

An Integrated Manure Utilization System (IMUS)

Xiaomei Li¹ and Robert Borg²

¹ Alberta Research Council, Climate Change Technologies, Bag 4000, Vegreville, AB T9C 1T4;
Email: xiaomei@arc.ab.ca; ² AAFRD, #301, 4920-51 St., Red Deer, AB T4N 6K8
Email: robert.borg@gov.ab.ca

Manure, a by-product from livestock operations is a valuable biomass resource. A conventional approach to manure management is to spread it on land. Major concerns associated with this method of management are surface water and ground water contamination caused by pathogens and excess nitrogen, phosphorus, and other soluble salts, and air pollution from odours, dust and ammonia. Emission of the greenhouse gasses, methane and nitrous oxide, is also of concern. Although this practice is extensively used, the amount of land required for spreading increases with increasing size of the livestock operation. As a consequence, transportation of manure over longer distances becomes inevitable as livestock operations intensify, adding to the cost of the process and further greenhouse gas emissions. Novel, cost-effective technologies that maximize the energetic and nutritive benefits of manure while minimizing the negative environmental impacts are needed. The Alberta Research Council Inc. and Alberta Agriculture, Food and Rural Development have teamed with industry to develop an integrated manure utilization system (IMUS). IMUS will provide the livestock industry with an economically and environmentally viable technology for managing manure as a valuable resource, deriving economic benefit from organic carbon and other nutrients contained in manure, while offsetting greenhouse gas emissions and eliminating adverse environmental impacts. It uses manure as a raw material to generate biogas (green energy), organic fertilizer and reusable water while at the same time reducing air and water pollution. This presentation will highlight the economic and environmental benefits of the IMUS technology and present a basic design for a demonstration unit.

Implications

Biogas production is a mature technology that can be used to generate energy from manure. The energy can be utilized to generate electricity and heat. Benefits to an integrated systems approach are the added values of odour reduction, greenhouse gas reduction, and the production of a nutrient balanced organic fertilizer.