



09th and 10th June 2026.

Hotel Hills Sarajevo, Bosnia and Herzegovina

"استشراف مستقبل تطبيق التشريعات الإسلامية (معايير الحلال)
في إطار التقنيات المستدامة، مع التركيز على مؤشر مخلفات
الحيوانات"

**FUTURE FORESIGHT OF HALAL IN THE
CONTEXT OF SUSTAINABLE
TECHNOLOGIES WITH FOCUS TO ANIMAL
WASTE INDEX**

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**Food Regulatory Specialist – Food Safety and Halal
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The concept of “you are what you eat”
is supported by Quran

Surah Mu'minun Ayat 51

يَأْتِيهَا الرُّسُلُ كُلُّوا مِنَ الطَّيِّبَاتِ وَأَعْمَلُوا صَالِحًا
إِنِّي بِمَا تَعْمَلُونَ عَلِيمٌ

Ya'ayyaha r-rusul kullu minat tayyibatil wa'maloo saalihan innaa 'Alimaa bimaa ta'maloon 'Alim

[Allah said], "O messengers, eat from the good foods and work righteousness. Indeed, I, of what you do, am Knowing.

The core definition of Halal is based on the Islamic principle where it says: criticizes wasteful consumption. It highlights the contradiction of people overindulging in food and letting it go to waste, even though there are others who are hungry or in need. It's a call for mindfulness, moderation, and compassion toward those less fortunate.

يَا بَنِي آدَمَ خُذُوا زِينَتَكُمْ عِندَ كُلِّ
مَسْجِدٍ وَكُلُوا وَاشْرَبُوا وَلَا تُسْرِفُوا
إِنَّهُ لَا يُحِبُّ الْمُسْرِفِينَ

O Children of Adam! Take your adornment, while praying and going round the Ka'bah, **and eat and drink but waste not by extravagance**, certainly He (Allah) likes not Al-Musrifun (those who waste by extravagance).
[Surah Al-A'raaf: Verse 31]

Key Points

“Rising global demand for sustainable, ethical food systems

Need for technologies that reduce waste and enhance productivity

Importance of integrating Halal principles into sustainability frameworks

Waste is no longer waste.*

But integrity must lead.

The future lies in convergence:

Where circular economy meets synthetic biology, and where technology meets ethical clarity.



Introduction

- As the global population grows and environmental challenges intensify, the demand for ethical, sustainable, and health-conscious solutions continues to rise. Within this evolving landscape, the integration of Islamic principles; particularly those related to **Halal (permissible) and Tayyib** (pure and wholesome), into technological and environmental frameworks offers an innovative and culturally rooted approach to sustainability. The Halal industry, traditionally associated with food, is now expanding its influence into diverse sectors such as agriculture, pharmaceuticals, cosmetics, and biotechnology, calling for robust systems that align with both religious compliance and environmental stewardship.

Food chain control

- Halal covers all aspects of food production from raw materials, food processing and food handling services. They must comply with the halal supply chain standard, food and requirements of the country or certification by the halal body. Muslim and non-Muslim consumers who buy **halal food products due to health, environmental and quality concerns have diversified the market.** Food chain control efforts need to be focused to develop more effective security halal authentication systems. National situations will influence the design of these systems. However, whatever the architecture of a national food control system, measuring its effectiveness is universally important to verify that resources are being used well and that the health and economic interests of consumers are protected.

Food Chain Sustainability : “Farm to Fork” then to FARM



Religion and culture

Religion is ‘the belief in Allah Almighty with a commitment to follow principles believed to be set forth by God’ (McDaniel and Burnett, 1990).

Religion is “cultural subsystem” (Arnould, Price and Zinkhan, 2004)

Religion is a specific element of culture (Parida and Sahney, 2017) Religion can also provide a holistic understanding of people’s lives (Noori Doabi & Talebnia, 2022).

Therefore, researchers should integrate religious commitment into different **models** of attitudes and behaviour (El Hafiz, 2020).





Halal – More Than a Diet

- Halal is not just about food.
- It represents a complete ethical lifestyle:
 - Cleanliness
 - Sustainability
 - Social responsibility
- Applies to agriculture, waste management, environment, and economy.





