGRIRANI HALAL–HACCP MODEL ZA RAD KLAONICA: POV- EZIVANJE HALAL USKLAĐENOSTI SA STANDARDIMA SIGURNOS- TI HRANE**

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### **SAŽETAK**

Ova prezentacija predstavlja tehnički okvir za sistemsku integraciju protokola halal osiguranja kvaliteta sa principima HACCP-a (Analiza opasnosti i kritične kontrolne tačke) u radu klaonica, usklađenu sa međunarodnim standardima sigurnosti hrane i upravljanja kvalitetom, uključujući ISO 22000 i GSO 2055-2. Prezentacija definiše ključne zahtjeve za halal usklađenost, uključujući dobrobit životinja prije klanja, metode ritualnog klanja (dhabīhah) i obavezno ispuštanje krvi, u skladu s islamskim pravnim i regulatornim kriterijima. Uloga preduslovnih programa (PRP) — uključujući standardne sanitarne operativne procedure (SSOP), higijenu objekta, praksu osoblja i sisteme sljedivosti — analizirana je kao temelj za uspješnu implementaciju HACCP-a i očuvanje integriteta halal certificiranja. Predlaže se jedinstveni Halal-HACCP model u kojem se kritične kontrolne tačke (CCP) usklađuju sa halal kritičnim granicama, čime se omogućava istovremena kontrola sigurnosnih rizika u hrani i religijskih neusklađenosti. Prezentacija dodatno naglašava potrebu za strukturiranim programima obuke koji obuhvataju halal etiku, zahtjeve standarda GSO 2055-2 i HACCP principe, kako bi se osigurala operativna dosljednost, smanjili rizici od unakrsne kontaminacije i podržao kontinuitet certifikacije. Ovaj integrirani pristup unapređuje kontrolu procesa, regulatornu usklađenost i povjerenje potrošača u globalnim sistemima proizvodnje halal mesa.

**Ključne riječi:** *halal osiguranje, HACCP, klaonica, ISO 22000, GSO 2055-2*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**INTEGRATION OF HALAL AND TAYYIB STANDARDS INTO DAIRY  
CHAIN BIOSECURITY: ANALYSIS OF MRSA IN COWS WITH MASTITIS  
IN SELECTED REGIONS**

**Elma Hrustemović<sup>1,2\*</sup>, Faruk Čaklović<sup>2</sup>, Vesna Jaki-Tkalec<sup>3</sup>, Sanja Furmeg<sup>3</sup>, Zrinka Štritof<sup>4</sup>, Lejla Kapur-Pojškić<sup>5</sup>, Jasmin Ramić<sup>5</sup>, Marija Pajić<sup>6</sup>, Usman Mir Khan<sup>7</sup>, Raúl Argüello-García<sup>8</sup>**

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**ABSTRACT**

Maintaining high hygienic integrity of raw milk and pathogen control represent a critical segment in ensuring food biosecurity, which is directly linked to the scientific and integrated principles of Halal and Tayyib standards (the *Halalan Toyyiban* concept – permissible, pure, and wholesome). The presence of pathogens on the udder skin and in the farm environment implies a constant risk of mammary tract contamination. The occurrence of mammary gland inflammation in dairy cows directly threatens this biological status, making the raw material a potential source of resistant microorganisms and toxins in the food chain. The aim of this study is to evaluate the global epidemiological situation through the analysis of resistance rates of *Staphylococcus aureus* strains to therapeutic agents, with a specific focus on identifying methicillin-resistant isolates and detecting the specific genetic marker of resistance (*mecA*). The research includes a comparative review of data collected from the dairy sector across Europe, the Western Balkans, Asia, and Africa. A review of available scientific data revealed that empirical and uncontrolled treatment of clinically manifest forms of the disease leads to selection pressure and accelerated spread of resistant bacterial clones. A particular challenge is posed by asymptomatic (subclinical) infections that pass unnoticed, thereby enabling continuous milk contamination and the occurrence of foodborne intoxications in humans.

The results indicate a pronounced resistance to conventional antimicrobial substances, which directly compromises the treatment strategies and biosecurity of dairy herds. Early and precise laboratory verification of the causative agent represents the primary measure in protecting consumer health. Controlling the dissemination of resistant isolates requires systematic rationalization of current drug use, the introduction of new immunoprophylactic measures (vaccines), and the implementation of innovative, natural, and harmless alternative treatments. Integrating these measures into primary production is essential for eliminating biological hazards and achieving the premium standards of purity and safety required by the modern Halal and Tayyib market.

**Keywords:** *Alimentary intoxications, biological food safety, mecA genotyping, methicillin-resistant Staphylococcus aureus, preventive immunoprophylaxis, thermostable enterotoxins.*

## INTEGRACIJA HALAL I TAYYIB STANDARDA U BIOSIGURNOST MLIJEČNOG LANCA: ANALIZA MRSA KOD KRAVA S MASTITISOM U ODABRANIM REGIJAMA

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### SAŽETAK

Očuvanje visoke higijenske ispravnosti sirovog mlijeka i kontrola patogena predstavljaju ključni segment u osiguranju biološke sigurnosti hrane, što je u direktnoj vezi s naučnim i integriranim principima halal i tayyib standarda (koncept *Halalan Toyayiban* – dozvoljeno, čisto i zdravstveno sigurno). Prisustvo patogena na koži vimena i u okruženju farmi implicira stalni rizik od kontaminacije mliječnog trakta. Pojava upale mliječne žlijezde kod muznih krava direktno ugrožava ovaj biološki status, čineći sirovinu potencijalnim izvorom rezistentnih mikroorganizama i toksina u prehrambenom lancu. Cilj ovog rada je evaluacija globalne epidemiološke situacije kroz analizu stopa otpornosti sojeva *Staphylococcus aureus* na terapijske agense, s posebnim osvrtom na identifikaciju meticilin-rezistentnih izolata te detekciju specifičnog genetskog markera rezistencije (*mecA*). Istraživanje obuhvata komparativni pregled podataka prikupljenih iz mliječnog sektora na

području Evrope, Zapadnog Balkana, Azije i Afrike. Pregledom dostupnih naučnih podataka utvrđeno je da empirijsko i nekontrolisano tretiranje manifestnih oblika bolesti dovodi do selekcijskog pritiska i ubrzanog širenja rezistentnih bakterijskih klonova. Poseban izazov predstavljaju asimptomatske (subkliničke) infekcije koje prolaze neopaženo, čime se omogućava kontinualna kontaminacija mlijeka i pojava alimentarnih intoksikacija kod ljudi. Rezultati ukazuju na izraženu rezistenciju prema konvencionalnim antimikrobnim supstancama, što direktno ugrožava koncepte liječenja i biosigurnosti mliječnih stada. Rana i precizna laboratorijska verifikacija uzročnika bolesti predstavlja primarnu mjeru u zaštiti zdravlja potrošača. Kontrola širenja otpornih izolata zahtijeva sistemsku racionalizaciju upotrebe postojećih lijekova, uvođenje novih imunoprofilaktičkih mjera (vakcina) te implementaciju inovativnih, prirodnih i neškodljivih alternativnih tretmana. Integracija ovih mjera u primarnu proizvodnju esencijalna je za eliminaciju bioloških opasnosti i postizanje vrhunskih standarda čistoće i sigurnosti koje zahtijeva savremeno halal i tayyib tržište.

**Ključne riječi:** *Alimentarne intoksikacije, biološka sigurnost hrane, mecA genotipizacija, meticilin-rezistentni Staphylococcus aureus, preventivna imunoprofilaksa, termostabilni enterotoksini.*



## **CHAPTER 2**

### **POGLAVLJE 2**



## **HALAL CERTIFICATION, ACCREDITATION AND GOVERNANCE**

Halal certificiranje, akreditacija i upravljanje procesima

[www.congress.halal.ba](http://www.congress.halal.ba)



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**ADVANTAGES OF SMIIC STANDARD IN ACCREDITATION OF  
HALAL CERIFICATION BODIES IN PAKISTAN**

**Ateeq-Ur-Rehman Memon**

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**ABSTRACT**

The rapid expansion of the global halal market has intensified the need for a globally accepted harmonized quality infrastructure in Halal to ensure consumer confidence, regulatory compliance, and international trade facilitation. The halal accreditation, a reliable mechanism that validates the competence, impartiality, and consistency of halal certification bodies (HCBs). The adoption of SMIIC (Standards and Metrology Institute of Islamic Countries) standards for Halal certification is gaining momentum globally. In Pakistan, implementing SMIIC standards can significantly enhance the accreditation of Halal Certification Bodies (HCBs). This paper highlights the advantages of SMIIC standards in accrediting Halal CBs in Pakistan, including improved credibility, increased international recognition, and enhanced consumer trust. Aligning with SMIIC standards can also facilitate trade, promote Pakistan's Halal industry globally, and increase export opportunities. Furthermore, SMIIC standards ensure compliance with Shariah principles, strengthening the integrity of Halal certification processes. This alignment can position Pakistan as a key player in the global Halal market, boosting economic growth and industry development. Further, the International Forum for Halal Accreditation Bodies (IFHAB), and The Organization of Islamic Cooperation (OIC), contribute to the harmonization of halal practices and support mutual recognition arrangements (MRA). It further analyzes the impact of accreditation on trade facilitation, particularly in reducing technical barriers (TBT) and promotion cross-border acceptance of halal-certified products by certified HCBs.

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**Keywords:** *SMIIC, IFHAB, OIC, MRA, HCB, TBT*

## **PREDNOSTI SMIIC STANDARDA U AKREDITACIJI HALAL CERTIFIKACIJSKIH TIJELA U PAKISTANU**

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### **SAŽETAK**

Brzi rast globalnog halal tržišta pojačao je potrebu za globalno prihvaćenom i usklađenom infrastrukturom kvaliteta u halal sektoru, kako bi se osigurali povjerenje potrošača, regulatorna usklađenost i olakšavanje međunarodne trgovine. Halal akreditacija predstavlja pouzdan mehanizam koji potvrđuje kompetentnost, nepristrasnost i dosljednost tijela za halal certificiranje (HCB – Halal Certification Bodies). Primjena SMIIC standarda (Institut za standardizaciju i metrologiju islamskih zemalja) za halal certificiranje dobija sve veći globalni značaj. U Pakistanu, implementacija SMIIC standarda može značajno unaprijediti akreditaciju halal certifikacijskih tijela. Ovaj rad ističe prednosti SMIIC standarda u akreditaciji HCB-ova u Pakistanu, uključujući veću kredibilnost, povećano međunarodno priznanje i jačanje povjerenja potrošača. Usklađivanje sa SMIIC standardima također može olakšati trgovinu, unaprijediti halal industriju Pakistana na globalnom nivou i povećati izvozne mogućnosti. Nadalje, SMIIC standardi osiguravaju usklađenost sa šerijatskim principima, čime se jača integritet procesa halal certificiranja. Ovakvo usklađivanje može pozicionirati Pakistan kao ključnog aktera na globalnom halal tržištu, doprinoseći ekonomskom rastu i razvoju industrije. Pored toga, Međunarodni forum za halal akreditacijska tijela (IFHAB) i Organizacija islamske saradnje (OIC) doprinose harmonizaciji halal praksi i podržavaju sporazume o međusobnom priznavanju (MRA). Rad dalje analizira uticaj akreditacije na olakšavanje trgovine, posebno u smanjenju tehničkih barijera u trgovini (TBT) i promociji prekograničnog prihvatanja halal certificiranih proizvoda od strane akreditovanih HCB-ova.

**Ključne riječi:** *SMIIC, IFHAB, OIC, MRA, HCB, TBT*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**IMPROVING ANIMAL WELFARE COMPLIANCE THROUGH  
A HOLISTIC HALAL CERTIFICATION APPROACH**

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**ABSTRACT**

The importance of animal welfare in Islam cannot be underestimated. The Quran and Hadith lay down strong foundations for Muslims to protect the welfare of all animals from all stages of farming, during transport and slaughter. However, most Halal certification bodies (HCBs) only focus on the point of slaughter while ignoring welfare aspects of farming and events leading to slaughter. Farming practices such as feeding, castration, debeaking, catching (poultry), loading and transportation can all impact the welfare of animals. In the worse-case, animals may die due to poor welfare, this demonstrates the ultimate compromise of their welfare. Aside from the psycho-physiological impact on animals, poor welfare can cause the production of Pale Soft Exudative (PSE) and Dark Firm Dry (DFD) meats which can cause significant financial losses to the meat industry. Both PSE and DFD meats do not appeal to consumers aesthetically, and they also have poor binding qualities, hence not suitable for further processing. This paper highlights different stages of meat production where HCBs need to pay particular attention to protect animal welfare and product quality. Emphasis will be put on standardisation, certification and auditing skills. The author will suggest ways HCBs and governments of Muslim-majority countries can adopt strategies aimed at improving auditing with a view to improving animal welfare and the reputation of the Halal sector.

**Keywords:** *Animal Welfare; Meat Quality; Halal Certification; Muslims; Profit*

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## UNAPREĐENJE USKLAĐENOSTI DOBROBITI ŽIVOTINJA KROZ HOLISTIČKI PRISTUP HALAL CERTIFICIRANJA

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### SAŽETAK

Važnost dobrobiti životinja u islamu ne može se potcijeniti. Kur'an i hadisi postavljaju čvrste temelje koji obavezuju muslimane da štite dobrobit životinja u svim fazama – od uzgoja, preko transporta, pa sve do klanja. Međutim, većina tijela za halal certificiranje (HCB) fokusira se isključivo na trenutak klanja, zanemarujući aspekte dobrobiti životinja u fazama uzgoja i procesa koji prethode klanju. Poljoprivredne prakse poput hranjenja, kastracije, uklanjanja kljuna kod peradi (debeaking), hvatanja (kod peradi), utovara i transporta mogu značajno uticati na dobrobit životinja. U najgorim slučajevima, životinje mogu uginuti zbog loših uslova dobrobiti, što predstavlja krajnji oblik narušavanja njihove zaštite. Osim fiziološko-psihološkog uticaja na životinje, loša dobrobit može dovesti do pojave mesa blijedo-mekano-vodenaste strukture (PSE) i tamno-čvrsto-suvog mesa (DFD), što uzrokuje značajne finansijske gubitke u mesnoj industriji. Ovi oblici mesa nisu privlačni potrošačima, a imaju i loša svojstva vezivanja, te stoga nisu pogodni za dalju preradu. Ovaj rad ističe različite faze proizvodnje mesa u kojima tijela za halal certificiranje trebaju posvetiti posebnu pažnju zaštiti dobrobiti životinja i kvaliteti proizvoda. Naglasak se stavlja na standardizaciju, certificiranje i unapređenje vještina audita (revizije). Autor predlaže načine na koje HCB-ovi i vlade u muslimanskim zemljama mogu usvojiti strategije za unapređenje sistema audita s ciljem poboljšanja dobrobiti životinja i jačanja reputacije halal sektora.

**Ključne riječi:** *dobrobit životinja, kvalitet mesa, halal certificiranje, muslimani, profit.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**A PRACTICAL MODEL FOR HALAL SLAUGHTERING DEMONSTRATION AND RESEARCH: DESIGN SPECIFICATION OF A HEAVY-DUTY CABIN FACILITY**

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**ABSTRACT**

Training and research in halal slaughtering can face a practical limitation. Many institutions do not have controlled and specialised facilities for hands on demonstrations that meet monitored halal compliance, hygiene, and animal welfare standards. This article describes a compact and robust cabin facility designed as an in-house halal chicken slaughtering platform for training, applied research, demonstrations, and capacity building. The concept responds to an institutional gap because conventional halal slaughter training is often theoretical or dependent on external premises and location. This limits standardisation, repeatability, and compliance monitoring. The paper presents the functional design objectives, the spatial workflow and segregation logic, the specification of core equipment and utilities, the provisions for hygiene, sanitation, and waste management, and a preliminary cost structure for implementation. The facility is based on a 6 meter by 3 meters by 2.8-meter cabin with planned zones for loading, slaughtering, bleeding, defeathering, and evisceration. It is supported by plumbing, drainage, cleaning systems, and basic thermal comfort. The proposed model offers a scalable reference unit for university-based halal training, competency assessment, collaborative research, and industry engagement, while strengthening traceable compliance practice in a controlled setting. The design also supports future expansion and modular upgrades, including improved separation between clean and non-clean areas and enhanced data collection for research on halal critical control points.

**Keywords:** *Halal slaughtering, Poultry, Facility Design, Training, Halal Critical Control Points.*

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# PRAKTIČNI MODEL ZA DEMONSTRACIJU I ISTRAŽIVANJE HALAL KLANJA: SPECIFIKACIJA DIZAJNA ROBUSNOG KABINSKOG OB- JEKTA

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## SAŽETAK

Obuka i istraživanje u oblasti halal klanja mogu se suočiti s praktičnim ograničenjima. Mnoge institucije nemaju kontrolisane i specijalizirane objekte za praktične demonstracije koje ispunjavaju zahtjeve nadzirane halal usklađenosti, higijene i standarda dobrobiti životinja. Ovaj članak opisuje kompaktnu i robusnu kabinsku jedinicu, dizajniranu kao interna platforma za halal klanje pilića, namijenjenu obuci, primijenjenim istraživanjima, demonstracijama i izgradnji kapaciteta. Koncept odgovara na institucionalni nedostatak, jer je konvencionalna obuka za halal klanje često teorijska ili zavisi od vanjskih prostora i lokacija. To ograničava standardizaciju, ponovljivost procesa i praćenje usklađenosti. Rad predstavlja funkcionalne ciljeve dizajna, prostorni tok rada i logiku razdvajanja zona, specifikaciju ključne opreme i komunalnih instalacija, mjere za higijenu, sanitaciju i upravljanje otpadom, kao i preliminarnu strukturu troškova implementacije. Objekat je zasnovan na kabini dimenzija 6 metara x 3 metra x 2,8 metara, sa planiranim zonama za utovar, klanje, iskrvarenje, čerupanje perja i evisceraciju (vađenje unutrašnjih organa). Podržan je vodovodnim instalacijama, odvodnjom, sistemima za čišćenje i osnovnim rješenjima za termalni komfor. Predloženi model nudi skalabilnu referentnu jedinicu za univerzitetsku halal obuku, procjenu kompetencija, zajednička istraživanja i saradnju s industrijom, uz jačanje prakse sljedeće halal usklađenosti u kontrolisanom okruženju. Dizajn također podržava buduće proširenje i modularne nadogradnje, uključujući bolje razdvajanje čistih i nečistih zona te unaprijeđeno prikupljanje podataka za istraživanja halal kritičnih kontrolnih tačaka.

**Ključne riječi:** *Halal klanje, perad, dizajn objekta/postrojenja, obuka, halal kritične kontrolne tačke*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HALAL CERTIFICATION AND THE CHALLENGES FACING IT**

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**ABSTRACT**

Halal certification is a critical mechanism that ensures products meet the dietary, health, and Halal standards. It plays a pivotal role in fostering consumer trust within Muslim communities worldwide. With the growing Muslim population and rising awareness of Halal products, the demand for certified Halal goods has surged, creating a dynamic global market. Halal certification goes beyond merely complying with religious requirements; it also ensures transparency, quality, and safety across various industries. Numerous governmental and private organizations are working to develop and enforce Halal certification standards, addressing the increasing demand from Muslim consumers. However, despite significant advancements, the certification process still faces several challenges. These include the absence of standardized global regulations, difficulties in verifying production processes and concerns about transparency and accountability. This paper aims to provide valuable insights for policy makers, stakeholders (including Halal food producers, suppliers, regulators and consumers) and global trade participants about the efforts to promote Halal certification. It highlights the key challenges these initiatives face and examines the broader implications for global trade and consumer confidence.

