Production of mineral concentrates from animal manure

Kumac

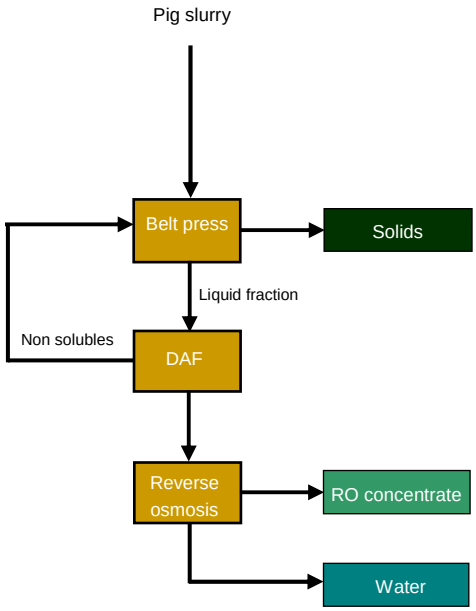

Figure 1 Scheme of slurry treatment process KUMAC

Introduction

Kumac is a plant of the pilot project Mineral Concentrates. The objective of this project is to determine if a mineral concentrate derived from animal manure has comparable qualities as an artificial N-K fertilizer. In 2009-2011 the technological, agricultural and environmental aspects of the production and application of mineral concentrates from animal manure are studied. Eight producers and a large number of users (arable farmers) participate in the project. The project is funded by the Dutch government and organizations of livestock farmers.

Treatment process

In the Kumac treatment plant pig slurry from a group of 45 pig farmers, 50,000 tons per year, is processed in a three step process (Figure 1). The following treatments are included:

(1) *Separation* by a belt press into a solid fraction and a liquid fraction; a flocculant is added. The solid fraction is used as raw material in a biogas plant in the region.

(2) Dissolved air flotation (DAF) of the liquid fraction after adding a small amount of flocculant. In the DAF unit non soluble material and colloid organic particles are concentrated in a foam which is recirculated in the process.

(3) *Reverse osmosis* (Hydranautics) of the conditioned liquid fraction into a permeate (water) and a concentrate as a mineral end product. The permeate is discharged into the surface water after it is purified in an ion exchanger. The RO concentrate is used as a mineral fertilizer on grass and arable land.

Table 1 Input and output of the Kumac treatment plant (tons/a)

Inputs		Outputs	
Pig slurry	50,000	Solids	10,000
		RO concentrate	12,000
		Water	28,000

Input and output

In Table 1 the annual amounts of raw slurry and end products of the Kumac treatment plant are given.

Table 2 Composition of solid fraction and RO concentrate from the Kumac treatment plant (g/kg)

	Solid fraction	RO concentrate
Total N	12.8	7.1
TAN	5.6	6.8
P	6.4	0.01
K	4.0	6.5
VS	212	17

Composition of end products

The Kumac treatment plant generates two valuable end products: (1) solid fraction with high content of phosphorus and volatile solids and (2) RO concentrate mostly composed of anorganic material with N and K as the main minerals (Table 2). The presented data are results of measurements done in 2009 and 2010.

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