BPEX Environment

Covering Slurry Stores

Benefits, Practicalities and Available Options

Covering slurry stores can keep rain out and odours and ammonia in. Farms with a PPC permit must submit proposals for covering existing slurry stores to the Environment Agency within six months of the date of the permit. For new stores on these farms covers are mandatory.

The use of covers reduces ammonia emissions during storage by up to 50% for a cover with "standard" leakiness and between 85-90% for an improved cover.

A number of covering techniques are available, many of which have been developed in northern Europe where in some countries slurry stores have had to be covered since the 1980s.

How does a cover work?

Ammonia and odorous gasses are produced by microbial activity in slurry; these gasses rise to the surface and are released into the atmosphere at varying rates partly dependent on the air speed over the surface (Figure 1). Covers on conventional slurry stores are not airtight like those on anaerobic digesters; gases are therefore able to escape but at a much-reduced rate compared to an open store.

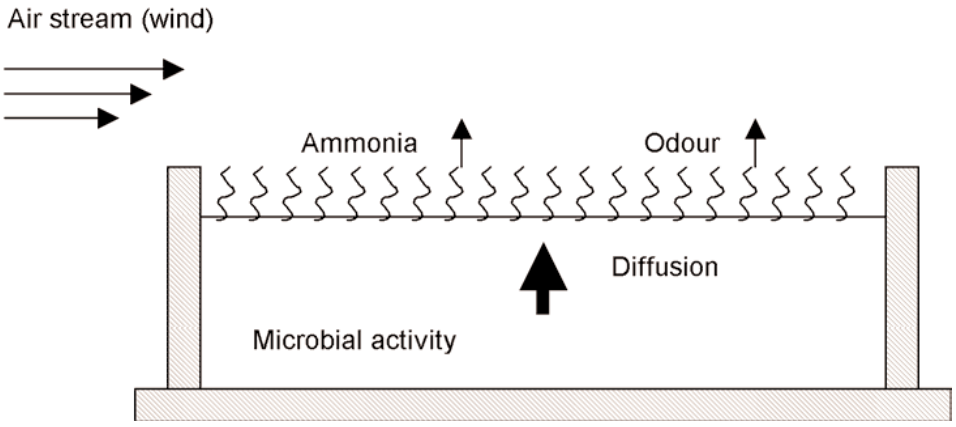

Figure 1: Schematic diagram showing gaseous loss from a slurry store

Types of cover

Slurry store covers can be impermeable or permeable, fixed (rigid) or floating. Impermeable covers keep rainwater out, significantly reducing the volume of slurry and increasing the effective storage period provided by the store. In moderate to high rainfall areas these types of cover can be cost effective. IPPC Best Available Techniques (BAT) for storage of pig slurry include chopped straw and natural crusts[1]. Straw is best suited to higher dry matter slurries (>5%); it can sink if used in thin slurries.

[1]IPPC, Reference document on Best Available Techniques for intensive rearing of poultry and pigs, EC, July 2003.

Permable covers

Type	Description	Advantage	Disadvantage
Lightweight Expanded Clay Aggregate (LECA) or foam glass 	• Applied in a layer 100 – 150 mm deep. • Moderate capital cost.	• Easy to install on existing • stores and lagoons regardless of shape and is effective. • No problems reported with pumps etc.	• Approximately 10% of the cover needs to be replaced annually. • These covers do not prevent rainfall from diluting the slurry.
Floating plastic plates 	• Free floating plastic plates, generally hexagonal in shape • Moderate cost, can be recovered and reused.	• Easy to install on existing stores and lagoons regardless of shape and is effective. • Up to 95% reduction in gas emissions can be achieved.	• These covers do not prevent rainfall from diluting the slurry

Impermeable covers

Type	Description	Advantage	Disadvantage
Lagoons – fixed floating plastic membrane 	• A large plastic sheet with integral floats and gas vents. • The edges of the cover are buried into the lagoon banks to retain it. • Moderate to high cost	• Rainwater can be pumped off the top. • Stirring is possible if design allows.	• Requires lagoon to be initially empty and embankments to be suitable for fixing. • Access for de-sludging is difficult.
Tanks – free floating plastic cover 	• A plastic sheet is stretched over and tensioned around a plastic hoop, which floats on the surface. • Low to moderate cost.	• It requires no structural alteration to the store. • Covers can be fitted with an agitation hatch. • Rainwater can be pumped off the top. • Suitable for retro-fitting.	• Access for de-sludging is difficult.
Tanks – fixed cover 	• Reinforced PVC polyester-coated fabric cover. • Normally these types of cover are attached to the sides of the tank with centre support pole and gas vents. • High cost.	• Rainwater is shed from the surface.	• May not be suitable for retro-fitting. • Requires store to be structurally suitable and may involve additional reinforcing.
Integral store and cover (bag) 	• Reinforced PVC polyester-coated fabric bag sitting within an earth structure. • Restrained at sides, fitted with gas vents. • The cover forms part of the structural integrity of the store. • Moderate cost.	• Smaller footprint than conventional lagoon cover. • Rainwater is kept separate from slurry. • Simpler earthworks than for lined and covered lagoons. • Agitation can be facilitated.	• Site needs to be carefully selected. • Secure safety fencing is required.

BPEX Environment

BPEX . Stoneleigh Park . Kenilworth . Warwickshire
CV8 2TL . Tel: 0247 647 8793
Email: kt@bpex.org.uk . www.bpex.org.uk