**Keywords:** *Halal Certification, Stakeholders in Halal Industry, Standardization, Certification Challenges, Consumer Trust.*

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## HALAL CERTIFICIRANJE I IZAZOVI S KOJIMA SE SUOČAVA

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### SAŽETAK

Halal certificiranje je ključni mehanizam koji osigurava da proizvodi ispunjavaju prehrambene, zdravstvene i halal standarde. Ono igra presudnu ulogu u jačanju povjerenja potrošača u muslimanskim zajednicama širom svijeta. Sa rastućom muslimanskom populacijom i sve većom svijesću o halal proizvodima, potražnja za certificiranom halal robom značajno je porasla, stvarajući dinamično globalno tržište. Halal certificiranje ne podrazumijeva samo poštivanje vjerskih zahtjeva; ono također osigurava transparentnost, kvalitet i sigurnost u različitim industrijama. Brojne vladine i privatne organizacije rade na razvoju i primjeni standarda halal certificiranja, odgovarajući na rastuću potražnju muslimanskih potrošača. Međutim, uprkos značajnom napretku, proces certificiranja i dalje se suočava s nizom izazova. To uključuje nedostatak standardizovanih globalnih propisa, poteškoće u provjeri proizvodnih procesa, te zabrinutosti u vezi s transparentnošću i odgovornošću. Ovaj rad ima za cilj da pruži korisne uvide kreatorima politika, zainteresiranim stranama (uključujući proizvođače halal hrane, dobavljače, regulatore i potrošače) te učesnicima u globalnoj trgovini o naporima za unapređenje halal certificiranja. Također ističe ključne izazove s kojima se ove inicijative suočavaju i razmatra šire implikacije na globalnu trgovinu i povjerenje potrošača.

**Ključne riječi:** *halal certificiranje, akteri u halal industriji, standardizacija, izazovi certificiranja, povjerenje potrošača.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**DEVELOPING A SECTOR-SPECIFIC HALAL CERTIFICATION  
SCHEME FOR THE FLAVOUR INDUSTRY BASED ON OIC/SMIIC  
STANDARDS**

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**ABSTRACT**

The globalization of food supply chains has significantly increased the complexity of halal assurance, particularly in high-risk industries such as flavour manufacturing, which involve extensive raw materials, diverse ingredient categories, and multi-site production systems. Flavour products comprise a wide range of substances, including natural extracts, synthetic compounds, processing aids, and additives, often sourced from multiple origins, thereby increasing the risk of non-halal contamination. Moreover, the highly interconnected structure of the flavour industry, linking raw material suppliers to multiple downstream sectors such as food, pharmaceuticals, and cosmetics, further complicates the assurance of halal integrity across the supply chain. Variations in halal certification practices across countries have created challenges in ensuring consistency, transparency, and mutual recognition within the global halal ecosystem. This study aims to develop a sector-specific halal certification scheme for the flavour industry by integrating internationally recognized standards, including ISO/IEC 17067, ISO/IEC TR 17026, and OIC/SMIIC standards. A qualitative conceptual framework approach was employed, combining standards analysis, a structured literature review, and expert-based insights derived from professional experience in halal auditing and certification. The proposed scheme comprises fifteen certification stages, encompassing application, evaluation, inspection, certification decision-making, surveillance, and recall mechanisms. The findings identify critical halal control points, including raw material verification, vendor management, production process control, and pork-free facility assurance. Furthermore, the study introduces a structured approach to ingredient traceability and certification consistency within complex supply chain environments. This study contributes to the literature by proposing a sector-specific certification framework that supports the harmonization of halal certification practices, enhances transparency and traceability, and strengthens global halal governance. The proposed framework is particularly relevant for improving halal assurance in complex food industries and facilitating international halal trade.

**Keywords:** *halal certification, halal certification scheme, halal governance, halal supply chain, OIC/SMIIC standards, flavour industry, halal standardization, traceability, halal integrity.*

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## RAZVOJ SEKTORSKI SPECIFIČNE ŠEME HALAL CERTIFICIRANJA ZA INDUSTRIJU AROMA NA OSNOVU OIC/SMIIC STANDARDA

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### SAŽETAK

Globalizacija lanaca snabdijevanja hranom značajno je povećala složenost halal osiguranja, posebno u industrijama visokog rizika kao što je proizvodnja aroma, koje uključuju širok spektar sirovina, različite kategorije sastojaka i višelokacijske proizvodne sisteme. Proizvodi aroma obuhvataju veliki raspon supstanci, uključujući prirodne ekstrakte, sintetička jedinjenja, pomoćna sredstva u procesu proizvodnje i aditive, koji često potiču iz različitih izvora, čime se povećava rizik od nehalal kontaminacije. Osim toga, visoko povezani karakter industrije aroma, koja povezuje dobavljače sirovina sa više nizvodnih sektora kao što su prehrambena, farmaceutska i kozmetička industrija, dodatno otežava osiguranje halal integriteta kroz cijeli lanac snabdijevanja. Razlike u praksama halal certificiranja među državama stvorile su izazove u osiguravanju dosljednosti, transparentnosti i međusobnog priznavanja unutar globalnog halal ekosistema. Ova studija ima za cilj razvoj sektorski specifične šeme halal certificiranja za industriju aroma kroz integraciju međunarodno priznatih standarda, uključujući ISO/IEC 17067, ISO/IEC TR 17026 i OIC/SMIIC standarde. Primijenjen je kvalitativni konceptualni okvir koji kombinuje analizu standarda, strukturirani pregled literature i ekspertske uvide zasnovane na profesionalnom iskustvu u halal auditu i certificiranju. Predložena šema obuhvata petnaest faza certificiranja, uključujući prijavu, evaluaciju, inspekciju, donošenje odluke o certificiranju, nadzor i mehanizme povlačenja proizvoda. Rezultati identifikuju ključne halal kontrolne tačke, uključujući verifikaciju sirovina, upravljanje dobavljačima, kontrolu proizvodnog procesa i osiguranje postrojenja bez prisustva svinjskih derivata. Također, studija uvodi strukturirani pristup sljedivosti sastojaka i dosljednosti certificiranja u složenim lancima snabdijevanja. Ova studija doprinosi literaturi predlaganjem sektorski specifičnog okvira certificiranja koji podržava harmonizaciju halal praksi, unapređuje transparentnost i sljedivost te jača globalno halal upravljanje. Predloženi okvir je posebno relevantan za poboljšanje halal osiguranja u kompleksnim prehrambenim industrijama i olakšavanje međunarodne halal trgovine.

**Ključne riječi:** *halal certificiranje, šema halal certificiranja, halal upravljanje, halal lanac snabdijevanja, OIC/SMIIC standardi, industrija aroma, halal standardizacija, sljedivost, halal integritet.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**PLAIN LANGUAGE IN HALAL STANDARDS: A NEW APPROACH TO  
ENHANCE CLARITY AND COMPLIANCE**

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**ABSTRACT**

The growing global halal industry requires not only strict compliance with religious and technical standards but also effective communication that ensures these standards are clearly understood and correctly implemented by diverse stakeholders. This paper introduces the concept of plain language—as defined by the International Plain Language Federation—into the domain of halal standards, proposing it as a critical yet underexplored dimension of halal governance and assurance. Plain language refers to communication that enables intended audiences to easily find, understand, and use information. While widely applied in regulatory, healthcare, and public service contexts, its integration into halal standardization remains limited. This study argues that the complexity, multilingual nature, and technical structure of existing halal standards may create barriers for stakeholders, including producers, auditors, consumers, and small and medium enterprises, potentially affecting compliance, trust, and market access. By analyzing selected halal standards and certification documents, this paper identifies key communication challenges, including ambiguity, inconsistent terminology, and inaccessible structure. It then proposes a framework for incorporating plain language principles into halal standards without compromising Shariah requirements or technical precision. The framework emphasizes clarity, usability, inclusivity, and accessibility, particularly for non-expert users and individuals with diverse linguistic and cognitive needs. The findings suggest that adopting plain language in halal standards can enhance transparency, improve compliance rates, reduce misinterpretation, and strengthen consumer confidence in halal certification systems. Furthermore, it supports inclusivity and aligns with global movements toward accessible and user-centered regulatory communication. This research contributes to the evolution of halal standardization by positioning plain language as a strategic tool for improving both the effectiveness and ethical integrity of halal communication. It calls for standard-setting bodies, certification agencies, and policymakers to integrate plain language principles into future revisions of halal standards, thereby advancing a more inclusive and globally accessible halal ecosystem.

**Keywords:** *halal standards, plain language, halal certification, transparency, compliance.*

## PRIMJENA JEDNOSTAVNOG JEZIKA U HALAL STANDARDIMA: UNAPREĐENJE RAZUMLJIVOSTI, TRANSPARENTNOSTI I USK- LAĐENOSTI

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### SAŽETAK

Rastuća globalna halal industrija zahtijeva ne samo strogo poštivanje vjerskih i tehničkih standarda, već i efikasnu komunikaciju koja osigurava da se ti standardi jasno razumiju i pravilno primjenjuju od strane različitih aktera. Ovaj rad uvodi koncept jednostavnog i jasnog jezika (plain language) – kako ga definiše Međunarodna federacija za jednostavan jezik (International Plain Language Federation) – u područje halal standarda, te ga predlaže kao važnu, ali nedovoljno istraženu dimenziju halal upravljanja i osiguranja. Jednostavan jezik podrazumijeva komunikaciju koja omogućava ciljnoj publici da lako pronade, razumije i koristi informacije. Iako se ovaj pristup široko primjenjuje u regulatornim sistemima, zdravstvu i javnim službama, njegova integracija u halal standardizaciju je još uvijek ograničena. Ova studija tvrdi da složenost, višejezičnost i tehnička struktura postojećih halal standarda mogu predstavljati prepreke za različite zainteresirane strane, uključujući proizvođače, auditore, potrošače i mala i srednja preduzeća, što može negativno uticati na usklađenost, povjerenje i pristup tržištu. Analizom odabranih halal standarda i certifikacijskih dokumenata, rad identificira ključne komunikacijske izazove, uključujući nejasnoće, nedosljednu terminologiju i teško pristupačnu strukturu. Zatim se predlaže okvir za uvođenje principa jednostavnog jezika u halal standarde, bez narušavanja šerijatskih zahtjeva ili tehničke preciznosti. Okvir naglašava jasnoću, upotrebljivost, inkluzivnost i dostupnost, posebno za korisnike koji nisu stručnjaci i osobe s različitim jezičkim i kognitivnim potrebama. Rezultati ukazuju da primjena principa jednostavnog jezika u halal standardima može povećati transparentnost, poboljšati nivo usklađenosti, smanjiti pogrešna tumačenja i ojačati povjerenje potrošača u halal certifikacijske sisteme. Nadalje, ovaj pristup doprinosi inkluzivnosti i usklađen je s globalnim trendovima ka dostupnoj i korisnički orijentisanoj regulatornoj komunikaciji. Ovo istraživanje doprinosi razvoju halal standardizacije pozicionirajući jednostavan jezik kao strateški alat za unapređenje efikasnosti i etičkog integriteta halal komunikacije. Rad poziva standardizacijska tijela, certifikacijske agencije i donosiocje politika da uključe principe jednostavnog jezika u buduće revizije halal standarda, čime bi se unaprijedio inkluzivniji i globalno dostupniji halal ekosistem.

**Ključne riječi:** *halal standardi, jednostavan jezik, halal certificiranje, transparentnost, usklađenost.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**PREMIUM RAW & PLANT-BASED HALAL PRODUCTS – FROM CON-  
CEPT TO MARKET: BRIDGING HEALTH, QUALITY AND CONSUMER  
TRUST**

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Raw Cakes & Raw Sweets by Mihaela, Đurđevačka ulica 18, Zagreb, Croatia

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**ABSTRACT**

This presentation explores the development of premium raw and plant-based halal products from concept to market, with a focus on quality, transparency, and consumer trust. With over 15 years of experience in the raw and plant-based sector, the author presents a practical case study of building a certified brand that combines organic, halal, and clean-label standards. The talk highlights key challenges in product development, including ingredient sourcing, shelf-life management, certification processes, and maintaining product integrity without artificial additives. Special attention is given to the growing demand for healthier dessert alternatives and the opportunity to position raw, plant-based products within the premium halal market. The presentation also addresses consumer behavior, trust-building through transparency, and the importance of aligning product values with modern lifestyle expectations. By bridging scientific understanding with real-world application, this presentation offers valuable insights for producers, distributors, and stakeholders interested in innovation within the halal food industry.

**Keywords:** *halal products, plant-based nutrition, raw food, certification, consumer trust*

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## **PREMIUM SIROVI I BILJNI HALAL PROIZVODI – OD KONCEPTA DO TRŽIŠTA: POVEZIVANJE ZDRAVLJA, KVALITETA I POVJERENJA POTROŠAČA**

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### **SAŽETAK**

Ova prezentacija istražuje razvoj premium sirovih i biljnih halal proizvoda od koncepta do tržišta, s fokusom na kvalitet, transparentnost i povjerenje potrošača. Sa više od 15 godina iskustva u sektoru sirove i biljne hrane, autor predstavlja praktičnu studiju slučaja izgradnje certificiranog brenda koji kombinuje organske, halal i “clean-label” standarde. Predavanje ističe ključne izazove u razvoju proizvoda, uključujući nabavku sastojaka, upravljanje rokom trajanja, procese certifikacije i održavanje integriteta proizvoda bez umjetnih aditiva. Posebna pažnja posvećena je rastućoj potražnji za zdravijim alternativama deserata i mogućnosti pozicioniranja sirovih i biljnih proizvoda u premium halal tržištu. Prezentacija također obrađuje ponašanje potrošača, izgradnju povjerenja kroz transparentnost i važnost usklađivanja vrijednosti proizvoda s modernim životnim stilovima. Povezujući naučno razumijevanje s praktičnom primjenom, ova prezentacija nudi vrijedne uvide za proizvođače, distributere i dionike zainteresovane za inovacije u halal prehrambenoj industriji.

**Ključne riječi:** *halal proizvodi, biljna ishrana, sirova hrana, certifikacija, povjerenje potrošača*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**DIGITAL TRANSFORMATION OF HALAL COMPLIANCE: A UNIFIED  
WEB-BASED ARCHITECTURE FOR GLOBAL ACCREDITATION VERIFI-  
CATION**

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**ABSTRACT**

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The global Halal ecosystem currently operates under a fragmented regulatory framework, creating significant barriers for the certification body and enterprises. Verifying the accreditation status of Halal Certification Bodies (HCBs) requires navigating multiple independent, non-synchronized digital directories such as Emirates International Accreditation Centre (EIAC), Saudi Food and Drug Authority (SFDA), Jabatan Kemajuan Islam (JAKIM), Badan Penyelenggara Jaminan Produk Halal (BPJPH) and others. This information silo leads to inefficiencies, data entry errors, and challenges in cross-border trade. This study presents a Unified Halal Accreditation Database (UHAD), a web-based application designed to centralize and standardize accreditation information from multiple global sources. UHAD employs a multi-layered architecture: The proposed web application utilizes a multilayered digital architecture: data aggregation: Implementing automated scripts and scrapers to pull real-time data from government portals and directories; data normalization: Transforming varied data formats (HTML, PDF, XLS) into a standardized SQL schema for uniform querying; feature set: A centralized search engine allows users to query by Accreditation Body, Certification Body, and accreditation scope (e.g., slaughtering, food processing, chemicals). Preliminary analysis of the “UHAD” system indicates a reduction in manual verification time. By providing a “single source of truth,” the app reduces human error in compliance checks and facilitates smoother trade between Europe, Asia, the Middle East, and Africa. Digitalization is the essential next step for the global Halal industry. By centralizing fragmented accreditation data into a functional web application, we can harmonize global standards and ensure the integrity of the Halal mark through technological innovation.

**Keywords:** *Halal Tech, Web Architecture, Accreditation Mapping, Trade Facilitation, Digital Transparency, Supply Chain Compliance, Halal Certification*

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## DIGITALNA TRANSFORMACIJA HALAL USKLAĐENOSTI: JEDINSTVENA WEB-BAZIRANA ARHITEKTURA ZA GLOBALNU VERIFIKACIJU AKREDITACIJA

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### SAŽETAK

Globalni halal ekosistem trenutno funkcioniše unutar fragmentiranog regulatornog okvira, što stvara značajne prepreke za certifikacijska tijela i preduzeća. Provjera akreditacijskog statusa halal certifikacijskih tijela (HCBs) zahtijeva navigaciju kroz više nezavisnih, nesinhronizovanih digitalnih direktorija kao što su Emirates International Accreditation Centre (EIAC), Saudi Food and Drug Authority (SFDA), Jabatan Kemajuan Islam (JAKIM), Badan Penyelenggara Jaminan Produk Halal (BPJPH) i drugi. Ovakvi informacioni silosi dovode do neefikasnosti, grešaka pri unosu podataka i poteškoća u prekograničnoj trgovini. Ova studija predstavlja Unified Halal Accreditation Database (UHAD), web-baziranu aplikaciju dizajniranu da centralizira i standardizira akreditacijske informacije iz više globalnih izvora. UHAD koristi višeslojnu arhitekturu: predložena web aplikacija koristi višeslojnu digitalnu arhitekturu: agregacija podataka — implementacija automatizovanih skripti i „scrapera“ za preuzimanje podataka u realnom vremenu iz vladinih portala i direktorija; normalizacija podataka — transformacija različitih formata podataka (HTML, PDF, XLS) u standardiziranu SQL šemu za jedinstveno pretraživanje; skup funkcionalnosti — centralizirani pretraživač omogućava korisnicima pretragu po akreditacijskom tijelu, certifikacijskom tijelu i opsegu akreditacije (npr. klanje, prerada hrane, hemikalije). Preliminarna analiza UHAD sistema pokazuje smanjenje vremena potrebnog za ručnu verifikaciju. Pružanjem „jedinstvenog izvora istine“, aplikacija smanjuje ljudske greške u provjeri usklađenosti i olakšava trgovinu između Evrope, Azije, Bliskog istoka i Afrike. Digitalizacija je sljedeći ključni korak za globalnu halal industriju. Centralizacijom fragmentiranih akreditacijskih podataka u funkcionalnu web aplikaciju moguće je harmonizirati globalne standarde i osigurati integritet halal oznake kroz tehnološke inovacije.

**Ključne riječi:** *halal tehnologija, web arhitektura, mapiranje akreditacija, olakšavanje trgovine, digitalna transparentnost, usklađenost lanca snabdijevanja, halal certifikacija*

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## BOOK OF ABSTRACTS AND PAPERS FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS

### SUSTAINABLE DIGITAL TRACEABILITY FOR HALAL FOOD SAFETY AND SUPPLY-CHAIN RESILIENCES

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#### ABSTRACT

Traceability remains the foundation of halal food assurance, ensuring product integrity from source to consumer. However, existing systems often lack environmental accountability, data interoperability and resilience under disruption within certification and audit processes. This study introduces a Sustainable Digital Traceability Framework (SDTF) integrating blockchainsecured ledgers, IoT-based monitoring and green data lifecycle assessment to support transparent and low-carbon halal verification. The framework connects halal compliance with sustainability performance by embedding measurable indicators such as data-energy intensity, carbon impact and device lifecycle efficiency within traceability systems. A mixed-method approach incorporating multi-node and multi-layer supply chain simulations across poultry, meat-processing and ready-to-eat food sectors indicates potential reductions in verification costs (~20%) and energy use (15–20%), alongside improvements in data integrity and auditability. The SDTF enables certification bodies, regulators and manufacturers to implement scalable and interoperable traceability systems that strengthen halal assurance, enhance transparency and support ESG-aligned reporting. Future work will extend validation through collaborative pilots with industry and certification stakeholders. By integrating digital verification with sustainability metrics, the framework supports more resilient, efficient and accountable halal supply chains.

