Handling of Hatchery Waste

The poultry industry produces large amounts of hatchery waste which includes solid waste and wastewater. The solid hatchery waste comprises empty shells, infertile eggs, dead embryos, late hatchings and dead chickens and a viscous liquid from eggs and decaying tissue. The wastewater comes from water used to wash down incubators, hatchers and chick handling areas

Separation of Waste at the Hatchery

Hatchery waste can be separated into solid and liquid components and then treated separately. For example, the liquid in hatchery waste can be separated from the solid hatchery waste by spinning. In other industries a flexible multi-layer filter can be used to separate liquid wastes from solid wastes.

Separating egg shells from hatchery waste

A powerful suction vacuum is used to only remove the dry and very light shells from the hatchery waste, leaving the heavier infertile eggs. The shell and non-shell materials can also be separated by using a vibrating or shaking device, which can separate lighter parts from heavier parts in the hatchery waste.

Methods to recycle egg shells

1) The pure shell powder can be used in the paper industry, or as a limestone substitute or calcium supplement in agriculture.

2) mixed with garden soil for use as a fertilizer.

3) fine pieces of crushed egg shell mixed with seeds for use as a feed for aviary birds.

4) added to cement to increase its strength.

5) used by artists to make mosaics.

6) used to make textured paint for 3D effects in artwork.

7) eggs shells can be composted with other organic materials to increase the mineral content of the compost.

Power generation

The hatchery waste can be automatically fed by conveyor belts into a furnace which is equipped with a rotating shredder unit for chopping and grinding solid waste. An incinerator system can be used as a furnace to heat the solid and liquid waste to produce steam. The steam can power a turbine generator to produce electricity for hatchery.

Autoclaving and extrusion

Extruded or autoclaved hatchery waste could be used as livestock feed. For example, extruded a mixture of ground hatchery waste and yellow maize meal (25:75) at 140 C for 10 s.

 Autoclaving hatchery waste (infertile eggs or eggs with dead embryos) and dried it at 100 C for 10 h. or autoclaved day-old cull male chicks for 30 min.

The product was dried and powdered and used as poultry or livestock feed.

Boiling

Dead embryos could be boiled for 100 C for 30 min, soaked in cold water for 20 min to remove shells, sun dried for 4d and used in poultry feed. Nutritive value of the dried dead embryos is 36% CP, 27% ether extract, 17% ash, 10% calcium and 0.6% phosphorus .

Composting

Composting is a common method for solid organic waste disposal. The decomposition of organic waste is performed by aerobic bacteria, yeasts and fungi. The composting process kills pathogens, converts ammonia nitrogen to organic nitrogen. The product can be used as a fertilizer.

Disadvantages of composting are loss of some nutrients including nitrogen, the land area required for the composting and odour problems.

Composting hatchery waste with sawdust and yard trimming in a ratio of 3:2:1 eliminated 99.99% of E. coli. Composting with litter also eliminated Salmonella.

When hatchery waste is composted with poultry litter it will produce a safe and rich organic product which is a good organic fertilizer. It is important to control the moisture content and keep raising the temperature of the compost to eliminate the pathogens.

Composting hatchery waste with poultry litter produces a product that contains 1% nitrogen, 2.5% phosphorus and 0.25% potassium on a dry weight basis. The product also contains high calcium and other micro-nutrients.

Sodium hydroxide treatments

Culled birds are treated for 2 h at 21 C in 0.4 N NaOH. The resulting product was fermented (with added sugar) for 21 days. After fermentation the products were autoclaved at 124 kPa and 127 C for 90 min, then dried in a forced-air oven at 60 C and the final product was used as poultry feed.