Halal Meets Sustainability

- Agricultural expansion = more animal waste.
- Poor waste management = pollution, disease, and lost resources.
- Islamic values demand responsible, ethical solutions

A Growing Problem

- Halal principles align naturally with:
 - Environmental care
 - Waste reduction
 - Resource efficiency
- Opportunity to build systems that are both halal and green.



Circular Economy and Waste Reduction

- The principles of Halalan Tayyiban can be further extended to circular economy practices. This concept encourages minimizing waste through recycling, reusing, and reducing consumption. For instance:
- Zero Waste Halal Food Chains: From production to packaging, Halalan Tayyiban products can be part of circular systems where waste is minimized, by-products are reused, and packaging is sustainable.
- Food Waste Prevention: Halal food businesses can partner with NGOs and community groups to redistribute surplus food, reducing food waste while fulfilling the duty of charity (Zakat), which aligns with Islamic ethics.
- Food Waste and Loss Index and Animal Waste Management: Animal waste must be handled ethically and hygienically in Islamic contexts. Technologies like halal-certified bioreactors: Ensure compliance, Reduce waste, Produce usable, halal-safe by-products. Contributing to global efforts to combat climate

The Food Safety Index (FSI)

- (FSI) is a measure used to assess the overall food safety situation in a given country or region. It typically evaluates how well food safety standards, regulations, and practices are implemented to protect public health from foodborne illnesses. This index is often compiled by organizations like the World Health Organization (WHO), the Food and Agriculture Organization (FAO), or national public health agencies.



The Halal Commitment Index (HCI)

- (HCI) is a tool designed to measure the level of commitment to Halal standards and principles within a company, organization, or sector. While the exact formulation or methodology of the HCI may vary depending on the entity that is using it, it typically aims to evaluate how seriously an organization adheres to Halal practices, especially in areas such as food, pharmaceuticals, cosmetics, and financial services.

Food Waste and Loss Index (FWLI)

- (FWLI) is an international metric developed to measure the amount of food that is lost or wasted throughout the supply chain, from production to consumption. It is used to assess and track progress toward Sustainable Development Goal (SDG) 12.3, which aims to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses, by 2030.

Animal Waste Index (AWI)

- The Animal Waste Index is a conceptual or analytical tool used to quantify and **monitor the volume, type, and environmental impact** of waste generated from livestock and animal production activities. This index helps in assessing the **sustainability and ecological footprint** of animal farming systems.
- Note: The term "Animal Waste Index" is not yet standardized globally like the Food Loss and Waste Index under SDG 12.3, but it's increasingly used in academic, environmental, and policy contexts to guide

Animal Waste Index (AWI): Purpose and Relevance:

- **Environmental Monitoring:** Tracks the impact of animal waste (e.g., manure, blood, offal) on soil, water, and air quality.
- **Resource Management:** Supports efforts to recycle or repurpose animal waste, such as in bioenergy, composting, or organic fertilizer production.
- **Sustainability Benchmarking:** Provides data for evaluating sustainable livestock practices and compliance with environmental regulations.
- **Public Health Considerations:** Helps identify risks associated with poor waste handling,

Circular Economy And Ecology

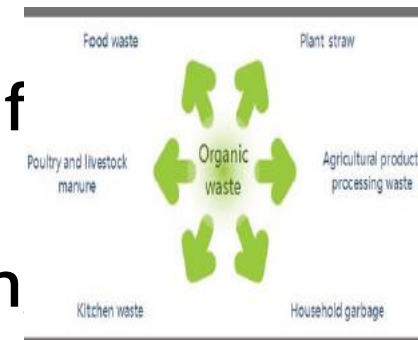
The Ecodrum - A Smart Solution

A modern, halal-compliant technology to treat animal, plant and food waste.

Features: Sealed, insulated, odor-free, Made of halal-grade materials

Rotates gently to preserve natural composting

- Benefits of the Ecodrum: Turns waste into value (compost, soil health)
- Reduces harmful emissions
- Supports halal agriculture and food safety
- Encourages ethical innovation



What is Composting?