**Keywords:** *Halal food safety, digital traceability, blockchain, sustainability metrics, supply-chain resilience.*

## ODRŽIVA DIGITALNA SLJEDIVOST ZA SIGURNOST HALAL HRANE I OTPORNOST LANCA SNABDIJEVANJA

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### SAŽETAK

Sljedivost i dalje predstavlja temelj osiguranja halal hrane, omogućavajući očuvanje integriteta proizvoda od izvora do potrošača. Međutim, postojeći sistemi često nemaju adekvatnu ekološku odgovornost, interoperabilnost podataka i otpornost na poremećaje u okviru procesa certificiranja i auditiranja. Ova studija predstavlja Održivi digitalni okvir sljedivosti (SDTF), koji integriše blockchain-zaštićene registre, IoT-bazirani monitoring i zelenu procjenu životnog ciklusa podataka kako bi podržao transparentnu i niskougljičnu halal verifikaciju. Okvir povezuje halal usklađenost sa rezultatima održivosti kroz ugradnju mjerljivih indikatora, poput intenziteta energije potrebne za obradu podataka, ugljičnog otiska i efikasnosti životnog ciklusa uređaja unutar sistema sljedivosti. Mješoviti metodološki pristup, koji uključuje simulacije višestrukih čvorova i višeslojnih lanaca snabdijevanja u sektorima peradarstva, prerade mesa i gotove hrane, ukazuje na moguće smanjenje troškova verifikacije (~20%) i potrošnje energije (15–20%), uz istovremeno poboljšanje integriteta podataka i mogućnosti auditiranja. SDTF omogućava certifikacijskim tijelima, regulatorima i proizvođačima da implementiraju skalabilne i interoperabilne sisteme sljedivosti koji jačaju halal osiguranje, povećavaju transparentnost i podržavaju izvještavanje usklađeno s ESG principima. Budući rad će proširiti validaciju kroz zajedničke pilot-projekte sa industrijom i relevantnim certifikacijskim akterima. Integracijom digitalne verifikacije sa metrikama održivosti, okvir podržava otpornije, efikasnije i odgovornije halal lance snabdijevanja.

**Ključne riječi:** *sigurnost halal hrane, digitalna sljedivost, blockchain, metrike održivosti, otpornost lanca snabdijevanja.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**APPLICATION OF ARTIFICIAL INTELLIGENCE IN HALAL CERTIFICATION: OPPORTUNITIES, CHALLENGES, AND PRACTICAL USE CASES**

**Almir Halilčević<sup>1</sup>, Midhat Jahić<sup>2</sup>, Benjamin Muhamedbegović<sup>2</sup>, Damir Alihodžić<sup>3</sup>**

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**ABSTRACT**

Artificial intelligence (AI) is transforming industries by improving efficiency, reducing the need for manual labor, and enabling faster and higher-quality decision-making. This shift is increasingly affecting the halal ecosystem as well. As halal certification becomes more global, documentation-intensive, and operationally complex, there is a growing need to modernize certification processes and enhance compliance management. The aim of this paper is to analyze how artificial intelligence can support halal certification from a practical business perspective and to identify areas in which AI can contribute to improving process efficiency and transparency. The paper is based on a review and conceptual approach, focusing on the application of technologies such as machine learning, natural language processing, intelligent document processing, and computer vision. It examines the potential use of these technologies in key certification activities, including reviewing large volumes of documentation, verifying application consistency, identifying missing information, preparing for audits, and improving traceability and transparency. The analysis indicates that the application of AI can significantly reduce the administrative burden on certification bodies and accelerate workflows. At the same time, it enables manufacturers and other industry participants to manage information more effectively, better prepare for certification, and implement more scalable compliance processes. This contributes to the development of a more flexible and reliable certification system capable of responding to the increasing complexity of the global halal market. However, the implementation of AI also introduces certain challenges, including issues related to data reliability, system transparency, and alignment with existing regulatory and halal standards. In this context, AI should not be viewed as a replacement for existing governance structures, but rather as a tool that can further strengthen and enhance them. Artificial intelligence represents significant potential for improving halal certification by increasing efficiency, transparency, and scalability. Its proper implementation can contribute to the development of a more modern and resilient halal quality assurance system. This analysis offers a forward-looking perspective and highlights the importance of a strategic approach to integrating AI solutions into the halal certification framework.

**Keywords:** *artificial intelligence, halal certification, practical application*

# PRIMJENA VJEŠTAČKE INTELIGENCIJE U HALAL CERTIFIKACIJI: MOGUĆNOSTI, IZAZOVI I PRAKTIČNI SLUČAJEVI UPOTREBE

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## SAŽETAK

Umjetna inteligencija (AI) transformira industrije unapređujući učinkovitost, smanjujući potrebu za ručnim radom i omogućujući brže i kvalitetnije donošenje odluka. Ova promjena sve više utječe i na halal ekosustav. Kako halal certifikacija postaje globalnija, dokumentacijski zahtjevnija i operativno složenija, javlja se potreba za modernizacijom certifikacijskih procesa i unapređenjem upravljanja usklađenošću. Cilj ovog rada je analizirati kako umjetna inteligencija može podržati halal certifikaciju iz praktične poslovne perspektive te identificirati područja u kojima AI može doprinijeti povećanju učinkovitosti i transparentnosti procesa. Rad se temelji na preglednom i konceptualnom pristupu, s fokusom na primjenu tehnologija poput strojnog učenja, obrade prirodnog jezika, inteligentne obrade dokumenata i računalnog vida. Analiziraju se potencijalne primjene ovih tehnologija u ključnim certifikacijskim aktivnostima, uključujući pregled velikih količina dokumentacije, provjeru konzistentnosti prijave, identifikaciju nedostajućih informacija, pripremu za audite te unapređenje sljedivosti i transparentnosti. Analiza ukazuje da primjena AI-a može značajno smanjiti administrativno opterećenje certifikacijskih tijela i ubrzati radne procese. Istovremeno, proizvođačima i drugim sudionicima u industriji omogućava učinkovitije upravljanje informacijama, bolju pripremu za certifikaciju i skalabilnije procese usklađenosti. Time se doprinosi stvaranju fleksibilnijeg i pouzdanijeg certifikacijskog sustava koji može odgovoriti na rastuću složenost globalnog halal tržišta. Međutim, implementacija AI-a otvara i određene izazove, uključujući pitanja pouzdanosti podataka, transparentnosti sustava te usklađenosti s postojećim regulatornim i halal standardima. U tom kontekstu, AI se ne treba posmatrati kao zamjena za postojeće upravljačke strukture, već kao alat koji ih može dodatno ojačati i unaprijediti. Umjetna inteligencija predstavlja značajan potencijal za unapređenje halal certifikacije kroz povećanje učinkovitosti, transparentnosti i skalabilnosti procesa. Njena pravilna implementacija može doprinijeti razvoju modernijeg i otpornijeg halal sustava osiguranja kvalitete. Ova analiza pruža perspektivu usmjerenu prema budućnosti i naglašava važnost strateškog pristupa u integraciji AI rješenja u halal certifikacijski okvir.

**Ključne riječi:** *umjetna inteligencija, halal certifikacija, praktična primjena*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**FROM THE WISDOM OF BAGHDAD TO THE HALAL TABLE: THE  
FORGOTTEN SCIENTIFIC HERITAGE OF ISLAMIC CIVILIZATION**

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**ABSTRACT**

Between the 8th and 14th centuries, the Islamic world produced not merely the preservation of ancient learning, but its systematic deepening — and the creation of original scientific disciplines that later became foundations of European Renaissance science. This contribution is largely forgotten in Bosnian and broader European public discourse, despite being thoroughly reconstructed by historians of science since the 1970s (Saliba, Huff, al-Khalili, and others). This presentation surveys the legacy through key figures: Ibn al-Haytham (965–1040), whose *Book of Optics* established the experimental scientific method six centuries before Galileo; Al-Khwarizmi (780–850), whose name and work gave us the words “algorithm” and “algebra”; Al-Biruni (973–1048), who in 1018 measured the Earth’s radius within 1% accuracy; Ibn Sina, Avicenna (980–1037), whose *Canon of Medicine* remained a standard European university textbook for six centuries; and Jabir ibn Hayyan, who systematized chemistry’s laboratory methods. The connection to halal food is direct and substantive: Ibn al-Awwam’s twelfth-century *Kitab al-Filaha* codified agronomy with over 580 plant species; Ibn Sina’s nutritional treatise integrated diet into medicine; Jabir’s distillation underlies food preservation and aromatic essence production. The legal structure of halal jurisprudence developed in parallel with this scientific exactitude — within the same intellectual tradition. Two contemporary touchstones frame the talk: Carly Fiorina’s notable 2001 Minneapolis speech, delivered two weeks after September 11, in which the then-CEO of Hewlett-Packard explicitly credited Islamic mathematicians with “creating the algebra and algorithms that would enable the building of computers and the creation of encryption”; and the 2006 *Nature* paper by Reibold, Paufler and colleagues at the Technical University of Dresden, who identified multi-walled carbon nanotubes in a seventeenth-century Damascus sabre — empirical mastery that preceded theoretical understanding by 1,300 years. The presentation closes with the Bosnian context: Sarajevo as a node, not periphery, in this transmission of knowledge — with reference to the Gazi Husrev-bey Library and the catastrophic 1992 loss at the Vijećnica.

**Keywords:** *islamic golden age, history of science, Ibn al-Haytham, Al-Khwarizmi, Avicenna, halal food, agronomy, nutrition, Damascus steel, Bosnia, transmission of knowledge*

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## OD BAGDADSKE MUDROSTI DO HALAL SOFRE: ZABORAVLJENO NAUČNO NASLIJEĐE ISLAMSKE CIVILIZACIJE

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### SAŽETAK

Između 8. i 14. stoljeća islamski svijet nije samo sačuvala antičko znanje, već ga je sistematski produbio — te razvio originalne naučne discipline koje su kasnije postale temelj nauke evropske renesanse. Ovaj doprinos je u velikoj mjeri zaboravljen u bosanskom i širem evropskom javnom diskursu, iako su ga historičari nauke detaljno rekonstruisali još od 1970-ih godina (Saliba, Huff, al-Khalili i drugi). Ova prezentacija daje pregled tog naslijeđa kroz ključne ličnosti: Ibn al-Haythama (965–1040), čija je Knjiga o optici uspostavila eksperimentalnu naučnu metodu šest stoljeća prije Galilea; Al-Khwarizmija (780–850), čije su ime i djelo dali svijetu pojmove „algoritam“ i „algebra“; Al-Birunija (973–1048), koji je 1018. godine izmjerio Zemljin poluprečnik s tačnošću unutar 1%; Ibn Sinu, Avicennu (980–1037), čiji je Kanon medicine ostao standardni univerzitetski udžbenik u Evropi šest stoljeća; te Džabira ibn Hajjana, koji je sistematizirao laboratorijske metode hemije. Veza sa halal hranom je direktna i suštinska: Ibn al-Awwamova Kitab al-Filaha iz 12. stoljeća kodificirala je agronomiju s opisom više od 580 biljnih vrsta; Ibn Sinina nutritivna rasprava integrisala je prehranu u medicinu; a Džabirove metode destilacije predstavljaju osnovu očuvanja hrane i proizvodnje aromatičnih esencija. Pravna struktura halal jurisprudencije razvijala se paralelno s ovom naučnom preciznošću — unutar iste intelektualne tradicije. Dva savremena primjera dodatno uokviruju temu: poznati govor Carly Fiorine iz 2001. godine u Minneapolisu, održan dvije sedmice nakon 11. septembra, u kojem je tadašnja direktorica Hewlett-Packarda izričito istakla da su islamski matematičari „stvorili algebru i algoritme koji su omogućili izgradnju računara i razvoj enkripcije“; te rad objavljen u časopisu Nature 2006. godine autora Reibolda, Pauflera i kolega sa Tehničkog univerziteta u Dresdenu, u kojem su identificirane višeslojne ugljenične nano-cijevi u sablji iz 17. stoljeća iz Damaska — dokaz empirijskog majstorstva koje je prethodilo teorijskom razumijevanju za 1.300 godina. Prezentacija se završava bosanskim kontekstom: Sarajevo kao čvorište, a ne periferija, u prijenosu znanja — uz osvrt na Gazi Husrevbegovu biblioteku i katastrofalni gubitak kulturne baštine tokom uništenja Vijećnice 1992. godine.

**Ključne riječi:** *islamsko zlatno doba, historija nauke, Ibn al-Haytham, Al-Khwarizmi, Avicenna, halal hrana, agronomija, nutricionizam, damask čelik, Bosna, prijenos znanja*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**EVALUATION OF HALAL COMPLIANCE IN MARKET TRANSACTIONS: A CASE STUDY OF CENTRAL MARKET IN MBALE CITY, UGANDA**

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**ABSTRACT**

This research aims to evaluate whether traders and dealers in the central market of Mbale City, Uganda, comply with halal compliance standards. This is important because financial transactions play a significant role in the lives of Muslims. Therefore, Islamic Shariah places great emphasis on regulating commercial activities to ensure justice, transparency, and fairness in all financial dealings and to prevent prohibited practice such as usury, uncertainty and fraud in transactions. The background of the study stems from observing the growth of commercial activities in the Central Market of Mbale City, where various commercial practices exist that may either comply with or violate Shariah rulings. The research problem is represented in the following questions: What are the principles that regulate halal-compliant commercial transactions in the market? What are the most prominent forms of Shariah violations that occur in these commercial transactions? The research aims to answer these questions by identifying the most important Shariah rulings governing commercial transactions and examining the extent to which traders and customers adhere to them in the central market of Mbale city. In addition, it seeks to identify the most common violations occurring in this market. This research offers recommendations that may govern commercial activities in the Central market in Mbale. This research employs both qualitative and quantitative methods to illustrate the rules of commercial transactions that legalize market activities. Data will be collected from traders, dealers and other stakeholders through interviews and questionnaires in order to understand the practical reality of the Central market in Mbale. This research examines the theoretical framework of commercial transactions in markets, the halal-compliant guidelines governing these transactions, and the practical realities of the Central market in Mbale, assessing its conformity and violations from Islamic law. Finally, the study highlights the challenges facing commercial transactions in the central Market of Mbale and proposes possible solutions.

**Keywords:** *Shariah law, Market, Central Market in Mbale City, Uganda*

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## PROCJENA USKLAĐENOSTI S HALAL STANDARDIMA U TRGOVAČKIM TRANSAKCIJAMA: STUDIJA SLUČAJA CENTRALNE PIJACE U GRADU MBALE, UGANDA

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### SAŽETAK

Ovo istraživanje ima za cilj procijeniti da li trgovci i prodavači na Centralnoj pijaci u gradu Mbale, Uganda, posluju u skladu s halal standardima. Ovo je važno jer finansijske transakcije imaju značajnu ulogu u životu muslimana. Stoga islamski šerijat pridaje veliku važnost regulisanju trgovačkih aktivnosti kako bi se osigurali pravda, transparentnost i pravičnost u svim finansijskim poslovima te spriječile zabranjene prakse poput kamate (riba), neizvjesnosti (garar) i prevare u transakcijama. Pozadina istraživanja proizašla je iz zapažanja rasta komercijalnih aktivnosti na Centralnoj pijaci u gradu Mbale, gdje postoje različite trgovačke prakse koje mogu biti u skladu sa šerijatskim propisima ili ih mogu kršiti. Istraživački problem predstavljen je kroz sljedeća pitanja: Koji su principi koji regulišu šerijatski dozvoljene (halal) trgovačke transakcije na tržištu? Koji su najistaknutiji oblici šerijatskih prekršaja koji se pojavljuju u ovim trgovačkim transakcijama? Istraživanje nastoji odgovoriti na ova pitanja identificiranjem najvažnijih šerijatskih propisa koji uređuju trgovačke transakcije te ispitivanjem u kojoj mjeri se trgovci i kupci pridržavaju tih propisa na Centralnoj pijaci u gradu Mbale. Pored toga, cilj je utvrditi najčešće prekršaje koji se javljaju na ovom tržištu. Ovo istraživanje nudi preporuke koje mogu doprinijeti uređenju i regulisanju komercijalnih aktivnosti na Centralnoj pijaci u Mbaleu. Istraživanje koristi i kvalitativne i kvantitativne metode kako bi prikazalo pravila trgovačkih transakcija koja legitimišu tržišne aktivnosti. Podaci će se prikupljati od trgovaca, prodavača i drugih relevantnih aktera putem intervjua i upitnika, kako bi se razumjela stvarna praksa poslovanja na Centralnoj pijaci u Mbaleu. Istraživanje razmatra teorijski okvir trgovačkih transakcija na tržištima, halal smjernice koje regulišu ove transakcije, kao i praktičnu realnost Centralne pijace u Mbaleu, procjenjujući njenu usklađenost ili odstupanja u odnosu na islamsko pravo. Na kraju, studija ističe izazove s kojima se suočavaju trgovačke transakcije na Centralnoj pijaci u Mbaleu i predlaže moguća rješenja.

**Ključne riječi:** *šerijatsko pravo, tržište, Centralna pijaca u Mbale Cityju, Uganda*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**IMPROVING HALAL INTEGRITY IN RAW MATERIAL INTAKE USING  
LEAN SIX SIGMA METHODOLOGY**

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**ABSTRACT**

The global growth of the halal food market is increasing the complexity of ensuring quality, safety, and compliance with halal requirements, particularly in the context of increasingly complex supply chains. Although globalization brings numerous advantages to the food industry, such as greater availability and lower costs of raw materials, it also increases the risks related to maintaining halal integrity, especially during the raw material receiving stage. The traditional implementation of halal requirements is based on risk analysis and enables the systematic identification and management of risks affecting halal compliance. Raw material receiving control represents the first and one of the most important points in preserving halal integrity. However, these systems often insufficiently address process efficiency through analysis, measurement, improvement, and control, as well as the elimination of waste and the enhancement of overall operational performance. The integration of the Lean Six Sigma approach with existing halal control systems provides a basis for developing a more efficient process management model, particularly in the control of haram critical control points. The aim of this paper is to present the results of a project focused on optimizing the control process of haram critical control points (HrACCP) during incoming raw material control at IFFCO Velvet d.o.o., through the integration of Lean principles and Six Sigma methodology. The Lean approach focuses on eliminating waste and improving process flow, while Six Sigma, through the DMAIC methodology (Define–Measure–Analyze–Improve–Control), contributes to reducing variability and supporting data-driven decision-making. The results show that the occurrence of storing products without a valid halal status was eliminated, with zero incidents recorded, as non-compliant raw materials were returned to suppliers already during the initial receiving control stage. The time required to identify halal status was reduced by 10%, while the share of digitally recorded halal statuses increased to 100%, significantly improving the traceability, transparency, and reliability of the halal system. The results confirm that an integrated Lean Six Sigma approach represents an effective framework for strengthening halal integrity while simultaneously improving process efficiency and the control of critical points.

**Keywords:** *Lean Six Sigma, Halal quality control, Haram Critical Control Points, Raw material intake*

## UNAPREĐENJE HALAL INTEGRITETA U PROCESU PRIJEMA SIROVINA PRIMJENOM LEAN SIX SIGMA METODOLOGIJE

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### SAŽETAK

Globalni rast halal tržišta hrane povećava složenost osiguravanja kvaliteta, sigurnosti i usklađenosti sa halal zahtjevima, posebno u kontekstu sve kompleksnijih lanaca snabdijevanja. Iako globalizacija donosi brojne prednosti prehrambenoj industriji, poput veće dostupnosti i nižih troškova sirovina, ona istovremeno povećava rizike povezane s očuvanjem halal integriteta, naročito tokom faze prijema sirovina. Tradicionalna implementacija halal zahtjeva zasniva se na analizi rizika i omogućava sistematsku identifikaciju i upravljanje rizicima koji utiču na halal usklađenost. Kontrola prijema sirovina predstavlja prvu i jednu od najvažnijih tačaka u očuvanju halal integriteta. Međutim, ovi sistemi često nedovoljno obrađuju efikasnost procesa kroz analizu, mjerenje, unapređenje i kontrolu, kao i eliminaciju rasipanja i poboljšanje ukupnih operativnih performansi. Integracija pristupa Lean Six Sigma sa postojećim sistemima halal kontrole pruža osnovu za razvoj efikasnijeg modela upravljanja procesima, posebno u kontroli haram kritičnih kontrolnih tačaka. Cilj ovog rada je prikazati rezultate projekta usmjerenog na optimizaciju procesa kontrole haram kritičnih kontrolnih tačaka (HrACCP) tokom kontrole ulaznih sirovina u kompaniji IFFCO Velvet d.o.o., kroz integraciju Lean principa i Six Sigma metodologije. Lean pristup fokusira se na eliminaciju rasipanja i poboljšanje toka procesa, dok Six Sigma, kroz DMAIC metodologiju (Definisanje–Mjerenje–Analiza–Unapređenje–Kontrola), doprinosi smanjenju varijabilnosti i podržava donošenje odluka zasnovanih na podacima. Rezultati pokazuju da je pojava skladištenja proizvoda bez važećeg halal statusa eliminisana, uz zabilježenih nula incidenata, jer su neusklađene sirovine vraćene dobavljačima već tokom početne kontrole prijema. Vrijeme potrebno za identifikaciju halal statusa smanjeno je za 10%, dok je udio digitalno evidentiranih halal statusa povećan na 100%, čime su značajno unaprijeđeni sljedivost, transparentnost i pouzdanost halal sistema. Rezultati potvrđuju da integrisani Lean Six Sigma pristup predstavlja efikasan okvir za jačanje halal integriteta, uz istovremeno unapređenje efikasnosti procesa i kontrole kritičnih tačaka.

