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# EFFLUENT MANAGEMENT – Co-composting for effluent reuse

Intensive livestock production in the Condamine region creates a large volume of high strength effluent that needs to be disposed of in a sustainable way. Particularly, pork production (in conventional systems) and abattoirs produce a relatively large volume of effluent.

While land disposal is the most common method for utilising effluent, this option is not always available to producers. If nutrient levels in reuse areas increase to excessive levels restrictions may be applied to application rates. Inadequate areas for land disposal of effluent can also become a problem when a facility is expanded but the land area remains the same.

In these cases, one alternative method for the sustainable usage of effluent is to co-compost the effluent with an organic material such as sawdust or cotton gin trash. Co-composting has the added advantage of producing a valuable soil amendment that may be sold at a profit.

Trials have suggested that co-composting may use up to 50,000 litres per tonne when managed to maximise effluent usage. However much lower effluent usage of between 700 – 2000 litres per tonne of organic material have been observed elsewhere. The amount of effluent used will be dependent on the material used and the management of composting operations.

**Composting overview**

Composting involves the microbial break down of material over a period of 3-6 months to produce a safe, nutrient rich humus like soil amendment. The process requires oxygen, moisture and the correct ratio of carbon to nitrogen (C:N ratio of between 15:1 and 40:1 required).

Co-composting is a way of combining an organic material with the nutrients from effluent to produce a product that can be transported more readily than liquid effluent. In addition to this, effluent usage solves the problem of sourcing adequate water to maximise the composting process and allows material with a poor nutrient content to be composted without other nutrient sources.

Co-composting requires several components for success, including;

- Readily available composting material (gin trash, spent bedding from deep litter piggeries, paunch material from abattoirs)
- A suitable site near to the effluent supply
- Machinery for turning the compost piles
- Markets for selling the final product
- Expertise to manage the composting process

**Readily available organic material**

Co-composting requires a high amount of organic material to dispose of effluent. For instance, if 2000 litres of effluent are used / tonne, then a piggery producing 10 ML of effluent will require about 5000 t of organic material. This will most likely need to be trucked to the site. Cotton gin trash or other by-products (paunch material at abattoirs or manure) could be a good option for co-composting.

As the intention of the operation is to maximise water usage, management has to focus on this aim. This may mean increasing the frequency of turning to increase the dry out rate and maintain the composting process. However if this is done the cost of production will increase from the greater levels of inputs.

**Site selection**

A composting site needs to be sufficiently large, compacted and sloped to allow for drainage. In addition to this, runoff from the site should be contained to reduce environmental impacts and the proximity of neighbours should be taken into account.

If the operation involves bringing material onto the site for the purpose of composting, the site will need to be approved and licensed by the EPA and local council prior to operation.

**Machinery**

Composting requires machinery to turn the material regularly (1-2 week intervals) throughout the composting period of 10-16 weeks. There are a number of machines available to do this work depending on the scale of the operation. Cost is a large factor in the decision making process when purchasing a machine. As usual, the higher the cost of the

machine, the higher the throughput. The two main alternatives are;

- Front end loaders
- Specialised compost turners

Specialised compost turners are usually more effective than front end loaders, though if a loader is already owned initial costs may be reduced. Turners can require relatively high power inputs and may differ in their ability to add water to the pile during the turning process. For further information see the fact sheet 'Composting equipment'.

As an alternative to buying a windrow turner, contractors can be used to carry out composting operations. This is can be done on a 'per tonne composted' basis.

**Markets**

Co-composting requires labour and capital inputs. For this to be viable in the long run markets for the finished product must be available and the demand must be sufficient at a price that is reasonable. Compost typically sells for $40-60 per tonne for broadacre application, and may sell for much more if marketed to home gardeners and small scale users.

The recycled organics market is dominated by 'raw' manure which is typically sold for much less than the price of compost, however this product may have several disadvantages, including; possible weed seed and pathogen contamination, unpleasant odour, high organic matter levels which can promote nitrogen draw-down and lumpy consistency which may not spread evenly. These and other benefits may improve the marketability of compost in some cases.

**Composting Expertise**

Composting is a process that requires some expertise to develop the right balance of inputs to get the process working.

Prior to establishing a composting operation there are some useful questions worth asking, such as:

- What materials are available nearby?
- How much effluent needs to be used?
- Is there a suitable site?
- What are the machinery and personnel requirements?
- Will I be able to sell the end product?

Before making the decision to purchase equipment or develop a site, it may be valuable to establish a small trial on site. This can be done with a small amount of room at a stockpiling site by turning a row of material weekly with a front end loader and adding effluent at the time of turning to make the moisture level up to about field capacity. The pile should then be checked through the week to ensure that it is heating adequately in the centre of the pile.

Information and services about compost techniques and management are available on the internet and from consultancy services to help establish such a trial.


***Some other fact sheets in this series:***

*Effluent management – Co-composting for effluent reuse*

*Effluent management – Handling salts in effluent*

*Effluent management – Sustainable land disposal*

*Effluent management – Composting Equipment*

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