- The decomposition and recycling of organic material in order to produce a homogeneous product.
- Micro-organisms present in the material use oxygen to break down organic matter in order to obtain energy and nutrients.
- The energy they gain is then used grow and multiply.
- Heat is given off as a by-product of this process, which gets trapped in the pile and helps with decomposition.



Why Ecodrum?

Ecodrum technology converts organic waste into safe, nutrient-rich compost through controlled biological processes, reducing environmental impact and supporting sustainable agriculture.

Scientific Rationale for In-Vessel Composting of Animal Waste

Ecodrum represents a scientifically validated approach to in-vessel aerobic composting, designed to manage organic waste, particularly animal mortality and by-products, through controlled microbial decomposition. The system operates within a sealed, rotating drum that maintains optimal temperature, aeration, and moisture conditions, thereby accelerating the breakdown of organic matter while minimizing environmental risks.

From a microbiological perspective, Ecodrum promotes thermophilic composting phases that effectively reduce pathogens, volatile organic compounds, and odor emissions. The system's design supports consistent oxygen



Why Ecodrum?

Environmental and Operational Benefits:

- **Biosecurity:** Reduces disease transmission risks associated with open-pit or windrow composting.
- **Carbon Stabilization:** Converts labile organic matter into stable humus-like material, enhancing soil health.
- **Nutrient Recycling:** Retains nitrogen and phosphorus in composted output, supporting circular agriculture.
- **Climate Resilience:** Proven performance in cold and variable climates, ensuring year-round operation.
- **Regulatory Alignment:** Supports compliance with USDA, EPA, and halal standards for waste treatment and reuse.

Ecodrum's modular scalability and low energy requirements make it suitable for diverse



The Ecodrum

The Ecodrum system is a proven technology, successfully installed on poultry, hog and meat processing operations throughout the world.

The Ecodrum is perfect for both large and small scale production, and offers the following benefits:

- Clean and simple to operate
- Low-cost operation
- Reduces odor and pathogens
- Maintains composting activity in cold weather



Bio-Thermic Digesters and Composting Technologies

Ecodrum Technology

- Ecodrum offers an innovative, eco-safe solution that transforms organic waste, including food residues and biodegradable packaging, into high-quality compost.
- Its rapid decomposition process is designed to minimize odors, pathogens, and greenhouse gas emissions, supporting sustainable agriculture



Composting Principles

- In order to create a satisfactory compost, it is essential to have a favorable carbon to nitrogen ratio, as well as a sufficient moisture level and adequate oxygen. Carbon provides both an energy source and the basic building block making up about 50% of the microbial cells (wood chips, shavings, peanut hulls, etc.). Nitrogen is a crucial component of proteins, nucleic acids, amino acids, enzymes and co-enzymes necessary for cell growth and function. The ideal ratio of C:N for active composting is 25:1 to 30:1. Ratios of 20:1 up to 40:1 will consistently give good results. A minimum of 5% oxygen concretion within the pore spaces of composting materials is recommended (air contains about 21%).

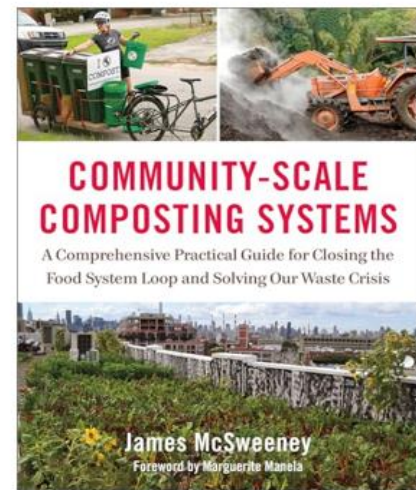
Feeding the Micro-Organisms with Carbon Materials

- In order for the composting process to occur, a suitable environment must be present for the micro-organisms to live and grow.
- Microbes use carbon for energy and nitrogen for growth
- Carbon to nitrogen ratio (C:N)
 - Ideal C:N for in-vessel compost systems 20:1 to 30:1