**Ključne riječi:** *Lean Six Sigma, halal kontrola kvaliteta, haram kritične kontrolne tačke, prijem sirovina*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**APPLICATION OF ALLICIN IN ACCORDANCE WITH HALAL AND  
TAYYIB PRINCIPLES: INFLUENCE ON ASCITES SYNDROME AND AN-  
GIOTENSIN II TYPE 1 RECEPTOR GENE EXPRESSION IN BROILERS  
REARED IN THE MEXICAN HIGHLANDS**

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**ABSTRACT**

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Ascites syndrome (AS) represents a critical, deadly condition in fast-growing broilers caused by pulmonary hypertension, which directly compromises animal welfare and violates the ethical principles of humane rearing. Given that the angiotensin II type 1 receptor (ATR1) is a key mediator in the pathogenesis of this condition, this study focused on evaluating the effects of allicin (ALLI), a natural garlic derivative, as a Tayyib alternative for alleviating ascites symptoms and signs. The aims of this work included investigating the influence of ALLI on AS traits, including hematocrit content (Hct%), blood oxygen saturation (SaO<sub>2</sub>), and the right-to-total ventricular weight ratio (RV:TV), alongside assessing the gene expression of the angiotensin II type 1 receptor (ATR1) in the lungs, heart, and liver. The research was conducted on male Ross 308 broilers divided into three groups: a control group (0-ALLI) and two treated groups (1 mg/kg and 2.5 mg/kg of allicin) administered via the oral-esophageal route from 14 to 27 days of age under the hypoxic conditions of the Mexican highlands. The results showed that the 2.5 mg/kg dose of ALLI significantly reduced Hct% values and right ventricular hypertrophy (RV:TV), thereby reducing physiological stress and cardiomyopathy in the birds. ATR1 expression was upregulated in the lungs and hearts of the treated

groups, and in silico studies confirmed the ability of ALLI to interact with the broiler ATR1 receptor. Importantly, the application of ALLI provided 4.3% protection against AS-related mortality without negatively affecting productive performance, confirming that ALLI, as a natural phytogetic additive, represents a scientifically grounded solution for enhancing the Halal poultry production chain while maintaining high standards of animal welfare.

**Keywords:** *Cardiomyopathy, Gene expression, Halal production, Hemodynamic parameters, Natural growth promoters, Phytogetic additives, Poultry welfare, Tayyib rearing.*

## **PRIMJENA ALICINA U SKLADU SA HALAL I TAYYIB PRINCIPIMA: UTJECAJ NA ASCITES SINDROM I EKSPRESIJU GENA RECEPTORA ANGIOTENZINA II TIP 1 KOD BROJLERA UZGOJENIH NA MEKSIČKIM VISORAVNIMA**

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### **SAŽETAK**

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Ascites sindrom (AS) predstavlja kritično, smrtonosno stanje kod brzorastućih brojlera uzrokovano plućnom hipertenzijom, što direktno narušava dobrobit životinja i narušava etičke principe humanog uzgoja. S obzirom na to da je receptor angiotenzina II tipa 1 (ATR1) ključni medijator u patogenezi ovog stanja, ovo istraživanje fokusiralo se na evaluaciju efekata alicina (ALLI), prirodnog derivata bijelog luka, kao Tayyib alternative za ublažavanje simptoma i znakova ascitesa. Ciljevi rada obuhvatili su ispitivanje utjecaja ALLI na parameter AS, uključujući sadržaj hematokrita (Hct%), zasićenost krvi kisikom (SaO<sub>2</sub>) i odnos težine desne komore prema ukupnoj težini komora (RV:TV), uz procjenu ekspresije gena receptora angiotenzina II tipa 1 (ATR1) u plućima, srcu i jetri. Istraživanje je sprovedeno na mužjacima Ross 308 brojlera podijeljenim u tri grupe: kontrolnu (0-ALLI) i dvije tretirane grupe (1 mg/kg i 2,5 mg/kg ALLI) koje su primale tretman oralno-ezofagealnim putem

od 14. do 27. dana starosti u uslovima hipoksije meksičkih visoravni. Rezultati su pokazali da je doza od 2,5 mg/kg ALLI značajno smanjila vrijednosti Hct% i hipertrofiju desne komore (RV:TV), čime je smanjen fiziološki stres i kardiomiopatija kod ptica. Ekspresija ATR1 bila je povišena u plućima i srcu tretiranih grupa, a in silico studije su potvrdile sposobnost ALLI da stupi u interakciju sa ATR1 receptorom brojlera. Važno je istaći da je primjena ALLI pružila zaštitu od 4,3% protiv mortaliteta uzrokovanog AS-om bez negativnog utjecaja na proizvodne performanse, što potvrđuje da alicin, kao prirodni fitogeni aditiv, predstavlja naučno utemeljeno rješenje za unapređenje Halal lanca proizvodnje peradi uz visoke standarde dobrobiti životinja.

**Ključne riječi:** *Dobrobit peradi, Fitogeni aditivi, Genetska ekspresija, Halal proizvodnja, Hemodinamski parametri, Kardiomiopatija, Prirodni stimulatori rasta, Tayyib uzgoj.*



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**ANTIMICROBIAL RESISTANCE DYNAMICS OF CAMPYLOBACTER  
SPECIES: THE IMPACT OF ENVIRONMENTAL RESERVOIRS ON THE  
INTEGRITY OF THE HALAL FOOD CHAIN**

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**ABSTRACT**

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Antimicrobial resistance in *Campylobacter jejuni* and *Campylobacter coli* represents a critical challenge to global food safety and clinical efficacy, directly impacting the integrity of halal standards which mandate that food must be Tayyib, pure, healthy, and ethically acceptable. Although poultry meat is the primary vector of transmission, pathogen control requires a broader approach that extends beyond the farm itself. This paper analyzes *Campylobacter* within a “reservoir paradigm,” investigating how genetic determinants of resistance persist and circulate through various ecological niches such as soil, water, and wildlife, and their subsequent impact on the contamination of the halal food chain. Through a comprehensive review of recent literature and molecular studies, the determinants of resistance were analyzed, with a focus on genomic plasticity that enables the

acquisition of resistance through point mutations and horizontal gene transfer via mobile genetic elements (e.g., the pTet plasmid and erm(B) genes).

The results indicate that ecological reservoirs act as permanent sources of contamination for the halal food chain. The transition to whole-genome sequencing has provided precise resolution, yet the observed discrepancy between genotype and phenotype highlights the necessity for database optimization and the expansion of global genomic repositories to ensure the production of safe and ethically acceptable food. In conclusion, preserving halal integrity in the modern era requires the strict application of a “One Health” approach that integrates genomic surveillance at all stages of production to ensure ultimate consumer safety.

**Keywords:** *Food Safety, Genomics, Molecular Epidemiology, Public Health, Zoonoses*

## DINAMIČNOST ANTIMIKROBNE REZISTENCIJE KOD VRSTA RODA *CAMPYLOBACTER*: UTICAJ EKOLOŠKIH REZERVOARA NA INTEGRITET HALAL LANCA ISHRANE

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### SAŽETAK

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Antimikrobna rezistencija kod *Campylobacter jejuni* i *Campylobacter coli* predstavlja kritičan izazov za globalnu sigurnost hrane i kliničku efikasnost, što direktno utiče na integritet halal standarda koji nalažu da hrana mora biti Tayyib, čista, zdrava i etički prihvatljiva. Iako je meso peradi primarni

vektor prijenosa, kontrola patogena zahtijeva širi pristup koji nadilazi samu farmu. Ovaj rad analizira *Campylobacter* unutar „paradigme rezervoara“, istražujući kako genetički determinanti otpornosti opstaju i cirkulišu kroz različite ekološke niše poput zemljišta, vode i divljih životinja, te kakav je njihov uticaj na kontaminaciju halal lanca ishrane. Sveobuhvatnim pregledom recentne literature i molekularnih studija, analizirani su determinanti rezistencije, s fokusom na genomsku plastičnost koja omogućava sticanje otpornosti putem tačkastih mutacija i horizontalnog prijenosa gena putem mobilnih genetičkih elemenata (na primjer pTet plazmid i erm(B) geni). Rezultati ukazuju na to da ekološki rezervoari djeluju kao trajni izvori kontaminacije halal lanca ishrane. Prelazak na sekvenciranje cijelog genoma omogućio je preciznu rezoluciju, ali uočena nepodudarnost između genotipa i fenotipa ukazuje na neophodnost optimizacije baza podataka i širenja globalnih genomskih repozitorija kako bi se osigurala proizvodnja zdravstveno ispravne i etički prihvatljive hrane. Zaključno, očuvanje halal integriteta u savremenom dobu zahtijeva striktnu primjenu „One Health“ pristupa koji integriše genomski nadzor u svim fazama proizvodnje kako bi se osigurala krajnja sigurnost potrošača.

**Ključne riječi:** *Genomika, Javno zdravlje, Molekularna epidemiologija, Sigurnost hrane, Zoonoze.*



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**BIOTECHNOLOGICAL ADVANCEMENTS IN ANIMAL HUSBANDRY:  
RISK ANALYSIS AND ETHICAL IMPERATIVES WITHIN PUBLIC  
HEALTH AND HALAL STANDARDS**

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**ABSTRACT**

In an era of a growing global population, biotechnology in animal husbandry has positioned itself as a primary mechanism for achieving food security and medical advancement. Therefore, the purpose of this narrative review paper was to explore the evolution of reproductive and genetic technologies, ranging from conventional artificial insemination to precision genome editing, and to critically evaluate their implications for biosafety, ecological stability, and compliance with Halal norms. Through a comparative analysis of modern methods, such as embryo transfer, somatic cell nuclear transfer (cloning), and CRISPR/Cas9 technology, scientific data regarding their technical efficiency and associated biological hazards were evaluated within the “One Health” concept. The research identified critical barriers, including the low cloning success rate (below 5%) and the occurrence of mosaicism in genome editing. From a Halal standards perspective, the paper recognized specific

risks such as horizontal gene transfer, transgene persistence in the environment, and unforeseen phenotypic changes that may compromise the Tayyib principle, namely the natural purity and integrity of animals. The conducted analysis confirmed that scientific progress in biotechnology requires rigorous regulatory protocols and full transparency, concluding that the integration of scientific validation and ethical oversight is essential to ensure that innovations serve humanity without compromising public health and the authenticity of the Halal supply chain.

**Keywords:** *Biosafety, Cloning, Genome editing, Horizontal gene transfer, Tayyib principle*

## **BIOTEHNOLOŠKI NAPREDAK U UZGOJU ŽIVOTINJA: ANALIZA RIZIKA I ETIČKIH IMPERATIVA U OKVIRU JAVNOG ZDRAVLJA I HALAL STANDARDA**

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### **SAŽETAK**

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U eri rastuće globalne populacije, biotehnologija u stočarstvu pozicionirala se kao primarni mehanizam za postizanje prehrambene sigurnosti i medicinskog napretka. Stoga je svrha ovog preglednog narativnog rada bila da se istraži evolucija reproduktivnih i genetičkih tehnologija, u rasponu od konvencionalne vještačke oplodnje do preciznog genomskog uređivanja, te da se kritički ocijene njihove implikacije na biosigurnost, ekološku stabilnost i usklađenost sa halal normama. Kroz komparativnu analizu savremenih metoda, poput embriotransfera, somatskog transfera nukleusa

(kloniranja) i CRISPR/Cas9 tehnologije, evaluirani su naučni podaci o njihovoj tehničkoj efikasnosti i pratećim biološkim hazardima unutar „One Health“ koncepta. Istraživanje je identifikovalo kritične barijere, uključujući nisku stopu uspješnosti kloniranja (ispod 5%) i pojavu mozaicizma kod genomskog uređivanja. Sa aspekta halal standarda, rad je prepoznao specifične rizike poput horizontalnog transfera gena, perzistencije transgena u okolišu i nepredviđenih fenotipskih promjena koje mogu narušiti princip Tayyib, odnosno prirodnu čistoću i integritet životinja. Provedena analiza potvrdila je da naučni progres u biotehnologiji zahtijeva rigorozne regulatorne protokole i potpunu transparentnost, uz zaključak da je integracija naučne validacije i etičkog nadzora neophodna kako bi inovacije služile čovječanstvu bez kompromitovanja javnog zdravlja i autentičnosti halal lanca snabdijevanja.

**Ključne riječi:** *Biosigurnost, Genomsko uređivanje, Horizontalni transfer gena, Kloniranje, Tayyib princip.*





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## **CHAPTER 3**

### **POGLAVLJE 3**



## **HALAL, SUSTAINABILITY, ISLAMIC ECONOMY AND FINANCE**

Halal, održivost, islamska ekonomija i finansije

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**INTEGRATION OF ESG PRINCIPLES AND THE HALAL MARKET:  
FROM PROFIT TO ETHICAL BUSINESS MODEL**

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**ABSTRACT**

The paper analyzes the concept of ESG (Environmental, Social, Governance) policy in the context of the halal market, with the aim of examining their mutual compatibility and potential for the development of sustainable business. Starting from the modern trend of moving from the traditional profit maximization model to the model of creating broader social value, the research indicates that the halal economy already contains elements in its fundamental principles that are now formalized through ESG standards. Special focus is placed on the comparative analysis of environmental, social and governance aspects of ESG with the principles of halal business, including the concept of halal tayyib, ethical financing, social responsibility and transparent management. The research results indicate that there is a high degree of complementarity between the ESG framework and the halal market, whereby halal can act as a natural model of sustainable and ethical business. Furthermore, the paper identifies the key advantages of integrating these two approaches, including strengthening consumer trust, access to broader investment flows and long-term business stability. It also discusses challenges such as lack of standardization and regulatory differences, as well as opportunities arising from the growth of the global halal economy and sustainable investment. In conclusion, the paper suggests that the integration of ESG principles into the halal market represents an important step towards redefining modern business — from profit to sustainable impact — and opens up space for further interdisciplinary research and practical application in the global economy.

**Keywords:** *halal market, ESG, sustainable business, ethical finance.*

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# INTEGRACIJA ESG PRINCIPA I HALAL TRŽIŠTA: OD PROFITA DO ETIČKOG MODELA POSLOVANJA

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## SAŽETAK

Rad analizira koncept ESG (Environmental, Social, Governance) politike u kontekstu halal tržišta, s ciljem sagledavanja njihove međusobne usklađenosti i potencijala za razvoj održivog poslovanja. Polazeći od savremenog trenda prelaska s tradicionalnog modela maksimizacije profita ka modelu stvaranja šire društvene vrijednosti, istraživanje ukazuje na to da halal ekonomija već u svojim temeljnim principima sadrži elemente koji su danas formalizirani kroz ESG standarde. Poseban fokus stavljen je na komparativnu analizu okolišnih, društvenih i upravljačkih aspekata ESG-a sa principima halal poslovanja, uključujući koncept halal tayyib, etičko finansiranje, društvenu odgovornost i transparentno upravljanje. Rezultati istraživanja ukazuju da postoji visok stepen komplementarnosti između ESG okvira i halal tržišta, pri čemu halal može djelovati kao prirodni model održivog i etičkog poslovanja. Nadalje, rad identificira ključne prednosti integracije ova dva pristupa, uključujući jačanje povjerenja potrošača, pristup širim investicionim tokovima i dugoročnu stabilnost poslovanja. Također se razmatraju izazovi poput nedostatka standardizacije i regulatornih razlika, ali i prilike koje proizlaze iz rasta globalne halal ekonomije i održivog investiranja. Zaključno, rad sugerira da integracija ESG principa u halal tržište predstavlja važan korak ka redefiniranju savremenog poslovanja — od profita ka održivom utjecaju — te otvara prostor za dalja interdisciplinarna istraživanja i praktičnu primjenu u globalnoj ekonomiji.

**Ključne riječi:** *halal tržište, ESG, održivo poslovanje, etičko finansiranje*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**NAVIGATING HALAL COMPLIANCE IN PHARMACEUTICALS AND  
NUTRACEUTICALS: CONSIDERATIONS FOR MUSLIM CONSUM-  
ERS**

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**ABSTRACT**

The growing global demand for ethical and environmentally responsible products has accelerated interest in Halal sustainable technologies. Integrating the Islamic principles of halal (permissible) and tayyib (pure and wholesome) into modern innovation offers new opportunities across agriculture, food production, pharmaceuticals, cosmetics, and bio-based industries. These sectors increasingly seek solutions that uphold both sustainability standards and Halal integrity. This study examines the Animal Waste Index (AWI) as a practical tool for evaluating the management and environmental impact of animal waste in agricultural systems. AWI provides a structured approach for tracking the conversion of animal waste into compost through efficient, Halal-aligned processes. Incorporating real-time monitoring and digital data collection enhances the accuracy and transparency of AWI, supporting more sustainable and Halal-compliant agricultural practices. The paper also highlights Ecodrum technology as an innovative solution for food and organic waste management. Through controlled aerobic and anaerobic biological processes, Ecodrum systems convert organic waste into nutrient-rich compost, reducing environmental burdens and improving soil health. Their scalability and operational efficiency make them suitable for Halal-compliant waste management in diverse agricultural settings. As Halal-certified products expand across global markets, aligning Halal principles with environmentally responsible technologies presents a strategic opportunity to advance sustainability within the Halal ecosystem. Emerging applications include animal welfare, sustainable cosmetics, circular economy models, and bio-based materials. These developments reflect a broader shift toward integrating Halal values with global sustainability goals.

**Keywords:** *Animal Waste Index, sustainability, Halal, Ecodrum, waste management.*

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## PREDVIĐANJE BUDUĆNOSTI HALALA U KONTEKSTU ODRŽIVIH TEHNOLOGIJA S FOKUSOM NA INDEKS ŽIVOTINJSKOG OTPADA

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### SAŽETAK

Rastuća globalna potražnja za etičkim i ekološki odgovornim proizvodima ubrzala je interes za halal održive tehnologije. Integracija islamskih principa halal (dozvoljeno) i tayyib (čisto i zdravo) u savremene inovacije otvara nove mogućnosti u poljoprivredi, proizvodnji hrane, farmaceutskoj industriji, kozmetici i bio-baziranim industrijama. Ovi sektori sve više traže rješenja koja istovremeno ispunjavaju standarde održivosti i očuvanja halal integriteta. Ova studija ispituje Indeks životinjskog otpada (Animal Waste Index – AWI) kao praktičan alat za procjenu upravljanja i uticaja životinjskog otpada u poljoprivrednim sistemima. AWI pruža strukturiran pristup praćenju pretvaranja životinjskog otpada u kompost kroz efikasne procese usklađene s halal principima. Uključivanje praćenja u realnom vremenu i digitalnog prikupljanja podataka poboljšava tačnost i transparentnost AWI sistema, podržavajući održivije i halal usklađene poljoprivredne prakse. Rad također ističe Ecodrum tehnologiju kao inovativno rješenje za upravljanje hranom i organskim otpadom. Kroz kontrolisane aerobne i anaerobne biološke procese, Ecodrum sistemi pretvaraju organski otpad u kompost bogat hranjivim tvarima, smanjujući ekološko opterećenje i poboljšavajući kvalitet tla. Njihova skalabilnost i operativna efikasnost čine ih pogodnim za halal usklađeno upravljanje otpadom u različitim poljoprivrednim okruženjima. Kako se halal certificirani proizvodi šire na globalnim tržištima, usklađivanje halal principa s ekološki odgovornim tehnologijama predstavlja stratešku priliku za unapređenje održivosti unutar halal ekosistema. Novi pravci primjene uključuju dobrobit životinja, održivu kozmetiku, modele kružne ekonomije i bio-bazirane materijale. Ovi razvojni pravci odražavaju širi pomak ka integraciji halal vrijednosti s globalnim ciljevima održivosti.

