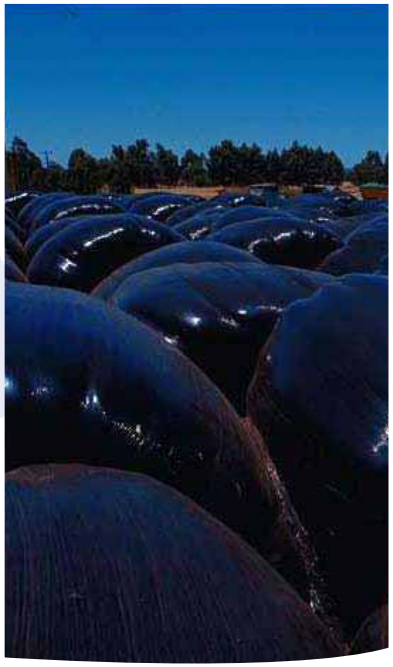
DairyingForTomorrow

DairyCatch

A Partnership for Sustainable and Profitable Dairy Farming in Western Australia

ENVIRONMENTAL BEST PRACTICE GUIDELINES

11.0 MANAGING SILAGE LEACHATE



11.0 MANAGING SILAGE LEACHATE

Silage is made by storing cut green forage in an oxygen-free environment. Silage leachate or juice is the liquid that seeps from freshly ensiled forage that is more than 70 percent moisture. This leachate is rich in soluble sugars and proteins. It is corrosive to concrete and steel and can be extremely polluting to waterways. Silage leachate has a polluting potential 20 times greater than animal effluent. Well made silage does not produce leachate.

Implementing Good Practice

Leachate production relates to the moisture content of the cut pasture. As a rule of thumb, leafy grass ensiled without wilting will produce about 500 litres of leachate per tonne of grass. Only forage with at least 30 percent dry matter should be used. For the best result, pit silage should be ensiled at 30 to 35% dry matter (DM). Round bale silage should be rolled at about 40 to 50% DM. Rapid wilting of pasture to the correct DM content is very important so only cut silage material in fine weather. Most people cut heavy pasture crops for hay or silage so to speed up drying times and ensure uniform wilting to the correct DM levels, you may want to consider tedding. For information about producing good silage, contact the Department of Agriculture and Food in Bunbury or buy a copy of the Successful Silage Manual.

Silage storage facilities should be located to minimise the risk of pollution and enable any leachate to be collected and dealt with appropriately. As such, they should be sited on land that is relatively flat and at least 45 metres from the dairy and 50 metres from waterways, open drains and dams. Areas prone to flooding (high water tables) or subsurface drains should be avoided and pits need to be placed well away from gullies or other places where runoff water can flow into them. The site should be easily accessible and if you use a feed pad you may consider storing your silage close by.

Cracks in the concrete walls and floors of pits allow the inflow of air and moisture that compromise silage quality and the outflow of leachate that pollutes the environment. Proper site preparation can help minimise this potential problem. The loads imposed on the pit are ultimately carried by the soil beneath it. In some cases, naturally occurring soils can carry the load. In others, an "engineered fill" may be required. Be sure that your chosen site is adequately compacted before construction begins. An experienced excavation contractor familiar with soils in your region should be able to identify properly compacted soil, but if you are building a pit at a site that needs more than about 1 m of fill, you are better off talking to a site development engineer to reduce the risk of settling that will cause walls and floors to crack. Pit walls and floors should be tough enough to withstand the hard knocks of tractors as well as resisting corrosion from silage leachate. Concrete with a water/cement ratio less than 0.4:1 should be used. A concrete floor should be 125 mm thick and reinforced to support 20 MPa. Silage pit floors should be watertight and extend out beyond its walls. Construct a nib wall along the sides. Slope the floor 1:50 towards a drainage channel laid across the front of the pit.

Silage stacks need to be well sealed for the ensiling process to work. The plastic used to cover the stack must be in good condition and free of holes. This will ensure that neither rain nor air enters the stack.

- For free-standing stacks, dig a shallow cut-off trench around the stack to prevent water runoff from the paddock entering the stack. Timber (e.g. half-rounds), old tyres or concrete posts should be used to hold the cover in place
- For pits with sides, the cover should extend and be secured over the sides. The grass should be stacked higher in the middle to allow water to run off the cover.

Do not let silage leachate flow across open concrete. Collect it in a channel and take it to blind ditches used as soakage holes or preferably into a watertight storage sump. This sump should be resistant to corrosion with at least 3 m storage per 100 tonnes of grass ensiled. It may be possible to use the nutrients in silage leachate by pouring it over an absorbent feedstuff such as hay or straw. Another alternative may be to direct it to your dairy effluent pond from where it can later be irrigated onto pasture.

As stated earlier, silage leachate can quickly compromise the structural integrity of concrete due to the acetic and lactic acids produced during the anaerobic fermentation process. Clean and inspect walls, floors and drainage channels of pits when they are empty and mend any cracks, corrosion or other faults before silage is made again.

Plastic wrapping of silage bales, if done properly, can prevent the risk of leachate pollution. However, production costs can be doubled and disposing of the spent wrap in landfill comes with an environmental cost. Producing plastic- wrapped silage sausages may be a cheaper option.

Further Information

Dexcel Limited. FarmFact.3-15: Silage Leachate. Dexcel Limited, New Zealand. Available online at www.dexcel.co.nz

Larsen. A. Sustainable Options Land Management 23: Disposal of Effluents on Farm. Environment Bay of Plenty regional Council, USA. Available online at www.envbop.govt.nz

Morris. R. 2005. Fodder conservation as silage. Farmnote 98/99. Available online at www.agric.wa.gov.au

NSW DPI. 2005. Successful Silage. Top Fodder Silage Manual. To order call 1800 028 374, fax: 1800 642 065 or online at www.dpi.nsw.gov.au/bookshop

Wright. P and Jacobs. E. 1999. Staunch the flow. Silage leachate poses problems. Searching for solutions. North East Dairy Business/Pro Dairy March. Online at www.dairybusiness.com/northeast/March April/Staunch.pdf