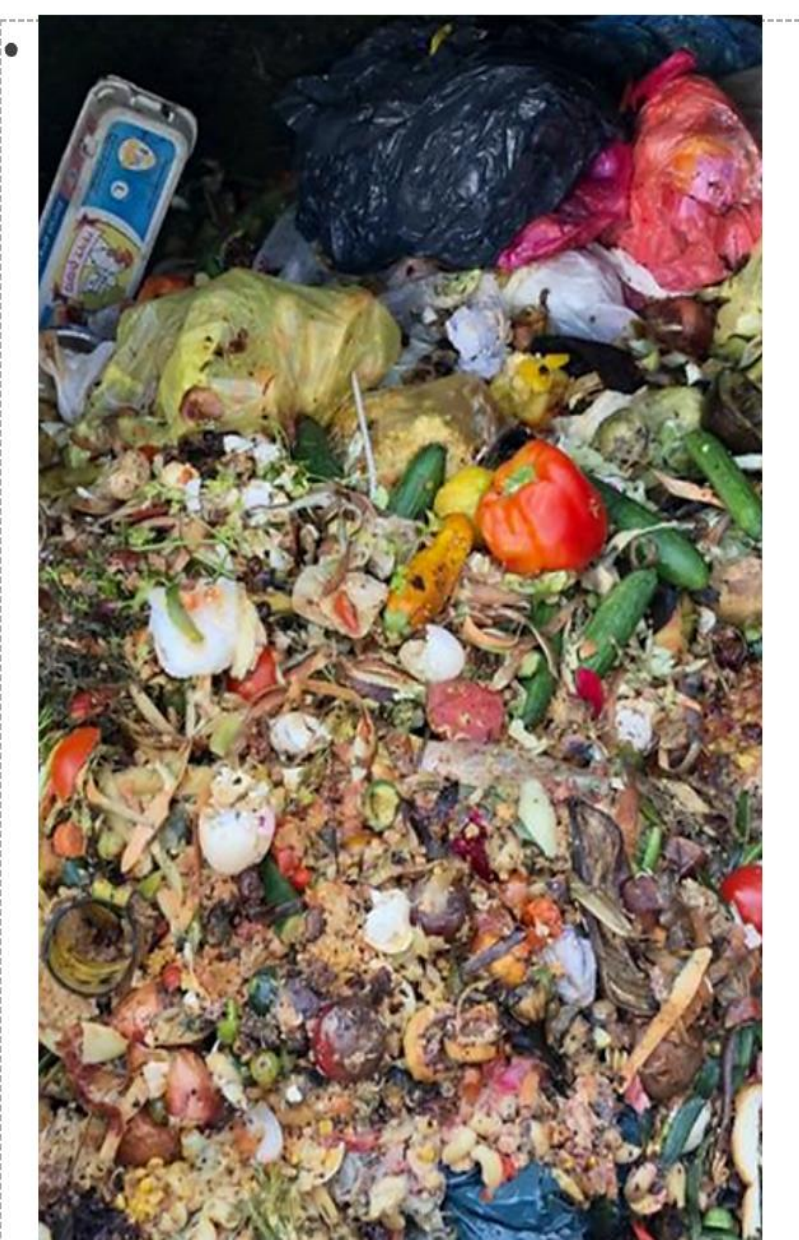




Community and School Opportunities



Organic Opportunity for schools and communities





The health of our planet depends on the health of its ecosystems,
and sustainable agriculture is key
to maintaining that health.