**Ključne riječi:** *Indeks životinjskog otpada, održivost, halal, Ecodrum, upravljanje otpadom.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**STRATEGIC FINANCIAL MANAGEMENT IN THE FUNCTION OF  
LONG-TERM SUSTAINABLE DEVELOPMENT OF THE HALAL IN-  
DUSTRY IN THE CONTEXT OF DIGITALIZATION AND ARTIFICIAL  
INTELLIGENCE**

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**ABSTRACT**

The halal industry is recognized as one of the fastest-growing global sectors, with significant and continuously expanding market value. Its sustainable development requires not only compliance with religious and ethical standards but also the application of modern strategic financial management tools capable of responding to the challenges of a dynamic business environment. This paper analyzes the role of strategic financial management in ensuring the long-term sustainable development of the halal industry, with particular emphasis on the transformative potential of digitalization and artificial intelligence (AI). The paper is based on an analysis of relevant scientific and professional literature, a review of global halal market trends, and a comparative examination of existing theoretical and empirical knowledge in the fields of strategic financial management and the halal industry. The paper explores how AI-powered tools, such as predictive analytics, automated financial reporting, and intelligent risk management systems, are reshaping strategic financial decision-making within the halal sector. The integration of artificial intelligence and digital technologies into strategic financial management processes is recognized as a key factor in enhancing the efficiency, transparency, and long-term sustainability of halal enterprises. The paper also examines the relationship between halal principles and ESG criteria (environmental, social, and governance) in the context of sustainable finance. The paper indicates that the synergy of strategic financial management, digitalization and artificial intelligence represents a prerequisite for the long-term competitiveness and sustainability of the halal industry in the global environment. Such an approach enables the halal industry to respond to the challenges of the modern global market while preserving its core values.

**Keywords:** *halal industry, strategic financial management, digitalization, artificial intelligence, sustainable development*

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# STRATEŠKI FINANSIJSKI MENADŽMENT U FUNKCIJI DUGOROČNOG ODRŽIVOG RAZVOJA HALAL INDUSTRIJE U UVJETIMA DIGITALIZACIJE I VJEŠTAČKE INTELIGENCIJE

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## SAŽETAK

Halal industrija prepoznata je kao jedan od najbrže rastućih globalnih sektora, sa značajnom i kontinuirano rastućom tržišnom vrijednošću. Njen održivi razvoj zahtijeva ne samo usklađenost s vjerskim i etičkim standardima, već i primjenu savremenih alata strateškog finansijskog menadžmenta sposobnih da odgovore na izazove dinamičnog poslovnog okruženja. Ovaj rad analizira ulogu strateškog finansijskog menadžmenta u osiguravanju dugoročnog održivog razvoja halal industrije, s posebnim naglaskom na transformacijski potencijal digitalizacije i vještačke inteligencije (AI). Rad je zasnovan na analizi relevantne naučne i stručne literature, pregledu globalnih trendova halal tržišta te komparativnoj analizi dostupnih teoretskih i empirijskih spoznaja iz oblasti strateškog finansijskog menadžmenta i halal industrije. Rad istražuje kako alati zasnovani na vještačkoj inteligenciji, poput prediktivne analitike, automatiziranog finansijskog izvještavanja i inteligentnih sistema upravljanja rizicima, mijenjaju strateško finansijsko odlučivanje u halal sektoru. Integracija vještačke inteligencije i digitalnih tehnologija u procese strateškog finansijskog menadžmenta prepoznata je kao ključni faktor povećanja efikasnosti, transparentnosti i dugoročne održivosti halal preduzeća. Rad također razmatra vezu između halal principa i ESG kriterija (okolišnih, društvenih i upravljačkih) u kontekstu održivog finansiranja. Rad ukazuje da sinergija strateškog finansijskog menadžmenta, digitalizacije i vještačke inteligencije predstavlja pretpostavku dugoročne konkurentnosti i održivosti halal industrije u globalnom okruženju. Ovakav pristup omogućava halal industriji da odgovori na izazove savremenog globalnog tržišta uz očuvanje svojih temeljnih vrijednosti.

**Ključne riječi:** *halal industrija, strateški finansijski menadžment, digitalizacija, vještačka inteligencija, održivi razvoj*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**INTEGRATION OF ISLAMIC ETHICAL PRINCIPLES INTO BUSINESS STRATEGIES OF SUSTAINABLE ECONOMIC SYSTEMS**

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**ABSTRACT**

The modern concept of the circular economy is based on the efficient use of resources, waste reduction, and the reuse of by-products in production processes. This approach is largely compatible with Islamic ethical principles, which emphasize responsible management of natural resources and prohibit wastefulness. In particular, the concepts of israf (prohibition of waste), khalifa (human responsibility as stewards of the Earth), mizan (balance in nature), and tayyib (purity and safety of products) stand out as an important normative framework for the development of sustainable production models in the halal industry. The aim of this study is to explore the possibilities of applying circular economy principles through the valorization of sludge generated during the purification process of raw saline water. Special focus is placed on the mineral sludge formed during the treatment process, which may represent a potential secondary raw material for use in animal nutrition. In order to assess the safety and potential application of the analyzed material, experimental laboratory tests were conducted, including physicochemical analyses, microbiological testing, FTIR spectroscopic analysis, and heavy metal content analysis. The obtained results of physicochemical analyses indicate a stable mineral composition of the sample, while microbiological tests did not reveal the presence of pathogenic microorganisms. The analysis of heavy metal content showed concentrations below the permissible limits prescribed by relevant safety standards. FTIR analysis showed that the sludge contains a dominant proportion of CaO (80.50%), clearly confirming the presence of calcium carbonate as the main component. Such a mineral composition indicates the potential of the sludge to be used as a source of calcium in animal nutrition, given that CaCO<sub>3</sub> is widely used as a mineral supplement in the animal feed industry. The obtained results indicate that controlled treatment and appropriate technological preparation of the resulting sludge can represent a sustainable solution within circular production systems. The integration of Islamic ethical principles with modern concepts of the circular economy can contribute to waste reduction, more efficient resource utilization, and the development of sustainable production models in accordance with halal and tayyib standards.

**Keywords:** *circular economy, sludge, israf, khalifa, mizan, tayyib, FTIR, heavy metals, microbiology, animal feed, halal*

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## INTEGRACIJA ISLAMSKIH ETIČKIH PRINCIPA U POSLOVNE STRATEGIJE ODRŽIVIH SISTEMA PRIVREDE

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### SAŽETAK

Savremeni koncept cirkularne ekonomije temelji se na efikasnom korištenju resursa, smanjenju otpada i ponovnoj upotrebi nusproizvoda u proizvodnim procesima. Ovakav pristup u velikoj mjeri je kompatibilan sa islamskim etičkim principima koji naglašavaju odgovorno upravljanje prirodnim resursima i zabranu rasipanja. Posebno se izdvajaju koncepti israf (zabrana rasipanja), khalifa (odgovornost čovjeka kao upravitelja Zemlje), mizan (ravnoteža u prirodi) i tayyib (čistoća i sigurnost proizvoda), koji predstavljaju važan normativni okvir za razvoj održivih modela proizvodnje u halal industriji. Cilj ovog rada je istražiti mogućnosti primjene principa cirkularne ekonomije kroz valorizaciju taloga nastalog u procesu prečišćavanja sirove slane vode. Poseban fokus stavljen je na mineralni talog koji nastaje tokom procesa obrade, a koji može predstavljati potencijalnu sekundarnu sirovinu za primjenu u stočnoj ishrani. U cilju procjene sigurnosti i potencijala primjene analiziranog materijala provedena su eksperimentalna laboratorijska ispitivanja koja su obuhvatila fizikalno-hemijske analize, mikrobiološka ispitivanja, FTIR spektroskopsku analizu te analizu sadržaja teških metala. Dobijeni rezultati fizikalno-hemijskih analiza ukazuju na stabilan mineralni sastav uzorka, dok mikrobiološka ispitivanja nisu pokazala prisustvo patogenih mikroorganizama. Analiza sadržaja teških metala pokazala je koncentracije ispod dozvoljenih granica propisanih relevantnim sigurnosnim standardima. FTIR analiza pokazali su da talog sadrži dominantan udio CaO (80,50%), što jasno potvrđuje prisustvo kalcijum-karbonata kao glavne komponente. Ovakav mineralni sastav ukazuje na potencijal taloga da se koristi kao izvor kalcijuma u stočnoj ishrani, budući da je CaCO<sub>3</sub> široko primjenjivan mineralni dodatak u industriji hrane za životinje. Dobijeni rezultati ukazuju da kontrolisana obrada i odgovarajuća tehnološka priprema nastalog taloga može predstavljati održivo rješenje u okviru cirkularnih proizvodnih sistema. Integracija islamskih etičkih principa sa savremenim konceptima cirkularne ekonomije može doprinijeti smanjenju otpada, efikasnijem korištenju resursa i razvoju održivih proizvodnih modela u skladu sa halal i tayyib standardima.

**Ključne riječi:** *cirkularna ekonomija, talog, israf, khalifa, mizan, tayyib, FTIR, teški metali, mikrobiologija, stočna hrana, halal*

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## CHAPTER 4

### POGLAVLJE 4



## HALAL FOOD SCIENCE, NUTRITION AND ALTERNATIVE SOURCES

Naučni aspekti halal hrane, prehrana i alternativni izvori

[www.congress.halal.ba](http://www.congress.halal.ba)



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HALALOPATHY: A SYSTEMS-BASED BRIDGE BETWEEN  
MODERN MEDICINE AND PROPHEPIC MEDICINE**

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**ABSTRACT**

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Modern medicine has achieved remarkable advances in diagnostics, pharmacology, and acute care; however, many chronic diseases remain closely linked to lifestyle, behavioral patterns, and psychosocial factors that extend beyond the conventional biomedical model. At the same time, traditional frameworks such as Prophetic medicine (Tibb al-Nabawi) have historically emphasized preventive health, moral conduct, dietary balance, and spiritual well-being. Despite their shared concern for human health, these two paradigms have largely evolved in parallel rather than in dialogue. This paper introduces Halalopathy, a conceptual framework that seeks to bridge modern biomedical science with the holistic principles embedded in Prophetic medicine. Halalopathy proposes that health emerges from the dynamic interaction between biological regulation, lifestyle behaviors, ethical conduct, and spiritual orientation. Drawing on concepts from systems medicine, psychoneuroimmunology, lifestyle medicine, and Islamic ethical traditions, the model interprets human health as a multidimensional balance in which behavioral choices, environmental exposures, and spiritual meaning influence physiological regulation and disease susceptibility. Within this framework, the concept of halal is expanded beyond its legal dimension to encompass a broader principle of purity, safety, and compatibility with human biological and moral integrity. Halalopathy therefore integrates preventive lifestyle practices—such as balanced nutrition, moderation, physical activity, emotional regulation, and spiritual mindfulness—with contemporary medical understanding of metabolic, neurological, and immune processes. By positioning Prophetic guidance within a systems-oriented biomedical perspective, Halalopathy provides a translational model that may help connect traditional wisdom with modern scientific approaches to health promotion and disease prevention. Further interdisciplinary research is needed to empirically investigate its mechanisms and clinical applications.

**Keywords:** *Halalopathy, Prophetic medicine, Tibb al-Nabawi, integrative medicine, lifestyle medicine, systems medicine, preventive medicine, Lifestyleopathy.*

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## HALALOPATIJA: SISTEMSKI MOST IZMEĐU SAVREMENE MEDICINE I POSLANIČKE MEDICINE

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### SAŽETAK

Savremena medicina postigla je izuzetne napretke u dijagnostici, farmakologiji i akutnoj njezi; međutim, mnoge hronične bolesti i dalje su usko povezane sa stilom života, obrascima ponašanja i psihosocijalnim faktorima koji prevazilaze klasični biomedicinski model. Istovremeno, tradicionalni okviri poput poslaničke medicine (Tibb al-Nabawi) historijski su naglašavali preventivno zdravlje, moralno ponašanje, uravnoteženu ishranu i duhovno blagostanje. Uprkos zajedničkoj brizi za ljudsko zdravlje, ova dva pristupa su se uglavnom razvijala paralelno, bez značajnog međusobnog dijaloga. Ovaj rad uvodi Halalopatiju, konceptualni okvir koji nastoji povezati savremenu biomedicinsku nauku s holističkim principima sadržanim u poslaničkoj medicini. Halalopatija predlaže da zdravlje nastaje kroz dinamičku interakciju biološke regulacije, životnih navika, etičkog ponašanja i duhovne orijentacije. Oslanjajući se na koncepte sistemske medicine, psihoneuroimunologije, medicine životnog stila i islamske etičke tradicije, ovaj model tumači ljudsko zdravlje kao višedimenzionalnu ravnotežu u kojoj ponašajne odluke, okolišni faktori i duhovni smisao utiču na fiziološku regulaciju i podložnost bolesti. U ovom okviru, pojam halal se proširuje izvan svoje pravne dimenzije i obuhvata širi princip čistoće, sigurnosti i usklađenosti s ljudskim biološkim i moralnim integritetom. Halalopatija stoga integriše preventivne životne prakse — poput uravnotežene ishrane, umjerenosti, fizičke aktivnosti, emocionalne regulacije i duhovne svjesnosti — s savremenim medicinskim razumijevanjem metaboličkih, neuroloških i imunoloških procesa. Pozicioniranjem poslaničkog učenja unutar sistemski orijentisanog biomedicinskog okvira, Halalopatija nudi translacijski model koji može pomoći u povezivanju tradicionalne mudrosti s modernim naučnim pristupima promociji zdravlja i prevenciji bolesti. Potrebna su dalja interdisciplinarna istraživanja kako bi se empirijski ispitali njeni mehanizmi i kliničke primjene.

**Ključne riječi:** *Halalopatija, Poslanička medicina, Tibb al-Nabawi (Poslanička medicina), integrativna medicina, medicina životnog stila, sistemska medicina, preventivna medicina, lifestyleopatija.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HALAL GOVERNANCE IN AESTHETIC PRACTICE: A MAQASID  
SHARIAH-BASED FRAMEWORK FOR QUALITY AND ETHICAL  
COMPLIANCE**

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**ABSTRACT**

Aesthetic medical practice has expanded rapidly as a consumer-driven healthcare segment, encompassing non-invasive, minimally invasive, and invasive procedures aimed at enhancing physical appearance within clinically normal conditions. In Malaysia and similar Muslim-majority contexts, regulatory oversight is primarily structured around medical safety, practitioner competency, and procedural classification. However, existing frameworks remain largely value-neutral, lacking explicit integration of Shariah-based ethical parameters in determining the necessity, intent, and proportionality of aesthetic interventions. Concurrently, the increasing demand for procedures such as dermal fillers, Botox, Endo lift, and laser-based treatments raises concerns about sourcing materials, safety risks, and the boundary between therapeutic necessity and beauty-enhancement-driven practices. The absence of an integrated halal governance model in aesthetic medical practice creates a critical gap between regulatory compliance and Shariah compliance. While current medical guidelines ensure procedural safety, they do not adequately assess whether a treatment fulfils legitimate Maqasid-oriented objectives, such as preservation of life (hifz al-nafs), intellect (hifz al-'aql), or psychological well-being. This disconnect leads to inconsistent decision-making, particularly in borderline cases where procedures may be technically safe but ethically questionable. Drawing on Maqasid Shariah as a normative-analytical framework centred on the realisation of Maslahah (benefit) and prevention of Mafsadah (harm), this study positions halal governance as a mechanism to operationalise ethical evaluation within clinical decision-making and industry regulation. This study proposes a Maqasid Shariah-based halal governance framework that integrates three core dimensions: (i) procedural safety and medical necessity, (ii) source and permissibility of materials, and (iii) intention and proportionality of aesthetic outcomes. The framework introduces a decision matrix that classifies aesthetic procedures into darurah (necessity), hajah (need), and tahsiniyyat (enhancement), enabling a systematic assessment of permissibility across varying clinical contexts. By aligning medical practice with halal quality assurance principles, the proposed model contributes to the development of a structured, ethically grounded aesthetic ecosystem that bridges clinical standards and Shariah requirements. The findings have practical implications for policymakers, practitioners, and halal certification bodies in advancing a more coherent, value-integrated governance system within the global halal medical and cosmetic industry.

**Keywords:** *aesthetic medical practice, halal governance, ethical compliance, quality assurance, Maqasid-Shariah*

## HALAL UPRAVLJANJE U ESTETSKOJ PRAKSI: OKVIR ZASNOVAN NA MAQASID ŠERIJATU ZA KVALITET I ETIČKU USKLAĐENOST

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### SAŽETAK

Estetska medicinska praksa se brzo razvila kao segment zdravstvene zaštite vođen potrošačkom potražnjom, obuhvatajući neinvazivne, minimalno invazivne i invazivne procedure čiji je cilj poboljšanje fizičkog izgleda u klinički normalnim uslovima. U Maleziji i sličnim kontekstima sa većinskim muslimanskim stanovništvom, regulatorni nadzor je uglavnom strukturiran oko medicinske sigurnosti, kompetencija praktičara i klasifikacije procedura. Međutim, postojeći okviri su uglavnom vrijednosno neutralni i nedostaje im eksplicitna integracija šerijatskih etičkih parametara u procjeni potrebe, namjere i proporcionalnosti estetskih intervencija. Istovremeno, rastuća potražnja za procedurama kao što su dermalni fileri, Botox, Endolift i laserski tretmani otvara pitanja porijekla materijala, sigurnosnih rizika i granice između terapijske potrebe i estetskog unapređenja. Odsustvo integrisanog modela halal upravljanja u estetskoj medicinskoj praksi stvara značajan jaz između regulatorne i šerijatske usklađenosti. Dok postojeće medicinske smjernice osiguravaju sigurnost procedura, one ne procjenjuju u dovoljnoj mjeri da li tretman ispunjava legitimne ciljeve Maqasid pristupa, kao što su očuvanje života (hifz al-nafs), razuma (hifz al-'aql) ili psihološke dobrobiti. Ova nepovezanost dovodi do nedosljednog donošenja odluka, posebno u graničnim slučajevima gdje su procedure tehnički sigurne, ali etički upitne. Oslanjajući se na Maqasid šerijat kao normativno-analički okvir usmjeren na ostvarenje koristi (maslahah) i sprječavanje štete (mafsadah), ova studija pozicionira halal upravljanje kao mehanizam za operacionalizaciju etičke evaluacije u kliničkom odlučivanju i industrijskoj regulativi. Ova studija predlaže Maqasid šerijat zasnovan okvir halal upravljanja koji integriše tri ključne dimenzije: (i) sigurnost procedure i medicinsku opravdanost, (ii) porijeklo i dozvoljenost materijala, te (iii) namjeru i proporcionalnost estetskog ishoda. Okvir uvodi matricu odlučivanja koja klasificira estetske procedure u darura (nužnost), haja (potreba) i tahsiniyyat (uljepšavanje), omogućavajući sistematsku procjenu dozvoljenosti u različitim kliničkim kontekstima. Usklađivanjem medicinske prakse sa principima halal osiguranja kvaliteta, predloženi model doprinosi razvoju strukturiranog i etički utemeljenog estetskog sistema koji povezuje kliničke standarde i šerijatske zahtjeve. Rezultati imaju praktične implikacije za kreatora politika, praktičare i tijela za halal certifikaciju u unapređenju koherentnijeg i vrijednosno integrisanog sistema upravljanja u globalnoj halal medicinskoj i kozmetičkoj industriji.

