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Hog Manure Management System Advantages

ATD Waste Systems of Vancouver BC have developed an on-farm chemical/mechanical system to manage hog manures in an environmentally and cost effective way. Developed at the University of British Columbia, this patent pending system is designed to provide a consistent analysis dry fertilizer pellet, with options for liquid recycling. It eliminates lagoons and reduces or eliminates the land base used for disposal to the extent that surplus nutrients can now be exported. It removes threats to ground water and air pollution, reduces odours substantially, and dramatically reduces water consumption. It will operate 365 days a year under computer control with minimal intervention and produce cash flow from fertilizer sales and greenhouse gas reduction credits. **It does not discharge pollutants to the environment.**

The ATD system operation involves:

prompt removal of the manure from the barn — decreases barn exhaust odours from the anaerobic action that produces the odours;

separation of solids from liquids;

extraction of nutrients from the liquids to add back, with supplements if necessary, to the finished product;

liquid sterilization and optional treatment based on end use; and

drying the pelleted solids for storage.

The successful implementation of this system will generate the following changes in the industry:

1. Lagoons can be eliminated — leakage, odours, costs are gone.
2. Land disposal of liquid manure with associated odours and run off is eliminated.
3. Odours can be reduced to in-barn exhaust from on-floor evaporation.
4. Lost business opportunity profits will emerge as expansion goes ahead.
5. Compliance costs will be minimized.
6. If lagoon solids are 2.7% and the recycling option is used, water consumption can be reduced by over 50%.
7. If there are surplus nutrients, fertilizer sales will provide a new revenue stream and some choices in re-balancing the land requirement under nitrogen and phosphorus application rules.
8. Animal and farm workers health will be improved with better air quality.

9. Recruitment of farm workers will be easier as odours are reduced and job openings increase.
10. Earlier to market as feed conversion improves with better air quality.
11. Relocation will be simpler as land acquisition is no longer part of the equation.
12. More consistent fertilizer analysis will allow better crop nutrition.
13. Dry pelleted fertilizer will allow more flexibility in terms of access to the fields.
14. Organic fertilizer will, over time, improve soil structure and water holding capacity.
15. Green House Gas Emissions are reduced by over 65% and the sale of the reduction credits will provide a new revenue stream and a safety net as other markets fluctuate.

Additionally, the system captures all the manure nutrients whereas current practices lose up to 70% of the nitrogen to the air during storage and disposal, depending on farm practices. The fertilizer offers a more easily controlled application of nutrients when compared to liquid manure, which varies due to incomplete agitation when emptying the lagoon. Public perception — neighbours, municipalities and regulators will show relief that the industry is making the changes it wants to see on the road to sustainable operations (i.e., no discharge to the environment).

To this point we have identified the following as our competitive advantages over conventional disposal systems — composting of solids, liquid storage and land disposal; aerobic/anaerobic treatment with or without solids removal and land disposal of liquids.

1. Produces profits. Increases in return per market pig are possible from the sale of fertilizer and greenhouse gas reduction credits.
2. Holds the line on costs for conversions. ATD's model has used over 50 assumptions to estimate financial results for an average farm in Canada. The costs as currently estimated for conversions can show a reduction of about \$10.00 per place. However, it is our intention that each operation be evaluated based on real numbers as a first step. Current trends show increases in fertilizer prices and greenhouse gases over time improving the bottom line. Composting provides a low analysis, low sales price alternative that must be disposed of locally and can still pose problems with leachate and odours and liquid disposal. Anaerobic digesters with sales of electricity have yet to be proven profitable.
3. Allows economies of scale. Existing operations wishing to expand to say 20,000 places, can reap the benefits of economies of scale, increasing our estimated cost reductions from \$10.00 to \$23.00 per place.
4. Odour and gas emissions are substantially reduced. Daily removal of the manure removes a major source of in-barn odours and with lagoons and land disposal eliminated, all odours are substantially reduced not by any process, but by attacking the source — anaerobic activity. Composting must be aerobic to keep odours at a minimum and relies on adding up to 50% more materials to maintain C:N ratios and aerobic conditions. Composts must be managed intensely to meet this standard while liquids must still be dealt with. The total air emissions from various digester systems have not yet been quantified. Having burned off

significant methane fractions, the result of residual disposals in the lagoon and on land has not been identified at this time. Anaerobic digestion removes carbon and therefore solids, but the after affects on the remaining nitrogen and its tendency to leave as ammonia or nitrous oxide is “still up in the air.”

5. No discharge of water or solids. Conserves water by recycling it for wash down and drinking. With the full treatment option all solids and nutrients are incorporated in the dry fertilizer product. Composting must guard against leachate liquids and the escape or discharge of the separated liquids. Lagoons and storage tanks must be leak proof and transportation systems must be trouble free.
6. Irrigation is still an option: Extracting all the solids allows optional extraction of the dissolved nutrients if the water is to be used for irrigation. Sterilization and zero suspended solids reduce line plugging.
7. Removes manure disposal from site considerations. Land ownership or acquisition for lagoons and manure disposal is no longer a requirement. Operations can be consolidated or expanded based on the logistics of feed, labour and distance to market. Compost windrows require acreage to handle solids year round. Liquids must be stored for long periods in lagoons before being moved to a site large enough to absorb the dissolved nutrients.
8. Dries solids to 10-12% moisture content, ready for storage or transport to market in one day. Composted solids are heavy to transport as they carry 45-50% moisture and are market ready in 45-60 days, weather permitting. Our product has a significantly higher and consistent analysis than typical non-labelled compost.
9. Product is easily incorporated into seeding to reduce field time and leaching. Leaching over winter and spring is significantly reduced. Both spring and fall applications are practical without the total loss of nutrients.
10. Satisfies EPA Part 503 Class A Pathogen Requirements for Biosolids. Solids will be pathogen and weed seed free. Compost requires intense management of moisture, C:N ratio, and air to achieve this standard.
11. Requires less space than any system using biological treatment. No lagoons or digesters. Lagoon sizes are governed by local regulators to hold manure from 250 days to over 400 days. Additional acreage will still be required for a composting operation.
12. Operates in all climates. The system is totally enclosed in its own building. All other alternatives involve biological treatment and can be sensitive to extremes of the weather.
13. Creates saleable by-products — dry organic solids for fertilizer. All nutrients can leave the operation. Composted solids have a lower analysis and must compete with other low-cost non-farm composted products, which often receive a tip fee for incoming materials and can therefore sell for less.
14. Produces a clean water effluent for recycling in the barns, year round. Biological treatment does not attempt this standard and often relies on allowing nitrogen to escape in the form of free nitrogen, ammonia or nitrous oxide
15. Reduces water requirements from municipal supply or water table. Up to 80% of manure liquids can be recycled to the operation and all other water used to collect the manure can be eliminated. All other systems require a constant and substantial source of water.

16. Improves in-barn air quality and creates potential for reduction in health costs for animals and humans with increases in feed conversion. By removing the anaerobic conditions that create hydrogen sulfide and ammonia we reduce stress, medication and improve feed conversion and time to market.
17. Eliminates long-term storage of liquid manures on the farm. If irrigation is the option, then a smaller lagoon to store treated water until irrigation time will still be required. Lower nutrient level will allow disposal based on the amount of water, not nutrients. Potential for damage to water table from leakage is minimized. All other systems require lagoons and their attendant odours of some sort.

For more information, please contact:

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