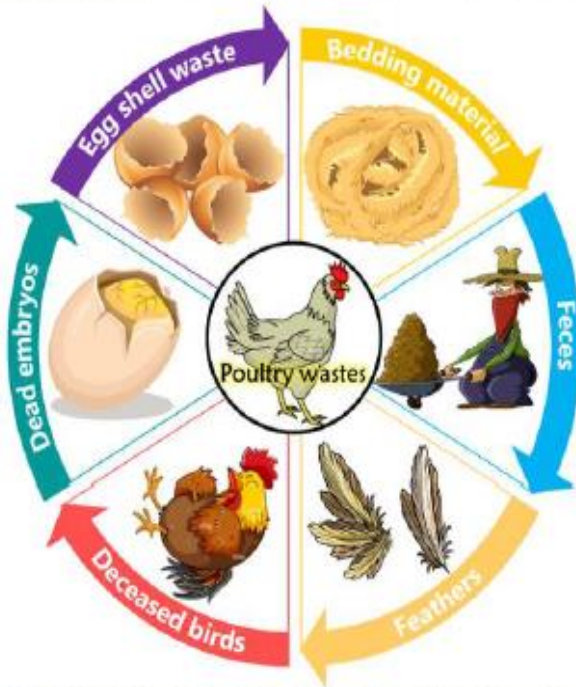
- Jules Pretty

ORGANIC WASTE



Food waste

Municipal
Restaurants
Hotels



Farms waste

Poultry & Dairy manure
Hatchery waste
Chicken Mortality



What is Compost?

- Compost is maturing plant and animal based inputs with the use of technological methods via the help of bacteria.
- Compost is not just an organic fertilizer, more importantly it is soil activator and regulator.
- While chemical fertilizers are good at providing the necessary minerals to soil in order to feed the plants, compost additionally provides organic material that helps soil regain its natural structure back further improving the biological and the chemical components.

ecodrum |

Circular Economy And Ecology

Composting converts biological waste into valuable resources, reducing the need for chemical fertilizers and replacing peat in soil improvement products.

The compost restores nutrients in the soil, captures carbon and improves food security, as well as generally contributing to both a circular economy and circular ecology: bioeconomic!



Composting Principles

- During composting, the microorganisms consume oxygen while feeding on the organic matter. In addition to providing oxygen, aeration removes heat, water vapor and other gases trapped within the composting materials. The most efficient temperatures for composting are between **130 F and 160 F** (=54.4°C and 71.1°C). At these temperatures, your organic matter will break down quicker and there will be little to **no pathogens, diseases, weed seeds**, and insect larvae in the compost. **Water** provides the medium for chemical reactions and for the transportation of nutrients. It also allows the microorganisms to move from place to place. Ideally, you are looking for a moisture level between **50-60%**. Activity ceases when the moisture level drops below 15% and when moisture levels are above 60%; the water displaces much of the air in the pore spaces of the composting materials, which

Circular Economy And Ecology- Process Overview

✓ Compost verified safe and halal-compliant

Stage	Description
Input	Organic waste (agricultural, animal, food)
Processing	Microbial breakdown in bioreactors
Output	Compost, biofuels, feed, bedding materials

Halal Compliance in Composting Processes

- The steps in the composting process that **ensure halal compliance** must be beneficial. This would include stages where waste is verified to be free from prohibited materials, and where no harm comes to animals, aligning with Islamic ethical standards.
- Under **Halal (Shariah)** compliance, the process involving food or waste was conducted with all these criteria:
 - Avoid contamination with **najis** (impurities).
 - Use only **halal-certified materials or inputs**.
 - Maintain hygiene and separation of **halal**



Future Foresight: Aligning Animal Waste Awareness with Sustainability and Ethics

- The future outlook for raising awareness about animal waste highlights a growing alignment between religious ethics, particularly Islamic principles, and global sustainability trends.
- As consumers become increasingly mindful of their environmental responsibilities and ethical values, the demand for sustainable, halal-compliant waste management solutions is expected to rise.
- This shift reflects a broader movement toward systems that respect both planetary boundaries and faith-based



New Laboratory Technologies in Food Science
Modern labs are integrating cutting-edge tools to enhance food safety, halal assurance, and sustainability:



Applications and Application Engineered Solution



Why it is Required?

Sample Lab Analysis Report – Compost from Animal Waste (Ecodrum- Technology)

Parameter	Result	Unit	Acceptable Range	Remarks
Moisture Content	45.2	%	40–60	Within optimal range
Organic Matter	62.5	%	30–70	High-quality compost
Carbon-to-Nitrogen Ratio (C:N)	28:1	Ratio	25:1–35:1	Ideal for microbial activity
Total Nitrogen (N)	1.8	%	0.5–2.5	Suitable for soil enrichment
Phosphorus (P)	0.9	%	0.3–1.5	Adequate for plant growth
Potassium (K)	1.2	%	0.5–2.0	Good nutrient balance
pH Level	7.4	—	6.0–8.0	Neutral and safe