**Ključne riječi:** *estetska medicinska praksa, halal upravljanje, etička usklađenost, osiguranje kvaliteta, Maqasid šerijat.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**ALTERNATIVE SOURCES OF PROTEIN:  
TECHNICAL ASPECTS AND HALAL REQUIREMENTS**

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**ABSTRACT**

Protein is an essential macronutrient that is mainly sourced from meat products (beef, pork, lamb, poultry, seafood), offering complete essential amino acids to support body functions and growth. However, many religions and traditions stand against consumption of meat or require specific slaughtering practices which created increasing demand for alternative protein sources worldwide. Here, we explore the current technological innovations, acceptability for Muslim consumers, and Halal certification requirements for alternative proteins including plant base, clean meat (cultivated cell-based meat), mycoprotein (single-cell proteins) and insects' proteins. The findings show limited understanding to the technological aspects of alternative proteins among Muslim consumers and scholars, resulting on conflict Islamic opinions. Plant base materials are the most acceptable to halal but when processed to mitigate the real meat becomes doubtful due to the added additives that are sourced from non-halal materials. Clean meat is genuine animal meat produced from animal cells grown in a controlled culture medium which brings questions to halal about the source of cells and components of cultured medium. Mycoprotein is produced by fermenting a specific fungus grown in a controlled culture medium resulting in a meat-like texture. Edible insects are controversial, accepted by some Muslim cultures while rejected by others. Researching the published halal standards, alternative proteins are either not covered, not clear, or have conflict opinions. This article summarizes the key technological aspects, food safety (Tayyib) considerations, and halal perspectives that are being adopted to alternative proteins. It does conclude that the halal authorities, Muslim scholars and Muslim consumers are in need to better understand the technical aspects of alternative proteins the nature of base materials, processes and additives to establish a clear position and halal requirements.

**Keywords:** *Halal Certification, Stakeholders in Halal Industry, Standardization, Certification Challenges, Consumer Trust.*

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## ALTERNATIVNI IZVORI PROTEINA: TEHNIČKI ASPEKTI I HALAL ZAHTJEVI

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### SAŽETAK

Proteini su esencijalni makronutrijent koji se uglavnom dobija iz mesnih proizvoda (govedina, svinjetina, jagnjetina, perad, morski plodovi), i obezbjeđuju sve esencijalne aminokiseline potrebne za funkcije i rast organizma. Međutim, mnoge religije i tradicije se protive konzumaciji mesa ili zahtijevaju specifične metode klanja, što je dovelo do sve veće potražnje za alternativnim izvorima proteina širom svijeta. U ovom radu se razmatraju trenutne tehnološke inovacije, prihvatljivost za muslimanske potrošače i zahtjevi halal certificiranja za alternativne proteine, uključujući biljne proteine, "čisto meso" (uzgojeno meso na bazi ćelijskih kultura), mikoprotein (proteini iz mikroorganizama) i proteine iz insekata. Rezultati pokazuju ograničeno razumijevanje tehnoloških aspekata alternativnih proteina među muslimanskim potrošačima i učenjacima, što dovodi do različitih islamskih stavova. Biljni izvori su u najvećoj mjeri prihvatljivi kao halal, ali kada se procesiraju tako da imitiraju pravo meso, postaju upitni zbog dodatka koji mogu poticati iz nehalal izvora. "Čisto meso" je pravo životinjsko meso proizvedeno iz životinjskih ćelija uzgojenih u kontrolisanom hranjivom mediju, što otvara pitanja u pogledu porijekla ćelija i komponenti tog medija u halal kontekstu. Mikoprotein se proizvodi fermentacijom specifičnih gljiva u kontrolisanim uslovima, što rezultira teksturom sličnom mesu. Jestivi insekti su kontroverzni – prihvatljivi u nekim muslimanskim kulturama, dok su u drugim odbijeni. Pregledom dostupnih halal standarda, utvrđeno je da alternativni proteini nisu jasno obuhvaćeni, ili postoje nejasnoće i različita mišljenja. Ovaj članak sumira ključne tehnološke aspekte, sigurnost hrane (Tayyib) i halal perspektive koje se primjenjuju na alternativne proteine. Zaključuje se da su halal institucije, islamski učenjaci i muslimanski potrošači u potrebi za boljim razumijevanjem tehničkih aspekata alternativnih proteina – prirode sirovina, procesa i aditiva – kako bi se uspostavio jasan stav i precizni halal zahtjevi.

**Ključne riječi:** *halal certificiranje, akteri u halal industriji, standardizacija, izazovi certificiranja, povjerenje potrošača.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HALAL STATUS OF UNCONVENTIONAL ANIMAL SPECIES  
AS A SOURCE OF HUMAN NUTRITION**

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**ABSTRACT**

The main purpose of Halal regulation is the obtainment of safe food for the Muslim and other populations. While the halal status of commonly grown animals, such as cattle and pigs, has been extensively studied, the debate regarding the unconventional animal species is still ongoing. In the modern world, where the importance of alternative sources of animal protein is on the rise, an exploration of halal status of different animals is necessary, especially in cases where all other demands, regarding general safety and means of sacrifice, have been met. For some species, the halal status has been determined already. Predatory birds and coprophagous animals are explicitly described as considered haram. Grazing beasts are considered lawful except those that are explicitly prohibited, which would mean species such as reindeer should be considered halal. Locusts are generally considered halal, which is of great importance, as insects are often seen as one of the most promising sources of animal protein for the future. While animals with fangs are declared as haram, marine hunting is allowed, which puts animals such as crocodiles in a controversial position, as some scholars consider them haram while others consider them halal. In addition, frogs are often considered haram, because the killing of frogs is prohibited. As this is a very demanding and complex issue, of an ethical, cultural, traditional, religious, gastronomic and health nature, our position on Halal status will be based on current scientific and theological knowledge about the animal species, its importance in the ecosystem and interaction with other animal species, threats and natural forms, which will determine our commitment to the potential use of the appropriate animal species in nutrition.

**Keywords:** *unconventional animal species, Halal status, human nutrition*

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## HALAL STATUS NEKONVENCIONALNIH ŽIVOTINJSKIH VRSTA KAO IZVORA LJUDSKE ISHRANE

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### SAŽETAK

Glavna svrha halal regulative je osiguravanje sigurne hrane za muslimansku, ali i za ostalu populaciju. Iako je halal status uobičajenih domaćih životinja, poput goveda i svinja, detaljno istražen, rasprava o nekonvencionalnim životinjskim vrstama još uvijek traje. U savremenom svijetu, gdje raste važnost alternativnih izvora životinjskih proteina, neophodno je istražiti halal status različitih životinja, posebno u slučajevima kada su ispunjeni svi drugi zahtjevi koji se odnose na opću sigurnost i način klanja. Za neke vrste halal status je već jasno određen. Ptice grabljivice i koprofagne životinje izričito se smatraju haram. Pašinske životinje smatraju se dozvoljenim, osim onih koje su eksplicitno zabranjene, što znači da bi vrste poput soba (irvasa) mogle biti halal. Skakavci se generalno smatraju halal, što je posebno važno jer se insekti smatraju jednim od najperspektivnijih izvora životinjskih proteina u budućnosti. Iako se životinje sa očnjacima smatraju haram, morski lov je dozvoljen, što dovodi do kontroverzi oko životinja poput krokodila, jer ih neki učenjaci smatraju haram, dok ih drugi smatraju halal. Pored toga, žabe se često smatraju haram, jer je njihovo ubijanje zabranjeno. Kako je ovo vrlo složeno i zahtjevno pitanje etičke, kulturne, tradicionalne, religijske, gastronomske i zdravstvene prirode, stav o halal statusu zasniva se na savremenom naučnom i teološkom znanju o životinjskim vrstama, njihovoj ulozi u ekosistemu i međusobnim interakcijama, prijetnjama i prirodnim oblicima, što određuje pristup mogućem korištenju odgovarajućih životinjskih vrsta u ishrani.

**Ključne riječi:** *nekonvencionalne životinjske vrste, halal status, ljudska ishrana*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**KEY REQUIREMENTS FOR HALAL AQUACULTURE FEED PRODUCTION:  
A SHARIAH PERSPECTIVE**

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**ABSTRACT**

Halal assurance in the food industry has traditionally focused on downstream processes, while upstream elements such as animal feed remain less emphasised. From a Shariah perspective, although animals are not directly bound by religious obligations, the status of animal feed becomes relevant when it affects food consumed by humans. The use of non-halal or impure feed may lead to animals being classified as al-jallalah, raising concerns over permissibility and food safety. This study adopts a qualitative doctrinal approach by analysing Shariah principles, relevant fatwas, and existing standards related to animal feed and feeding practices. The analysis also considers current industry practices and regulatory frameworks. The findings of this study highlight the importance of ensuring that feed ingredients, production processes, handling, and feeding practices comply with Shariah requirements. The study also identifies the need for clearer guidelines to support halal feed production, particularly in addressing issues related to contamination, use of non-halal ingredients, and integrated farming practices.

**Keywords:** *halal assurance, food industry, animal feed, Shariah principles, al-jallalah, contamination, halal standards, animal feeding practices*

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## KLJUČNI ZAHTJEVI ZA PROIZVODNJU HALAL HRANE ZA AKVAKULTURU: ŠERIJATSKA PERSPEKTIVA

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### SAŽETAK

Halal osiguranje u prehrambenoj industriji tradicionalno je bilo fokusirano na procese u završnim fazama proizvodnje, dok su početni (upstream) elementi, poput stočne hrane, ostali manje naglašeni. Iz šerijatske perspektive, iako životinje nisu direktno obavezane vjerskim propisima, status stočne hrane postaje važan kada utiče na hranu koju konzumiraju ljudi. Upotreba nehalal ili nečiste stočne hrane može dovesti do toga da se životinje svrstaju u kategoriju al-jallalah (nečiste), što otvara pitanja dozvoljenosti (halal statusa) i sigurnosti hrane. Ova studija primjenjuje kvalitativni doktrinarni pristup kroz analizu šerijatskih principa, relevantnih fetvi i postojećih standarda koji se odnose na stočnu hranu i praksu ishrane životinja. Analiza također uzima u obzir trenutne industrijske prakse i regulatorne okvire. Rezultati ove studije naglašavaju važnost osiguranja da sastojci stočne hrane, proizvodni procesi, rukovanje i praksa ishrane životinja budu u skladu sa šerijatskim zahtjevima. Studija također ukazuje na potrebu za jasnijim smjernicama koje bi podržale proizvodnju halal stočne hrane, posebno u rješavanju pitanja kontaminacije, korištenja nehalal sastojaka i integrisanih farmi/proizvodnih sistema.

**Ključne riječi:** *halal osiguranje, prehrambena industrija, stočna hrana, šerijatski principi, al-jallalah, kontaminacija, halal standardi, praksa ishrane životinja*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**THE INFLUENCE OF LACTOBACILLUS SPP. ON THE HYGIENIC  
SAFETY OF DRY CHEESE - A TRADITIONAL HALAL PRODUCT OF  
BOSNIA AND HERZEGOVINA**

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**ABSTRACT**

This study examines the influence of *Lactobacillus spp.* on the hygienic safety of dry cheese, a traditional halal product of Bosnia and Herzegovina. Dry cheese is an important part of cultural and gastronomic heritage, especially in northeastern Bosnia, where it is produced according to traditional methods and passed down from generation to generation. This cheese has probiotic properties thanks to its natural microflora, including *Lactobacillus spp.* which positively affects on digestive health. The aim of the study is to examine the antimicrobial activity of *Lactobacillus spp.* against pathogenic bacteria *Listeria monocytogenes*, *Escherichia coli*, *Staphylococcus aureus* and Aerobic mesophilic bacteria. A total of 33 samples of dry cheese from BiH producers were analyzed for the purposes of the study. Dry cheese samples were analyzed after 7 days of ripening at a temperature of 15 ° C +/- 1 ° C and after 7 days of storage at a temperature of +4 to 8°C. The results showed that the product remains microbiologically safe for consumption after ripening and storage, and the presence of *Lactobacillus spp.* confirms the probiotic properties of the cheese. This cheese is produced in accordance with the requirements of the Halal standard and guarantees the safety and quality of the product, and has additional value for Muslim consumers. Dry cheese produced in Bosnia and Herzegovina has high microbiological correctness and health benefits associated with probiotic properties. Production according to halal requirements provides additional security to consumers looking for products in accordance with religious norms.

**Keywords:** *Lactobacillus spp.*, dry cheese, hygiene, halal product.

## UTICAJ *LACTOBACILLUS SPP.* NA HIGIJENSKU SIGURNOST SUHOG SIRA – TRADICIONALNOG HALAL PROIZVODA BOSNE I HERCEGOVINE

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### SAŽETAK

Ova studija ispituje uticaj *Lactobacillus spp.* na higijensku sigurnost suhog sira, tradicionalnog halal proizvoda Bosne i Hercegovine. Suhi sir predstavlja važan dio kulturno-gastronomске baštine, posebno u sjeveroistočnoj Bosni, gdje se proizvodi prema tradicionalnim metodama i prenosi s generacije na generaciju. Ovaj sir ima probiotička svojstva zahvaljujući prirodnoj mikroflori, uključujući *Lactobacillus spp.*, koji pozitivno utiču na zdravlje probavnog sistema. Cilj studije je ispitati antimikrobno djelovanje *Lactobacillus spp.* protiv patogenih bakterija kao što su *Listeria monocytogenes*, *Escherichia coli*, *Staphylococcus aureus* i aerobne mezofilne bakterije. Za potrebe studije analizirano je ukupno 33 uzorka suhog sira proizvođača iz Bosne i Hercegovine. Uzorci su analizirani nakon 7 dana zrenja na temperaturi od  $15 \pm 1$  °C, kao i nakon 7 dana skladištenja na temperaturi od +4 do +8 °C. Rezultati su pokazali da proizvod ostaje mikrobiološki siguran za konzumaciju nakon procesa zrenja i skladištenja, a prisustvo *Lactobacillus spp.* potvrđuje probiotička svojstva sira. Ovaj sir se proizvodi u skladu sa zahtjevima halal standarda, što garantuje sigurnost i kvalitet proizvoda te pruža dodatnu vrijednost muslimanskim potrošačima. Suhi sir proizveden u Bosni i Hercegovini pokazuje visok nivo mikrobiološke ispravnosti i zdravstvenih koristi povezanih s probiotičkim svojstvima. Proizvodnja u skladu sa halal zahtjevima pruža dodatnu sigurnost potrošačima koji traže proizvode usklađene s vjerskim normama.

**Ključne riječi:** *Lactobacillus spp.*, suhi sir, higijena, halal proizvod.

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## BOOK OF ABSTRACTS AND PAPERS FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS

### HALAL NUTRITION IN DIABETES MANAGEMENT

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#### ABSTRACT

Halal nutrition represents a dietary pattern compliant with Islamic regulations, based on the consumption of permitted (halal) and the avoidance of prohibited (haram) foods, with moderation as a fundamental principle for glycemic control. This approach is guided by the Qur'anic verse: "Eat and drink, but be not excessive" (Al-A'raf, 31). For individuals with diabetes, proper nutrition is critical for regulating glycemia, preventing complications, and maintaining optimal nutritional status. Integrating Halal principles with a diabetic diet requires meticulous food selection, balanced macronutrient intake, and portion control. The significance of food synergy for glycemic regulation is emphasized by Dr. Duweik, whose methodology harmonizes Qur'anic guidelines with nutritional science. Drawing from the Sunnah, he notes that the Prophet (PBUH) combined foods such as fresh dates with cucumber. From a nutritional perspective, the dietary fiber in cucumbers slows the digestion and absorption of glucose and fructose from dates, thereby reducing the overall glycemic index and preventing rapid blood sugar fluctuations. Halal nutrition for diabetes management focuses on whole grains, vegetables, low-glycemic fruits, lean proteins (halal meat and fish), and healthy fats. Special emphasis is placed on avoiding refined sugars, processed foods, and saturated fats, aligning with contemporary medical guidelines. Furthermore, healthy preparation methods (boiling, baking, steaming) are essential. A vital health principle from the Sunnah is the discouragement of consuming hot food, as the Prophet (PBUH) stated: "There is blessing (barakah) in cold food." Scientifically, this pertains to the process of starch retrogradation. When starch-rich foods such as potatoes, rice, and pasta are cooled, a portion of their starch converts into resistant starch, which is resistant to enzymatic digestion. Integrating Halal nutrition into the therapeutic management of diabetes can improve disease control while respecting patients' religious beliefs. In conclusion, Halal nutrition is highly compatible with modern nutritional standards for diabetes when supported by an individualized approach and professional guidance.

**Keywords:** *Halal nutrition, Diabetes mellitus, Glycemic index, Resistant starch, Sunnah, Nutritional therapy.*

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## HALAL PREHRANA U UPRAVLJANJU DIJABETESOM

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### SAŽETAK

Halal prehrana predstavlja prehrambeni obrazac usklađen s islamskim propisima, zasnovan na konzumaciji dozvoljene (halal) i izbjegavanju zabranjene (haram) hrane, pri čemu je umjerenost temeljni princip za kontrolu glikemije. Ovaj pristup vođen je kur'anskim ajetom: „Jedite i pijte, ali ne pretjerujte“ (Al-Araf, 31). Za osobe s dijabetesom pravilna prehrana je ključna za regulaciju glikemije, prevenciju komplikacija i održavanje optimalnog nutritivnog statusa. Integracija halal principa s dijabetičkom prehranom zahtijeva pažljiv odabir namirnica, uravnotežen unos makronutrijenata i kontrolu porcija. Značaj sinergije hrane u regulaciji glikemije naglašava dr. Duweik, čija metodologija usklađuje kur'anske smjernice s nutricionističkom znanosti. Pozivajući se na Sunnet, navodi da je Poslanik (PBUH) kombinirao namirnice poput svježih hurmi i krastavca. S nutritivnog aspekta, prehrambena vlakna iz krastavca usporavaju probavu i apsorpciju glukoze i fruktoze iz hurmi, čime se smanjuje ukupni glikemijski indeks i sprječavaju nagle oscilacije šećera u krvi. Halal prehrana u upravljanju dijabetesom usmjerena je na cjelovite žitarice, povrće, voće s niskim glikemijskim indeksom, nemasne proteine (halal meso i riba) te zdrave masti. Poseban naglasak stavlja se na izbjegavanje rafiniranih šećera, prerađene hrane i zasićenih masti, što je u skladu sa savremenim medicinskim smjernicama. Nadalje, zdrave metode pripreme hrane (kuhanje, pečenje, kuhanje na pari) su od suštinskog značaja. Važan zdravstveni princip iz Sunneta je izbjegavanje konzumiranja vruće hrane, jer je Poslanik (PBUH) rekao: „U hladnoj hrani je bereket (blagoslov).“ Naučno gledano, ovo se odnosi na proces retrogradacije škroba. Kada se namirnice bogate škrobom poput krompira, riže i tjestenine ohlade, dio njihovog škroba prelazi u rezistentni škrob, koji je otporan na enzimsku razgradnju. Integracija halal prehrane u terapijsko upravljanje dijabetesom može unaprijediti kontrolu bolesti uz poštivanje religijskih uvjerenja pacijenata. Zaključno, halal prehrana je visoko kompatibilna sa savremenim nutricionističkim standardima za dijabetes kada je podržana individualiziranim pristupom i stručnim vođenjem.

**Ključne riječi:** *halal prehrana, dijabetes melitus, glikemijski indeks, rezistentni škrob, Sunnet, nutritivna terapija.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HALAL NUTRITION**

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**ABSTRACT**

Protecting the future population and the people's welfare, as mentioned in the "Maqasid Shariah" or the aims of Islamic Law, is very important in view of the increasing negative behaviours existing in today's societies at large. This paper on Halal nutrition emphasizes consuming food that is both permissible (Halal) under Islamic law and wholesome/pure (tayyiban). It is aimed looking at halal food consumed by the Prophet Muhammad s.a.w. and his eating practices which will impact any person's health. Some foods mentioned in the Quran and Hadith were studied to associate the relationship of halal food and health. The method used is reviewing journals, the Qur'an and Hadith and conduct cross document referencing. Islamic guidelines recommend avoiding overeating, specifically leaving one-third of the stomach for food, one-third for drink, and one-third for air. It is proposed that the Halal Nutrition Model is based on preference for plant-based foods such as dates, honey, milk, olive oil, and various fruits/vegetables and minimally processed products whereby it is actually suitable and befitting the halal nutrition model but the whole model has to be without the haram elements which are blood, pork, carrion, liquor and harmful substances to provide proper nutrition guidelines for quality and better consumption of halal food for the future population.

