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### **ELECTRO-SEPARATION PROCESS FOR TREATING LIQUID ANIMAL MANURES**

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**ABSTRACT** Presently, the most economical way to dispose of hog manure is to spread it on land as a source of nutrients for crops. A high risk to contaminate the environment occurs when large amounts of liquid manure are applied on soils and that risk increases when higher levels are applied as result of excess number of animal units per farm. Phosphorus losses are the result of soil erosion or drainage of excessive water following important rain events mainly in the fall (over 70 mm). In addition, there is also an odour problem associated with transportation and spreading operation, which puts more pressure on hog producers. Sometimes, producers have no choice to invest in very expensive manure treatment units in order to reduce the environmental and social pressures as well as to insure their farms expansion. The objective of this R&D project is to offer hog producers, a method capable of reducing the environmental risks associated with hog manure application on land and to reduce odours while spreading. The electrochemical process, that has been developed, will separate the solid from the liquid phase. P and N will be concentrated mainly in the solid and the liquid phases respectively. This technology should be accessible to all sizes of hog farms: low cost, user friendly and economical to use. The study has resulted in an appropriate method capable of pre-treating the slurries and that insure a high level of efficiency and performance when removing suspended particles from the liquid in the electro-flotation cell unit. The data shows that the organic particles in suspension are removed at 99.9% (turbidity index). The phosphorus level in the liquid portion is reduced by more than 98%. Furthermore, the heavy metal contents in the treated liquid manure are under the suggested environmental levels. Moreover, the treated liquid portion still contains nitrogen that could be used on crops and vegetables. The liquid is sterilized (free of pathogens) and odours are limited. The slurry phosphorus is concentrated in the solid portion (flock). The proposed technology uses an electro-flotation cell unit to concentrate the phosphorus in the solid phase and the nitrogen in the liquid portion shows a great potential to facilitate nutrients management on crops as well as to develop valuable products. Consequently, it is possible to reduce the surcharge in nutrients like phosphorus on agricultural soils. In addition, odours are under control and this will contribute to reduce the social pressure from the people living nearby hog facilities. Several advantages of the electro-flotation technology have been identified such as the competitive operating cost, its ability to adapt to a wide variety of farm size operations

(volumes produced), a short residence time, easy to install, limited space required, adaptability to a high degree of automation.

**Keywords:** manure, hog, phosphorus, odour, electrochemical, electro-flotation