

# Production of mineral concentrates from animal manure

## Biogreen

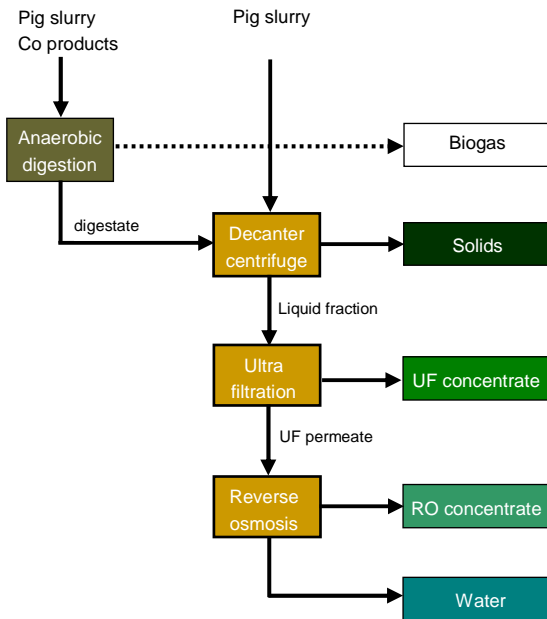


Figure 1 Scheme of slurry treatment process Biogreen

Table 1 Input and output of the Biogreen treatment plant (ton/a)

Input	Output
Pig slurry	50,000
Poultry litter	5,000
Maize	10,000
Co-products	5,000
Biogas	10,000
Solids	9,000
UF concentrate	24,000
RO concentrate	9,000
Water	18,000

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

	Solid fraction	RO concentrate
Total N	11.1	6.3
TAN	6.0	6.0
P	7.6	0.2
K	4.3	7.1
VS	220	8.8

### Introduction

Biogreen 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 Biogreen treatment plant pig slurry from a group of 40 pig farmers as well as an amount of organic co-products, totally 70,000 tons of biomass per year, is processed. A diagram of the treatment process is shown in Figure 1. After anaerobic treatment of the raw material the digestate is processed in a three step process:

- (1) *Separation* by a decanter centrifuge (AlfaLaval) into a solid and a liquid fraction under addition of a flocculant.
- (2) *Ultra filtration* (ceramic membrane) of the liquid fraction into a concentrate and a permeate. Non soluble material and colloid organic particles are trapped in the UF concentrate. This product is partly recirculated to keep the dry matter content in the digester at the right level.
- (3) *Reverse osmosis* (Toray) of the UF permeate into water and a concentrate as a mineral end product. The water is discharged into the sewer and treated in the municipal waste water treatment plant. The RO concentrate is used as a fertilizer on grass and arable land.

### Input and output

In Table 1 the annual amounts of raw material and end products of the Biogreen treatment plant are given. Maize, poultry litter and co-products (e.g. glycerin) are supplied for biogas production.

### Composition of end products

The Biogreen 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.