**Keywords:** *halal nutrition, maqasid shariah, health and nutrition, Qur'an and Hadith, plant-based diet*

## HALAL ISHRANA

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### SAŽETAK

Zaštita buduće populacije i dobrobiti ljudi, kako je navedeno u „Maqasid Shariah“ ili ciljevima islamskog prava, od velike je važnosti s obzirom na porast negativnih ponašanja u današnjim društvima u cjelini. Ovaj rad o halal ishrani naglašava konzumiranje hrane koja je istovremeno dozvoljena (halal) prema islamskom pravu i čista/pitka (tayyib). Cilj je sagledati halal hranu koju je konzumirao Poslanik Muhammed s.a.w. i njegove prehrambene navike koje imaju utjecaj na zdravlje svake osobe. Proučavana je hrana spomenuta u Kur'anu i Hadisu kako bi se uspostavila veza između halal hrane i zdravlja. Metoda koja je korištena uključuje pregled naučnih radova, Kur'ana i Hadisa, kao i međusobno upoređivanje dokumenata. Islamske smjernice preporučuju izbjegavanje prejedanja, posebno ostavljanje jedne trećine stomaka za hranu, jedne trećine za piće i jedne trećine za zrak. Predlaže se da model halal ishrane bude zasnovan na preferiranju biljne hrane kao što su hurme, med, mlijeko, maslinovo ulje te različito voće i povrće, kao i minimalno prerađeni proizvodi. Ovakav pristup je u skladu s halal nutritivnim modelom, pod uslovom da je potpuno bez haram elemenata kao što su krv, svinjetina, strvina, alkohol i štetne supstance, kako bi se osigurale pravilne smjernice za kvalitetnu i sigurnu konzumaciju halal hrane za buduću populaciju.

**Ključne riječi:** *halal ishrana, ciljevi šerijata, zdravlje i prehrana, Kur'an i Hadis, biljna ishrana*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**WHEN ACCESS IS RESTRICTED: UNDERSTANDING INTERVIEW  
REJECTION BY HALAL CERTIFICATION AGENCIES IN AUSTRALIA**

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**ABSTRACT**

Having access to industry stakeholders is crucial for scientific and academic research, yet difficulties in securing participation and rejections are inevitable. This study explores the phenomenon of interview rejection by halal certification agencies within Australia's halal industry. Despite the sector's growing economic and regulatory significance, very few research has examined the barriers faced by researchers when engaging with halal certification bodies. Utilizing a qualitative exploratory approach, this paper examines the identified patterns of refusal and non-response encountered during attempts to conduct semi-structured interviews with halal certification agencies. Through analysis of communication record, follow-up correspondence, and literature reviews, this paper demonstrates the major reasons behind the interview rejection, including confidentiality concerns, regulatory sensitivities, resource constraints, and perceived lack of direct benefit. These results demonstrate how gatekeeping at an institutional level combined with a lack of trust can influence the knowledge of perception on halal industry. This paper contributes to methodological discussion by providing insight into the power dynamics between researchers and industry players. In addition, this paper offers practical suggestions on how to enhance engagement strategies for all parties involved and highlights the necessity for increased openness and cooperation in supporting comprehensive and inclusive research across Australian halal industry.

**Keywords:** *Australian halal industry, halal agencies, interview rejection, qualitative study*

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## KADA JE PRISTUP OGRANIČEN: ANALIZA ODBIJANJA INTERVJUA HALAL CERTIFIKACIJSKIH AGENCIJA U AUSTRALIJI

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### SAŽETAK

Pristup ključnim akterima u industriji od presudnog je značaja za naučna i akademska istraživanja, međutim poteškoće u osiguravanju njihovog učešća, kao i odbijanja saradnje, gotovo su neizbježni. Ova studija istražuje fenomen odbijanja intervjua od strane halal certifikacijskih agencija u okviru halal industrije u Australiji. Uprkos rastućem ekonomskom i regulatornom značaju ovog sektora, vrlo mali broj istraživanja bavio se preprekama s kojima se istraživači suočavaju prilikom uspostavljanja saradnje s halal certifikacijskim tijelima. Koristeći kvalitativni eksplorativni pristup, ovaj rad analizira uočene obrasce odbijanja i izostanka odgovora tokom pokušaja provođenja polustrukturiranih intervjua s halal certifikacijskim agencijama. Kroz analizu evidencije komunikacije, naknadne korespondencije i pregleda relevantne literature, rad prikazuje glavne razloge odbijanja intervjua, uključujući zabrinutost zbog povjerljivosti, regulatorne osjetljivosti, ograničene resurse i percepciju nedostatka direktne koristi. Rezultati pokazuju kako institucionalno „gatekeeping“ ponašanje, u kombinaciji s nedostatkom povjerenja, može uticati na percepciju i razumijevanje halal industrije. Ovaj rad doprinosi metodološkoj raspravi pružajući uvid u dinamiku moći između istraživača i industrijskih aktera. Također, rad nudi praktične prijedloge za unapređenje strategija angažmana svih uključenih strana te naglašava potrebu za većom otvorenošću i saradnjom u cilju podrške sveobuhvatnim i inkluzivnim istraživanjima unutar australske halal industrije.

**Ključne riječi:** *Australska halal industrija, halal agencije, odbijanje intervjua, kvalitativna studija*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**FROM WASTE TO BARAKAH: HALAL PATHWAYS  
FOR TRANSFORMING FOOD WASTE INTO SUSTAINABLE RE-  
SOURCES**

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**ABSTRACT**

Food waste represents a critical global challenge intersecting food security, environmental sustainability, and ethical responsibility. Muslim populations worldwide, particularly in European countries, rely on food that is Halal from the source, making the management of food waste a matter of both safety and religious integrity. This study introduces a Halal-centric framework that integrates food waste management within the principles of Halal assurance and Maqasid al-Shariah, bridging the gap between religious compliance and sustainable practices. It proposes structured Halal pathways for converting food waste into safe, traceable, and value-added resources within a circular economy model. The research advances the concept of “Halal integrity beyond consumption” by extending Halal compliance to post-consumption stages, including surplus redistribution and waste transformation. By embedding Halal assurance systems (HAS) into sustainable technologies and operational processes, the study offers a practical, scalable, and ethically responsible model that enhances consumer trust, supports regulatory alignment, and promotes the generation of Barakah through responsible resource utilization.

**Keywords:** *Halal, Food Waste, Food Safety, Halal Assurance System, Circular Economy, Sustainable Development, Barakah.*

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## OD OTPADA DO BEREKETA: HALAL PUTEVI ZA TRANSFORMACIJU OTPADA OD HRANE U ODRŽIVE RESURSE

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### SAŽETAK

Otpad od hrane predstavlja kritičan globalni izazov koji se prepliće sa sigurnošću hrane, ekološkom održivošću i etičkom odgovornošću. Muslimanske populacije širom svijeta, posebno u evropskim zemljama, oslanjaju se na hranu koja je halal od samog izvora, što čini upravljanje otpadom od hrane pitanjem koje se tiče i sigurnosti i vjerskog integriteta. Ova studija uvodi halal-centrični okvir koji integriše upravljanje otpadom od hrane unutar principa halal osiguranja i ciljeva šerijatskog prava (Maqasid al-Šerijat), premošćujući jaz između vjerske usklađenosti i održivih praksi. Studija predlaže strukturirane halal puteve za pretvaranje otpada od hrane u sigurne, sljedive i resurse s dodatnom vrijednošću u okviru modela kružne ekonomije. Istraživanje unapređuje koncept „halal integriteta izvan konzumacije“ proširujući halal usklađenost na post-konzumacijske faze, uključujući redistribuciju viškova i transformaciju otpada. Ugradnjom sistema halal osiguranja (HAS) u održive tehnologije i operativne procese, studija nudi praktičan, skalabilan i etički odgovoran model koji jača povjerenje potrošača, podržava usklađenost s regulativom i promovise stvaranje bereketa (Barakah) kroz odgovorno korištenje resursa.

**Ključne riječi:** *halal, otpad od hrane, sigurnost hrane, sistem halal osiguranja, kružna ekonomija, održivi razvoj, bereket.*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**FROM HALAL COMPLIANCE TO EVIDENCE-BASED ASSURANCE:  
THE ROLE OF ISO/IEC 17025 ACCREDITED LABORATORIES IN  
CONTROLLING HARAM RISKS IN FOOD SYSTEMS**

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**ABSTRACT**

Ensuring halal integrity in modern food systems faces significant challenges due to globalized supply chains, complex product formulations, and mixed production environments. This paper analyzes the role of laboratories accredited in accordance with ISO/IEC 17025 in identifying and controlling risks associated with the presence of prohibited substances in food, with the aim of shifting from declarative compliance to an evidence-based approach. The methodology is based on the analysis of critical points in production processes where there is a risk of contamination with non-halal components, as well as on the evaluation of applicable analytical methods. Particular emphasis is placed on chromatographic and molecular techniques used for the detection of alcohol, porcine origin, and other prohibited ingredients in complex food matrices. In addition, the reliability of results was assessed through criteria of method validation and measurement traceability. The results show that accredited laboratories play a key role in ensuring objective and verifiable evidence of the halal status of products. Analytical methods enable the detection of even minimal amounts of prohibited substances that cannot be identified through conventional audits or documentation review. The importance of laboratory support is particularly highlighted in the control of highly processed products and complex supply chains. In conclusion, the inclusion of accredited laboratory testing in halal verification processes significantly improves system reliability, reduces the risk of mislabeling, and strengthens consumer trust. This approach represents a practical and applicable solution for enhancing halal control in the modern food industry.

**Keywords:** *halal, laboratories, food safety, contamination, analytics*

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## OD HALAL USKLAĐENOSTI DO OSIGURANJA ZASNOVANOG NA DOKAZIMA: ULOGA LABORATORIJA AKREDITOVANIH PREMA ISO/IEC 17025 U KONTROLI HARAM RIZIKA U PREHRAMBENIM SISTEMIMA

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### SAŽETAK

Osiguravanje halal integriteta u savremenim prehrambenim sistemima suočava se sa značajnim izazovima zbog globaliziranih lanaca snabdijevanja, složenih formulacija proizvoda i mješovitih proizvodnih okruženja. Ovaj rad analizira ulogu laboratorija akreditovanih u skladu sa standardom ISO/IEC 17025 u identifikaciji i kontroli rizika povezanih s prisustvom zabranjenih supstanci u hrani, s ciljem prelaska sa deklarativne usklađenosti na pristup zasnovan na dokazima. Metodologija se zasniva na analizi kritičnih tačaka u proizvodnim procesima gdje postoji rizik od kontaminacije nehalal komponentama, kao i na evaluaciji primjenjivih analitičkih metoda. Poseban naglasak stavljen je na hromatografske i molekularne tehnike koje se koriste za detekciju alkohola, porijekla svinjskog mesa i drugih zabranjenih sastojaka u složenim prehrambenim matricama. Pored toga, pouzdanost rezultata procijenjena je kroz kriterije validacije metoda i sljedivosti mjerenja. Rezultati pokazuju da akreditovane laboratorije imaju ključnu ulogu u osiguravanju objektivnih i provjerljivih dokaza o halal statusu proizvoda. Analitičke metode omogućavaju detekciju čak i minimalnih količina zabranjenih supstanci koje se ne mogu identificirati kroz klasične audite ili pregled dokumentacije. Važnost laboratorijske podrške posebno je naglašena u kontroli visoko prerađenih proizvoda i složenih lanaca snabdijevanja. Zaključno, uključivanje akreditovanog laboratorijskog ispitivanja u procese halal verifikacije značajno poboljšava pouzdanost sistema, smanjuje rizik pogrešnog označavanja i jača povjerenje potrošača. Ovaj pristup predstavlja praktično i primjenjivo rješenje za unapređenje halal kontrole u savremenoj prehrambenoj industriji.

**Ključne riječi:** *halal, laboratorije, sigurnost hrane, kontaminacija, analitika*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**ANALYTICAL STRATEGIES FOR PORCINE DETECTION IN HALAL  
CERTIFICATION**

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**ABSTRACT**

**Introduction:** The continued expansion of the global halal market has intensified the need for reliable analytical tools to detect porcine adulteration and cross-contamination. Economic substitution of halal raw materials with lower-cost non-halal alternatives, combined with increasingly complex international supply chains, has elevated risks of porcine-DNA contamination, as experienced by Indonesia, Malaysia, and Brunei. As a result, laboratory testing has become an important complement to strengthen halal auditing systems. This paper critically evaluates and shared LPPOM's experiences related to the practical applicability of porcine detection platform, namely rapid immunoassays, enzyme-linked immunosorbent assay (ELISA), real-time polymerase chain reaction (PCR), and liquid chromatography tandem mass spectrometry (LC-MS/MS).

**Results and Discussion:** Rapid lateral-flow immunoassays remain attractive as first-line screening tools due to low cost, portability, and short turnaround time. However, their use in critical decision-making may be constrained by lower sensitivity, matrix effects, and limited transparency regarding proprietary antibody targets.

ELISA provides improved sensitivity and semi-quantitative capability, but performance may decline in highly processed products where heat treatment, hydrolysis, or fermentation alters protein structures required for antibody recognition.

Real-time PCR is widely regarded as one of the most reliable routine approaches for species authentication because it targets species-specific DNA sequences with high sensitivity. Nevertheless, severe processing may degrade DNA, while robust implementation requires validated primers and probes, contamination control, competent personnel, and compliance with ISO/IEC 17025 quality requirements.

LC-MS/MS is a sophisticated complementary approach that detects peptides or characteristic molecular markers through mass-based identification (a molecular fingerprint). However, reliable interpretation depends on comprehensive reference libraries. Natural variation caused by breed, age,

feed, tissue source, and processing history can change detectable marker profiles. If datasets are incomplete and interpretation is not rigorous, markers assumed specific to porcine may overlap with bovine or other species.

**Conclusion:** No single analytical platform is universally optimal. Rapid tests are valuable for preliminary screening, real-time PCR remains highly practical for routine halal authentication, and LC-MS/MS offers advanced confirmatory potential when supported by robust reference datasets. Method selection should therefore be risk-based and aligned with product matrix, processing severity, laboratory capability, cost, and decision urgency. The most resilient halal certification model combines targeted analytical testing with effective audit and traceability systems.

**Keywords:** *porcine detection, halal assurance, real-time PCR, LC-MS/MS, adulteration, authentication*

## ANALITIČKI PRISTUPI ZA DETEKCIJU SASTOJAKA SVINJSKOG PORIJEKLA U HALAL CERTIFICIRANJU

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### SAŽETAK

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**Uvod:** Kontinuirano širenje globalnog halal tržišta povećalo je potrebu za pouzdanim analitičkim alatima za otkrivanje prisustva svinjskog porijekla i unakrsne kontaminacije. Ekonomska zamjena halal sirovina jeftinijim nehalal alternativama, zajedno sa sve složenijim međunarodnim lancima snabdijevanja, povećala je rizik od kontaminacije svinjskom DNK, što je zabilježeno u zemljama poput Indonezije, Malezije i Bruneja. Kao rezultat toga, laboratorijska ispitivanja postala su važna dopuna za jačanje sistema halal audita. Ovaj rad kritički ocjenjuje i predstavlja iskustva LPPOM-a vezana za praktičnu primjenjivost platformi za detekciju svinjskog porijekla, uključujući brze imunološke testove, enzimski imunotest (ELISA), lančanu reakciju polimeraze u realnom vremenu (PCR) i tečnu hromatografiju u sprezi s tandemskom masenom spektrometrijom (LC-MS/MS).

**Rezultati i diskusija:** Brzi lateralni imunološki testovi i dalje predstavljaju atraktivne alate za početni skrining zbog niske cijene, prenosivosti i kratkog vremena potrebnog za dobijanje rezultata. Međutim, njihova primjena u donošenju ključnih odluka može biti ograničena zbog niže osjetljivosti, uticaja matrice uzorka i ograničene transparentnosti u pogledu vlasnički zaštićenih ciljeva antitijela. ELISA metoda pruža veću osjetljivost i mogućnost polukvantitativne analize, ali njena učinkovitost može biti smanjena kod visoko prerađenih proizvoda u kojima termička obrada, hidroliza ili fermentacija mijenjaju strukturu proteina neophodne za prepoznavanje od strane antitijela.

PCR u realnom vremenu široko je prihvaćen kao jedan od najpouzdanijih rutinskih pristupa za identifikaciju životinjskih vrsta, jer cilja DNK sekvence specifične za određenu vrstu uz visoku osjetljivost. Ipak, intenzivna prerada može uzrokovati degradaciju DNK, dok pouzdana primjena zahtijeva validirane početnice (primere) i sonde, kontrolu kontaminacije, kompetentno osoblje i usklađenost sa zahtjevima standarda ISO/IEC 17025. LC-MS/MS predstavlja sofisticiran komplementarni pristup koji detektuje peptide ili karakteristične molekularne markere putem identifikacije zasnovane na masi (molekularni otisak). Međutim, pouzdano tumačenje rezultata zavisi od sveobuhvatnih referentnih baza podataka. Prirodne varijacije uzrokovane pasminom, starošću, hranidbom, vrstom tkiva i historijom prerade mogu promijeniti profile detektabilnih markera. Ukoliko su dostupni skupovi podataka nepotpuni, a interpretacija nedovoljno rigorozna, markeri koji se smatraju specifičnim za svinjsko porijeklo mogu se preklapati s markerima goveđeg ili drugih životinjskih vrsta.

**Zaključak:** Ne postoji jedinstvena analitička platforma koja je optimalna za sve situacije. Brzi testovi imaju značajnu vrijednost za preliminarni skrining, PCR u realnom vremenu ostaje izuzetno praktičan za rutinsku halal autentifikaciju, dok LC-MS/MS pruža napredne mogućnosti potvrdne analize kada je podržan robusnim referentnim bazama podataka. Stoga bi izbor metode trebao biti zasnovan na procjeni rizika i usklađen s vrstom proizvoda, stepenom prerade, laboratorijskim kapacitetima, troškovima i hitnošću donošenja odluke. Najotporniji model halal certificiranja kombinuje ciljano analitičko testiranje sa efikasnim sistemima audita i sljedivosti.

**Ključne riječi:** *detekcija svinjskog porijekla, halal osiguranje, PCR u realnom vremenu, LC-MS/MS, patvorenje, autentifikacija.*



## **CHAPTER 5**

### **POGLAVLJE 5**



## **HALAL IN PHARMACEUTICAL, COSMETIC AND HEALTHCARE SECTORS**

Halal u farmaceutskom, kozmetičkom i zdravstvenom sektoru

**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**NAVIGATING HALAL COMPLIANCE IN PHARMACEUTICALS AND NUTRACEUTICALS: CONSIDERATIONS FOR MUSLIM CONSUMERS**

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**ABSTRACT**

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Over the past several decades, the global market for dietary supplements has experienced substantial growth, driven by expanding distribution through specialty retailers, supermarkets, online platforms, and multi-level marketing networks. This rapid expansion has increasingly blurred the distinction between pharmaceuticals, traditionally intended for the prevention and treatment of disease and nutraceuticals, which are marketed to promote general health and well-being. As a result, consumers are faced with a complex landscape of products that often share similar formulations, delivery systems, and ingredient sources. For Muslim consumers, this convergence raises important questions regarding halal compliance and the permissibility of these products under Islamic dietary laws. This presentation examines the composition and manufacturing of pharmaceuticals and nutraceuticals, with a particular focus on ingredients and processes that may pose concerns for halal observance. Islamic jurisprudence provides allowances for the consumption of otherwise prohibited (haram) substances in cases of necessity, particularly when no permissible alternatives are available and the product is required for medical treatment. However, many Muslim consumers seek to minimize or avoid the use of such products when alternatives exist. For example, gelatin capsules commonly used in both prescription medications and dietary supplements are often derived from porcine sources, rendering them non-halal. While life-saving or essential medications may be exempt under the principle of necessity, non-essential products such as multivitamins and supplements present opportunities for substitution with halal-certified or plant-based alternatives, including tablet forms or vegetarian capsules. In addition to gelatin, alcohol is another ingredient of concern. Muslim consumers often prefer alcohol free formulations, particularly in products such as cough syrups, tonics, and liquid supplements. Although certain interpretations of Islamic law permit the use of non-intoxicating or industrial alcohols in pharmaceuticals and cosmetics, preferences vary widely among consumers, emphasizing the importance of transparency and labeling. Furthermore, the production of dietary supplements closely parallels that of food products, requiring careful evaluation of raw materials, processing aids, and cross-contamination risks associated with shared manufacturing facilities. The concept of halal has also gained increasing prominence in the cosmetics and personal care sector, reflecting heightened consumer awareness and demand, particularly among Muslim women. Ingredients such as ethanol, animal-derived fats, collagen, and other bioactive compounds must be scrutinized not only for their source but also for their processing and handling. As with

food products, halal compliance in cosmetics requires that all ingredients be permissible and that manufacturing processes prevent contact with najis (impure) or haram substances.