Sample Lab Analysis Report – Compost from Animal Waste (Ecodrum Technology)

Electrical Conductivity (EC)	3.2	dS/m	< 4.0	Safe for most crops
Salmonella spp.	Not Detected	—	Absent	Complies with safety standards
E. coli	Not Detected	—	Absent	Hygienic and safe
Lead (Pb)	12	mg/kg	< 150	Within safe limits
Cadmium (Cd)	1.1	mg/kg	< 3	Safe
Arsenic (As)	4.5	mg/kg	< 10	Acceptable
Mercury (Hg)	0.2	mg/kg	< 2	Safe
Germination Index	92	%	> 80	Mature and non-toxic compost
Respiration Rate	Low	—	Low	Indicates compost stability

Typical Lab Analysis Report: Broiler Chickens

REPORT NO.
F12319-6020
ACCOUNT NUMBER
88630

A & L GREAT LAKES LABORATORIES, INC.

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www.algreatlakes.com • lab@algreatlakes.com



QUALITY ANALYSES FOR INFORMED DECISIONS

TO: TRI-FORM POLY, INC.
PO BOX 1029
MORRIS MANITOBA, ROG1KO
CANADA

FOR: JARRELL POULTRY

ATTN: TIM EPP

LAB NUMBER: 63609

SAMPLE ID: TRIFORM POL, 111212

COMPOST ANALYSIS REPORT

DATE SAMPLED: 11/12/2012

DATE RECEIVED: 11/14/2012

DATE REPORTED: 11/21/2012 PAGE: 1

PARAMETER	UNIT	ANALYSIS RESULT	DRY BASIS RESULT	ANALYSIS METHOD
Moisture @ 70 C	%	43.30		TMECC 03.09-A
Dry Matter	%	56.70		TMECC 03.09-A
Total Nitrogen (N)	%	2.02	3.56	TMECC 04.02-D
Phosphorus (P)	%	0.78	1.37	TMECC 04.03-A
Phosphate (P205)	%	1.79	3.15	TMECC 04.03-A
Potassium (K)	%	1.45	2.55	TMECC 04.04-A
Potash (K2O)	%	1.74	3.06	TMECC 04.04-A
Fecal Coliform/MPN	MPN/g dry		0	SM(20th)-9221E TMECC

Typical Lab Analysis Report: Turkeys

REPORT NO.
F13317-6014
ACCOUNT NUMBER
88630

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QUALITY ANALYSES FOR INFORMED DECISIONS

TO: TRI-FORM POLY, INC.
PO BOX 1029
MORRIS MANITOBA, ROG1KO
CANADA

ATTN: TIM EPP

COMPOST ANALYSIS REPORT

LAB NUMBER: 69061
SAMPLE ID: PREDDY'S FARM

DATE RECEIVED: 11/13/2013
DATE REPORTED: 11/20/2013 PAGE: 1

PARAMETER	UNIT	ANALYSIS RESULT	DRY BASIS RESULT	ANALYSIS METHOD
Moisture @ 70 C	%	46.87		TMECC 03.09-A
Dry Matter	%	53.13		TMECC 03.09-A
Total Nitrogen (N)	%	1.56	2.93	TMECC 04.02-D
Phosphorus (P)	%	0.23	0.43	TMECC 04.03-A
Phosphate (P205)	%	0.53	0.99	TMECC 04.03-A
Potassium (K)	%	0.28	0.53	TMECC 04.04-A
Potash (K2O)	%	0.34	0.64	TMECC 04.04-A
Fecal Coliform/MPN	MPN/g dry		0	SM(20th)-9221E TMECC
Pathogen Reduction - PASS/FAIL	pass/fail		PASS	40 CFR 503 Class A

Heavy Metals

The heavy metals profile reports trace metal levels that may be undesirable in organic growing systems, and also for general agricultural and horticultural production.

Most composts will contain some heavy metals,

but the levels are determined by what

materials the compost is made from.

