



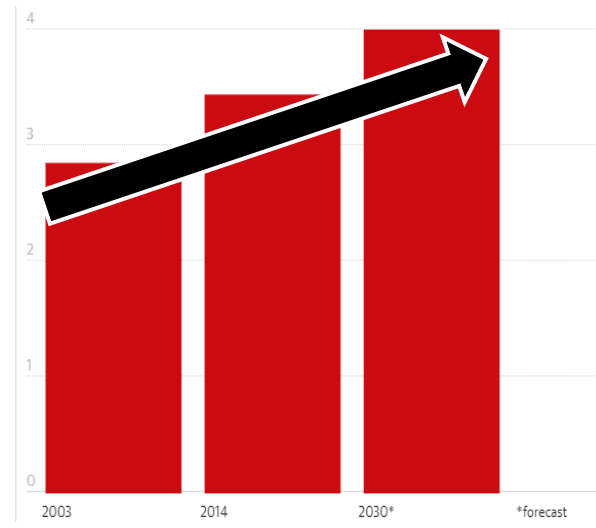
AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

The Irish Agriculture and Food Development Authority

Broiler Manure Usage

Declan Bolton

Teagasc Food Research Centre, Ashtown



Annual mass of livestock faeces, in billion tonnes (source: FAO)

Definitions, opportunities and threats

- a mixture of poultry excreta, spilled feed, feathers, and used bedding materials
- a source of nitrogen, phosphorus, potassium, copper, zinc, calcium, cobalt, iron, selenium, manganese and boron
- uncontrolled management of poultry manure can cause emissions of methane, carbon dioxide and ammonia into the atmosphere





- applied to soil in excess poses a threat to soil, water and the environment and management has to fulfil the requirements of EC1069/2009.
- specifically repeated poultry manure application to soil can result in phosphate and nitrate contamination of soil and surface water and trace element accumulation or result in phytotoxic effects on succeeding crops



Potential applications

Poultry manure is classified into category 2 of animal by-products and has several potential uses

- as an organic fertiliser or soil improver – predominates
- composted (eg. mushroom production)

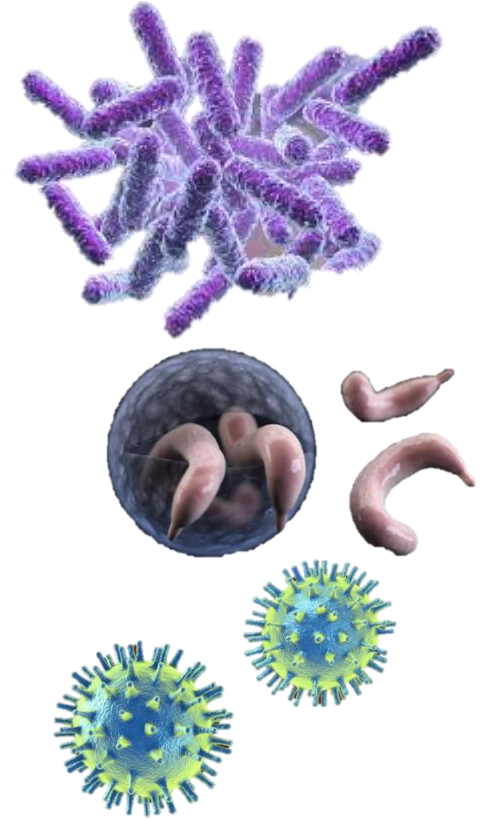


- Used as a fuel for combustion (in the form of pellets) with or without prior pre-treatment
- Applied to produce other by-products (eg. filler for cement mortars, processed for feed, etc.)
- converted into biogas using anaerobic digestion



Hazards

- Pathogenic bacteria (eg. *Salmonella*, *Campylobacter* & *Clostridium* spp.)
- Fungi (eg. *Penicillium* & *Aspergillus* spp.)
- Parasitic protozoa (eg. *Cryptosporidium* spp.)
- Viruses (eg. Avian influenza)



- Antibiotic residues & antibiotic resistance genes (eg. nalidixic acid, ampicillin & tetracycline)
- Heavy metals and metalloids (eg. cobalt, copper, iron, manganese, selenium & zinc)
- Pesticides (eg. fipronil)
- Coccidiostats (eg. sulphaquinoxaline)



Danger
Toxic Hazard

Land spreading of poultry litter



- nutrient build-up in soils (N, P & K)
- eutrophication of water bodies
- air pollution (eg. ammonia)
- GHG emissions (carbon dioxide, methane & nitrous oxide)

DAFM guidelines for the spreading of poultry litter.

- Should not be spread on land where animals will be grazing or in adjacent fields
- Should be immediately ploughed into the land
- Should not spread poultry litter that contains poultry carcasses or parts thereof
- Should not prepare silage from land where litter has been spread
- Should not stockpile or spread during warm weather

Anaerobic digestion

- Suitable because of high content of biodegradable organic matter and high buffering capacity
- Not suitable due to low carbon:nitrogen ratio (requires co-substrate into the reactor) and potential accumulation of ammonia from the degradation of uric acid and undigested proteins

Advantages:

- Reduced methane emissions into the atmosphere
- Energy recovery
- Valuable products such as biogas and digestate (may be used as a fertiliser)
- Removal of odours



Poultry litter as a fuel

Low value fuel due to high moisture and ash content with a heating value ranging from 9Gj/t to 12Gj/t

1 GJ of energy is equivalent to 26 litres of petrol or 277 kilowatt-hours of electricity.



Fibropower poultry litter-fired power plant, Suffolk, UK (1993)

Disadvantages



- It has a high moisture content
- It is less energy dense than coal, oil and natural gas
- It isn't easy to gravity feed or auger
- It is produced on individual farms and has to be picked up and transported to a large-scale user like a power plant

But on-farm furnaces burning poultry litter to heat poultry houses may be a viable alternative to propane

Adding commercial value to broiler manure: An invitation to farmers

- Teagasc are seeking 30 broiler farmers to participate in a study that will analyse the composition of broiler manure and assess its suitability for a range of uses with and without pre-treatment. All results will be anonymised and each farmer will receive his/her results free.
- To express an interest, please take 1 minute to complete the online form (name, farm type & email) using the link:
www.teagasc.ie/animalwastes
or email declan.bolton@teagasc.ie