This presentation will identify and analyze critical control points across pharmaceuticals, and nutraceuticals, that are essential for ensuring halal integrity. It will also highlight emerging trends, regulatory considerations, and opportunities for industry stakeholders to better serve Muslim consumers through product innovation, certification, and transparent communication. By addressing these issues, the discussion aims to provide practical guidance for consumers navigating increasingly complex product categories while maintaining adherence to their religious and ethical values.

**Keywords:** *Halal compliance, Pharmaceuticals, Nutraceuticals, Gelatin, Alcohol*

## SNALAŽENJE U HALAL USKLAĐENOSTI FARMACEUTSKIH PROIZVODA I NUTRACEUTIKA: RAZMATRANJA ZA MUSLIMANSKE POTROŠAČE

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### SAŽETAK

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Tokom posljednjih nekoliko decenija, globalno tržište dodataka prehrani zabilježilo je značajan rast, potaknut širenjem distribucije putem specijaliziranih prodavnica, supermarketa, online platformi i mreža višerazinskog marketinga. Ova brza ekspanzija sve više je zamaglila razliku između farmaceutskih proizvoda, koji su tradicionalno namijenjeni prevenciji i liječenju bolesti, i nutraceutika, koji se plasiraju kao proizvodi za unapređenje općeg zdravlja i blagostanja. Kao rezultat toga, potrošači se suočavaju s kompleksnim tržištem proizvoda koji često imaju slične formulacije, načine primjene i izvore sastojaka. Za muslimanske potrošače, ovakvo približavanje ovih kategorija otvara važna pitanja o halal usklađenosti i dozvoljenosti ovih proizvoda prema islamskim prehrambenim propisima. Ova prezentacija razmatra sastav i proces proizvodnje farmaceutskih proizvoda i nutraceutika, s posebnim fokusom na sastojke i procese koji mogu predstavljati izazov za halal praksu. Islamska pravna tradicija (fikhu) dozvoljava upotrebu inače zabranjenih (haram) supstanci u slučajevima nužde, naročito kada ne postoje dozvoljene alternative i kada je proizvod neophodan za medicinski tretman. Međutim, mnogi muslimanski potrošači nastoje smanjiti ili izbjeći korištenje takvih proizvoda kada alternative postoje. Na primjer, želatinske kapsule koje se često koriste i u lijekovima na recept i u dodacima prehrani često su porijeklom od svinje, što ih čini nehalal. Dok se lijekovi koji spašavaju život ili su medicinski neophodni mogu smatrati izuzetkom prema principu nužde, proizvodi koji nisu esencijalni, poput multivitamina i dodataka prehrani, predstavljaju mogućnost zamjene halal-certificiranim ili biljnim alternativama, uključujući tabletirane oblike ili vegetarijanske kapsule. Pored želatine, alkohol je još jedan sastojak koji izaziva zabrinutost. Muslimanski potrošači često preferiraju formulacije bez alkohola, posebno kod proizvoda poput sirupa protiv kašlja, tonika i tečnih dodataka prehrani. Iako određena tumačenja islamskog

prava dopuštaju upotrebu neintoksikacijskih ili industrijskih alkohola u farmaceutskim proizvodima i kozmetici, stavovi potrošača se značajno razlikuju, što naglašava važnost transparentnosti i jasnog označavanja proizvoda. Nadalje, proizvodnja dodataka prehrani često je vrlo slična proizvodnji prehrambenih proizvoda, što zahtijeva pažljivu procjenu sirovina, pomoćnih sredstava u preradi i rizika od unakrsne kontaminacije u pogonima gdje se proizvode različite kategorije proizvoda. Koncept halala sve više dobija na značaju i u sektoru kozmetike i proizvoda za ličnu njegu, što odražava rastuću svijest potrošača i povećanu potražnju, posebno među muslimankama. Sastojci poput etanola, masti životinjskog porijekla, kolagena i drugih bioaktivnih supstanci moraju se provjeravati ne samo prema izvoru, već i prema načinu obrade i rukovanja. Kao i kod prehrambenih proizvoda, halal usklađenost u kozmetici zahtijeva da svi sastojci budu dozvoljeni te da proizvodni procesi spriječe kontakt sa najis (nečistim) ili haram supstancama. Ova prezentacija će identificirati i analizirati kritične kontrolne tačke u farmaceutskim proizvodima i nutraceuticima koje su ključne za očuvanje halal integriteta. Također će istaknuti nove trendove, regulatorne aspekte i prilike za industrijske aktere da bolje odgovore potrebama muslimanskih potrošača kroz inovacije proizvoda, certificiranje i transparentnu komunikaciju. Obradom ovih pitanja, diskusija ima za cilj pružiti praktične smjernice potrošačima koji se snalaze u sve složenijim kategorijama proizvoda, uz očuvanje vjerskih i etičkih vrijednosti.

**Ključne riječi:** *halal usklađenost, farmaceutski proizvodi, nutraceutici, želatina, alkohol*



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**IN VITRO STUDY OF THE ANTIFUNGAL ACTIVITY OF 10% PROPO-  
LIS EXTRACT IN PROPYLENE GLYCOL ON CANDIDA ALBICANS**

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**ABSTRACT**

Propolis is a bee product known for its pronounced biological and antimicrobial properties. Due to its complex chemical composition and the presence of numerous bioactive components, propolis is increasingly being tested as a potential natural agent for suppressing the growth of microorganisms, including fungi from the genus *Candida*. The aim of this work was to test the antifungal effect of 10% propolis extract in propylene glycol on *Candida albicans in vitro*, thereby contributing to the development of new natural therapeutic options in the fight against resistant fungal infections. The antimicrobial activity of the samples was tested using the growth inhibition test, which is one of the standard in vitro methods for assessing the sensitivity of microorganisms to antimicrobial substances. The observed zone of inhibition around the application site of the propolis extract indicates the sensitivity of *Candida albicans* to the action of propolis. The results indicate the antifungal potential of propolis extract and justify further research into its biological activity and possible application as a natural antimicrobial agent, while the use of propylene glycol as a carrier and solvent enables the formulation of preparations without ethyl alcohol, which means that this type of propolis can be considered suitable for the development of a functional halal product.

**Keywords:** *propolis, antifungal activity, Candida albicans*

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## IN VITRO ISPITIVANJE ANTIFUNGALNOG DJELOVANJA 10% EKSTRAKTA PROPOLISA U PROPILEN GLIKOLU NA CANDIDA ALBICANS

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### SAŽETAK

Propolis je pčelinji proizvod poznat po izraženim biološkim i antimikrobnim svojstvima. Zbog složenog hemijskog sastava i prisustva brojnih bioaktivnih komponenti, propolis se sve češće ispituje kao potencijalno prirodno sredstvo za suzbijanje rasta mikroorganizama, uključujući gljivice iz roda *Candida*. Cilj ovog rada bio je ispitati antifungalno djelovanje ekstrakta 10% propolisa u propilen glikolu na *Candida albicans* u *in vitro* uslovima, čime se doprinosi razvoju novih prirodnih terapijskih opcija u borbi protiv rezistentnih gljivičnih infekcija. Antimikrobna aktivnost uzoraka ispitana je primjenom testa inhibicije rasta, koji predstavlja jednu od standardnih *in vitro* metoda za procjenu osjetljivosti mikroorganizama na antimikrobne supstance. Uočena zona inhibicije oko mjesta aplikacije ekstrakta propolisa ukazuje na osjetljivost *Candida albicans* na djelovanje propolisa. Rezultati ukazuju na antifungalni potencijal ekstrakta propolisa i opravdavaju dalja istraživanja njegove biološke aktivnosti i moguće primjene kao prirodnog antimikrobnog sredstva, dok primjena propilen glikola kao nosača i rastvarača omogućava formulaciju preparata bez etilnog alkohola, čime se ovakav propolis može smatrati pogodnim za razvoj funkcionalnog halal proizvoda.

**Ključne riječi:** *propolis, antifungalno djelovanje, Candida albicans*

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HALAL CERTIFICATION VERSUS SHARIAH-COMPLIANT OPERATIONS IN MALAYSIA'S BEAUTYPRENEURSHIP INDUSTRY:  
A THEMATIC LITERATURE REVIEW**

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**ABSTRACT**

The rapid growth of the beautypreneurship industry, particularly among micro and small-scale entrepreneurs, has created new opportunities within the halal economy. However, the current halal certification framework primarily focuses on product-based verification, with limited applicability to service-oriented sectors such as beauty spas, salons, and mobile facial services. This creates a conceptual and operational gap between halal-certified products and the broader implementation of Shariah-compliant practices within the beautypreneurship ecosystem. This study aims to examine the distinction between halal certification and Shariah-compliant practices, identify gaps in existing halal certification schemes, and propose a conceptual framework that integrates both dimensions within the beauty entrepreneurship industry. Employing a qualitative approach, this study adopts thematic analysis of relevant literature, policy documents, and industry reports related to halal certification, Islamic marketing, and beauty services. The findings reveal that while halal certification in Malaysia is well-structured for product categories such as cosmetics, there is a significant gap in addressing service-based operations. Key themes identified include the product-centric nature of halal certification, the hybrid structure of beautypreneurship (product-service-digital), and the lack of standardized Shariah operational guidelines for beauty services. The study further highlights the need for a more holistic framework that integrates halal certification with Shariah-compliant operational practices, including ethical marketing, service delivery, and customer interaction. This study contributes by bridging the conceptual and practical gap between product-based halal certification and service-based Shariah compliance, particularly in the underexplored context of beautypreneurship.

**Keywords:** *Halal and Certification, Shariah Compliance, Beauty Industry, Halal and Shariah integration, ethical marketing Islam.*

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## HALAL CERTIFIKACIJA NASPRAM ŠERIJATSKI USKLAĐENOG POSLOVANJA U INDUSTRIJI BEAUTY PODUZETNIŠTVA\* U MALEZIJI: TEMATSKI PREGLED LITERATURE

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### SAŽETAK

Brzi rast industrije „beautypreneurshipa“ (poduzetništvo u industriji ljepote), posebno među mikro i malim poduzetnicima, stvorio je nove mogućnosti unutar halal ekonomije. Međutim, postojeći okvir halal certifikacije uglavnom je fokusiran na verifikaciju proizvoda, uz ograničenu primjenjivost na uslužne sektore kao što su beauty spa centri, saloni ljepote i mobilne usluge njege lica. To stvara konceptualni i operativni jaz između halal certificiranih proizvoda i šire implementacije šerijatski usklađenih praksi unutar ekosistema beauty preduzetništva. Ova studija ima za cilj da ispita razliku između halal certifikacije i šerijatski usklađenih praksi, identifikuje nedostatke u postojećim sistemima halal certifikacije i predloži konceptualni okvir koji integriše obje dimenzije u industriji beauty preduzetništva. Koristeći kvalitativni pristup, studija primjenjuje tematsku analizu relevantne literature, političkih dokumenata i industrijskih izvještaja koji se odnose na halal certifikaciju, islamski marketing i beauty usluge. Rezultati pokazuju da je halal certifikacija u Maleziji dobro razvijena za kategorije proizvoda poput kozmetike, ali postoji značajan nedostatak u regulisanju uslužnih djelatnosti. Identifikovane ključne teme uključuju proizvodno-orijentisanu prirodu halal certifikacije, hibridnu strukturu beautypreneurshipa (proizvod–usluga–digitalno) i nedostatak standardizovanih šerijatskih operativnih smjernica za beauty usluge. Studija dodatno naglašava potrebu za holističkim okvirom koji integriše halal certifikaciju sa šerijatski usklađenim operativnim praksama, uključujući etički marketing, pružanje usluga i interakciju s klijentima. Ova studija doprinosi premošćivanju konceptualnog i praktičnog jaza između halal certifikacije bazirane na proizvodima i šerijatske usklađenosti u uslužnim djelatnostima, posebno u nedovoljno istraženom kontekstu beauty preduzetništva.

**Ključne riječi:** *halal i certifikacija, šerijatska usklađenost, industrija ljepote, integracija halala i šerijata, islamski etički marketing.*

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\*poduzetništvo u industriji ljepote





## **CHAPTER 6**

### **POGLAVLJE 6**



## **HALAL TOURISM AND GASTRONOMY**

Halal turizam i gastronomija

[www.congress.halal.ba](http://www.congress.halal.ba)



**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**HOW DO HOTEL MANAGERS AND HOTEL OWNERS IN BOSNIA  
AND HERZEGOVINA PERCEIVE HALAL CERTIFICATION AS A  
TOOL FOR MARKET ATTRACTIVENESS?  
AN EXPLORATORY QUALITATIVE STUDY**

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**ABSTRACT**

The continued growth of halal tourism has increased interest in halal-certified hospitality services as destinations seek to attract Muslim travellers and diversify their tourism offerings. While previous research has primarily examined halal tourism from the perspective of tourists and destination competitiveness, limited attention has been given to how hotel decision-makers themselves perceive halal certification as a strategic business tool.

This study explores how hotel managers and hotel owners in Bosnia and Herzegovina perceive halal certification in relation to hotel market attractiveness. Specifically, the research examines managerial perceptions regarding the role of halal certification in attracting guests, strengthening competitiveness, improving hotel image, and supporting market positioning. Bosnia and Herzegovina represents a particularly relevant context due to its established halal certification system, significant Muslim population, and growing tourism sector.

The study adopts an exploratory qualitative research design based on semi-structured interviews with hotel managers and hotel owners. Data will be analysed using thematic analysis to identify recurring patterns, perceptions, opportunities, and challenges associated with halal certification in the hotel sector.

The findings are expected to provide insights into how hospitality decision-makers understand halal certification, whether they perceive it as a strategic market opportunity, a branding mechanism, a signal of trust and quality, or an operational challenge. Drawing on signalling theory, the study contributes to the growing literature on halal tourism by shifting attention from tourist perceptions toward managerial perspectives and strategic decision-making processes.

The research offers practical implications for hotel operators, certification bodies, and tourism stakeholders seeking to enhance the competitiveness and positioning of Bosnia and Herzegovina within the growing halal tourism market.

**Keywords:** halal certification, halal tourism, hotel management, market attractiveness, signalling theory, Bosnia and Herzegovina

# KAKO MENADŽERI I VLASNICI HOTELA U BOSNI I HERCEGOVINI PERCIPIRAJU HALAL CERTIFICIRANJE KAO ALAT ZA TRŽIŠNU PRIVLAČNOST? EKSPLOLATIVNA KVALITATIVNA STUDIJA

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## SAŽETAK

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Kontinuirani rast halal turizma povećao je interes za halal certificirane usluge u ugostiteljstvu, dok istovremeno turističke destinacije nastoje privući muslimanske putnike i diversificirati svoju turističku ponudu. Iako su dosadašnja istraživanja halal turizma prvenstveno bila usmjerena na perspektive turista i konkurentnost turističkih destinacija, znatno manje pažnje posvećeno je načinu na koji sami donosioci odluka u hotelijerstvu percipiraju halal certificiranje kao strateški poslovni alat.

Ovo istraživanje analizira kako menadžeri i vlasnici hotela u Bosni i Hercegovini percipiraju halal certificiranje u kontekstu tržišne privlačnosti hotela. Poseban fokus stavljen je na percepcije menadžera o ulozi halal certificiranja u privlačenju gostiju, jačanju konkurentnosti, unapređenju imidža hotela i njegovom tržišnom pozicioniranju. Bosna i Hercegovina predstavlja posebno relevantan istraživački kontekst zahvaljujući uspostavljenom sistemu halal certificiranja, značajnom udjelu muslimanskog stanovništva i rastućem turističkom sektoru.

Istraživanje koristi eksplorativni kvalitativni istraživački pristup zasnovan na polu-strukturiranim intervjuima sa menadžerima i vlasnicima hotela. Prikupljeni podaci analizirat će se primjenom tematske analize s ciljem identifikacije ponavljajućih obrazaca, percepcija, prilika i izazova povezanih s halal certificiranjem u hotelskom sektoru.

Očekuje se da će rezultati pružiti dublje razumijevanje načina na koji donosioci odluka u hotelijerstvu razumiju halal certificiranje, odnosno da li ga percipiraju kao stratešku tržišnu priliku, alat za brendiranje, signal povjerenja i kvaliteta ili kao operativni izazov. Oslanjajući se na teoriju signaliziranja, istraživanje doprinosi rastućoj literaturi o halal turizmu preusmjeravanjem fokusa sa percepcija turista na perspektive hotelskih menadžera i procese strateškog odlučivanja.

Istraživanje također nudi praktične implikacije za hotelske operatere, certifikacijska tijela i druge aktere u turizmu koji nastoje unaprijediti konkurentnost i tržišno pozicioniranje Bosne i Hercegovine na rastućem tržištu halal turizma.

**Ključne riječi:** halal certificiranje, halal turizam, hotelski menadžment, tržišna privlačnost, teorija signaliziranja, Bosna i Hercegovina.

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**BOOK OF ABSTRACTS AND PAPERS  
FROM THE 4<sup>th</sup> EUROPEAN HALAL CONGRESS**

**THE SYNERGY BETWEEN HALAL GASTRONOMY AND HALAL TOURISM: ENHANCING MUSLIM-FRIENDLY TRAVEL EXPERIENCES**

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**ABSTRACT**

Halal tourism has emerged as one of the fastest-growing sectors within the global travel industry, driven by the increasing demand from Muslim travellers seeking faith-compliant services and experiences. Among the most influential components of this sector is halal gastronomy, which plays a critical role in shaping destination appeal and visitor satisfaction. This study explores the dynamic relationship between halal gastronomy and halal tourism, highlighting how authentic halal culinary experiences contribute to destination branding, cultural exchange, and sustainable tourism development. By examining case studies from emerging halal tourism destinations and industry practices, the paper identifies how gastronomy acts as both a cultural ambassador and a key factor in travel decision-making for Muslim tourists. The findings suggest that integrating halal-certified food systems, local culinary heritage, and tourism strategies can significantly enhance the competitiveness of destinations within the global halal travel market. Strengthening the link between gastronomy and tourism offers new opportunities for economic growth, cultural preservation, and improved Muslim-friendly travel experiences worldwide..

**Keywords:** *Halal tourism, Halal gastronomy, Muslim-friendly destinations, Culinary heritage, Sustainable tourism.*

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## **SINERGIJA IZMEĐU HALAL GASTRONOMIJE I HALAL TURIZMA: UNAPREĐENJE MUSLIMANIMA PRILAGOĐENIH PUTNIČKIH ISKUSTAVA**

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### **SAŽETAK**

Halal turizam se nametnuo kao jedan od najbrže rastućih sektora u globalnoj turističkoj industriji, potaknut sve većom potražnjom muslimanskih putnika koji traže usluge i iskustva usklađena s vjerskim principima. Među najutjecajnijim komponentama ovog sektora nalazi se halal gastronomija, koja ima ključnu ulogu u oblikovanju privlačnosti destinacije i zadovoljstva posjetilaca. Ova studija istražuje dinamičan odnos između halal gastronomije i halal turizma, naglašavajući kako autentična halal kulinarska iskustva doprinose brendiranju destinacije, kulturnoj razmjeni i održivom razvoju turizma. Kroz analizu studija slučaja iz novih halal turističkih destinacija i praksi u industriji, rad identificira kako gastronomija djeluje i kao kulturni ambasador i kao važan faktor u donošenju odluka o putovanju kod muslimanskih turista. Rezultati ukazuju da integracija halal-certificiranih prehrambenih sistema, lokalnog kulinarskog naslijeđa i turističkih strategija može značajno povećati konkurentnost destinacija na globalnom tržištu halal putovanja. Jačanje veze između gastronomije i turizma otvara nove mogućnosti za ekonomski rast, očuvanje kulture i unapređenje muslimanima prilagođenih putničkih iskustava širom svijeta.

**Ključne riječi:** *halal turizam, halal gastronomija, musliman-friendly destinacije, kulinarsko naslijeđe, održivi turizam.*

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