For example, composts containing sawdust from tanalised timber may contain high levels of Arsenic, Copper and Chromium

TECHNICAL NOTE



Maximum suggested levels:

Metal	Biosolids limits – Grade A (mg/kg Dry Weight)	Bio-Gro NZ Organic Standard for Compost (mg/kg Dry Weight)
Cadmium (Cd)	1	1
Chromium (Cr)	600	150
Arsenic (As)	20	20
Lead (Pb)	300	250
Nickel (Ni)	60	60
Mercury (Hg)	1	1
Zinc (Zn)	300	300
Copper (Cu)	100	60

Conclusion

- Implementing an Animal Waste Index and aligning it with national and global sustainability goals offers a strategic path to reducing environmental impact, enhancing resource efficiency, and supporting a circular bioeconomy in the livestock sector.
- This study confirms the **effectiveness of the ECODRUM in managing animal waste** in a way that is both environmentally sustainable and fully compliant with Islamic (halal) principles.
- The system achieved over 80% bioconversion efficiency in under 20 days, outperforming traditional **composting methods** in both speed and effectiveness. It also **eliminated odors and greenhouse gas emissions**, making it particularly valuable in livestock-dense or urban areas.
- The high-quality **compost produced was nutrient-rich**, free from harmful contaminants, and suitable for both organic and conventional farming, supporting the demand for sustainable agricultural inputs.
- The entire process strictly followed **Sharia law**, using no impure (**najis**) or prohibited (haram) substances and ensuring ethical animal welfare.
- This technology **Ecodrums** offers a holistic solution: addressing

Vision for the Future

- “A halal sustainability system is not just a regulatory framework;
it is a moral compass guiding us toward ethical, safe, and regenerative food systems.”
- “From waste to worth; we transform challenges into resources, and resources into resilience.”
- Empowering Circular Agriculture in the world
- Safe, science-based composting will become a cornerstone of sustainable livestock and food systems.
- Ecodrum and similar technologies will be scaled across farms, municipalities, and food industries to reduce waste and regenerate soil.
- Integrated lab testing and traceability will ensure compost quality, protect public health, and support export excellence.
- Public-private partnerships will drive innovation, policy

Recommendations and Solutions for Managing Animal Waste (Animal Waste Index Focus)

1. Develop a National Animal Waste Monitoring Framework

- **Recommendation:**
Establish a comprehensive data collection system to track animal waste volumes, types, and treatment methods across farms, slaughterhouses, and processing facilities.
- **Solution:**
- Create a centralized digital Animal Waste Index (AWI) platform.
- Mandate periodic reporting by livestock operations.

Recommendations and Solutions for Managing Animal Waste (Animal Waste Index Focus)

2. Promote Sustainable Waste Management Technologies

- Recommendation: Encourage the use of advanced technologies to convert animal waste into valuable by-products.
- Solution:
- Support anaerobic digestion systems to produce biogas and organic fertilizer. (COMPOST)
- Incentivize waste-to-energy or composting initiatives at industrial scale.
- Invest in plasma gasification or thermal processing for high-volume waste treatment.



Recommendations and Solutions for Managing Animal Waste (Animal Waste Index Focus)

3. Integrate AWI into Halal and Sustainability Standards

- Recommendation:
Ensure that halal certification frameworks include environmental sustainability components, including responsible animal waste management.
- Solution:
- Develop Halal + Sustainability audit criteria with AWI indicators.
- Encourage certification bodies to assess not only animal welfare and slaughter methods but also post slaughter waste handling

Recommendations and Solutions for Managing Animal Waste (Animal Waste Index Focus)

4. Establish Environmental Regulations and Compliance Standards
5. Promote Circular Economy Models in Livestock Sector
6. Build Capacity and Raise Awareness

SO “Let us unite science, faith, and innovation to build a world where food safety, sustainability, and halal integrity thrive together.”

In a world that is increasingly interconnected, it is vital that we work together as one team. Our shared values and common goals can serve as the foundation for a robust and thriving Halal food industry that benefits all.

By pooling our resources, sharing our expertise, and supporting each other, we can elevate the standards and reach of Halal and safety food across the globe.

Let us embrace the spirit of gratitude and harmony in our endeavors. By fostering mutual respect and understanding, we can create a network of collaboration



التناغم

Harmony

التعاون

Cooperation
Teamwork

الامتنان

Gratitude



