



Slurry Treatment Systems

Farm animal wastes have a very high air and water pollution potential. However, it is possible to lower their impact on the environment by treatment.

Biochemical Oxygen Demand - BOD₅

Biochemical oxygen demand is a measure of the pollution potential of waste material. Other measures exist but BOD₅ is the one most commonly referred to with regard to farm wastes. BOD₅ is the amount of oxygen demanded by the bacteria in the slurry over a 5 day period. The measurement is carried out in a laboratory. This figure is important in that, if pollutant of a high BOD₅ enters a watercourse, the micro-organisms in the waste will consume the dissolved oxygen in the water and lead to the asphyxiation and death of other forms of life. Table 1 gives an indication of the very high pollution potential of farm wastes when compared to domestic sewage.

Table 1

MATERIAL	BOD ₅	(mg/l)
Raw domestic sewage	300	- 400
Parlour/yard washings	1,000	- 3,500
Cattle slurry	10,000	- 22,000
Pig slurry	16,000	- 30,000
Silage effluent	12,000	- 85,000
Milk	90,000	- 140,000

Slurry digestion

The BOD₅ of slurry can be lowered in two main ways:

1. **Anaerobic digestion** - This involves the breakdown or digestion of the slurry by bacteria which are active and survive best in an oxygenless (or anaerobic) environment.

2. **Aerobic digestion** - Here slurry digestion is carried out by bacteria which thrive in an oxygen rich environment.

Anaerobic digestion

In its simplest form can take place in deep lagoons where dissolved oxygen has been consumed and there is no supply of additional oxygen. Substantial reductions in BOD₅ only take place over many months or years.

Quicker results can be obtained by placing the slurry in an insulated vessel and providing heat to accelerate the process. With this treatment a sizeable amount of methane gas is given off, and it may be possible to use this as a fuel. In practice producing gas from anaerobic digestion is high in equipment cost, tricky to manage and gives a poor return on capital.

Aerobic digestion

Aerobic digestion can take place in static lagoons but only near the surface where oxygen can be captured from the atmosphere. This is a very slow process. For quicker digestion the slurry can be agitated or aerated. Agitation brings a constant supply of raw slurry to the surface of the lagoon so that it can absorb oxygen from the atmosphere. Aeration goes one step further by introducing air into the body of the slurry itself.