

MANURE TREATMENT OPTIONS VS AVAILABLE LAND BASE

This factsheet presents various options for treating manure depending on the land base that you have available for applying manure. The treatment systems remove variable amounts of nitrogen, phosphorus and potassium from manure as well as other components such as solids, suspended solids and micronutrients.

Although all of these methods will effectively treat manure and will thus increase the amount of manure that can be applied to a given land base, it should be remembered that manure's best use is as a fertilizer. Treatment should be considered only when land application is not possible.

Manure application rates are determined by the nutrient content of the manure and the receiving crop's nutrient requirements. The long term goal of manure application is to maintain soil nutrient status in a steady state to prevent pollution caused by overloading the soil with nutrients.

APPLICATION RATES OF MANURE BASED ON NITROGEN CONTENT

In B.C. the nutrient of concern in land application is nitrogen, and because of this, allowable application rates are based on the crop's nitrogen requirement. Leaching of nitrogen into groundwater and subsequent pollution of well water drawn from groundwater supplies, as well as occasional fish kills from direct discharge of manure into surface water are the reasons for emphasis on nitrogen over phosphorus, the other main cause of pollution from agriculture waste.

Because application rates are based on manure nitrogen it is possible to treat manure to remove nitrogen only, and then apply more manure to an existing land base. Some of the methods mentioned below do this. However, this practice may lead to

problems with soil buildup of other nutrients, in particular phosphorus and potassium, and salts. Removal of nitrogen only from manure should be considered a temporary solution. In the long term, treatment systems that remove at least nitrogen and phosphorus, and preferably potassium as well are more sustainable.

CALCULATING LAND BASE REQUIREMENT FOR MANURE APPLICATION

A minimum of 0.57 acres per sow unit in your herd is required for manure application (eg. if you have a 100 sow farrow to finish operation, you need 57 acres). For finisher operations, you require 0.08 acres per animal unit (or 8 acres per 100 finisher places in your barn).

These numbers are based on the average amount of nitrogen contained in the feces and urine of a sow or finisher, and the amount of nitrogen taken up by a high yielding stand of forage grass. They take into account the loss of nitrogen from the manure before it is available to the crop. Forage grass is the highest consumer of nitrogen; other crops such as silage corn and vegetables will require more land to spread the same amount of manure. For more information see the Environment Guidelines for Pork Producers in British Columbia, available from the BCMAFF.

The following table gives a range of manure treatment options, some investigated by this group and other developed elsewhere. For each method of treatment, the percentage of land required following treatment compared to that required for land application of the raw manure is given, based on the nitrogen removal achieved by each method. For more information on any of these methods, contact the BCMAFF Resource Management Branch.

Table:

**MANURE TREATMENT OPTIONS
VS
LAND AVAILABLE TO SPREAD MANURE**

% Land Required	Treatment Option	Notes
100	Land application	preferred option if land is available no waste hauled off farm
85	Liquid solid separation – solids removed from farm	removes comparable amounts of P and K 15% of waste hauled off farm
75	Centrifuge with polymer added to manure before centrifuge; solids hauled off farm	polymer at 30 ppm or higher 20% of waste hauled off farm
50	Settling tank – settled liquid hauled off farm	90% of P removed, <10% of K 30% of waste hauled off farm
50	Aeration canal or tank	P and K removal not known
40	Volatilization of ammonia-N by altering pH of liquid manure and aerating	no P or K removed except incidentally nor removal of waste off farm
35	Anaerobic treatment – longterm lagoon storage (1 yr. min.), sludge removed from farm	good P removal, but only 10% of K 10% of waste hauled off farm
25	Sequencing Batch Reactor with preseparation and settling tank – solids and sludge removed from farm	good removal of P, less of K 20-25% of waste hauled off farm
10	Complete treatment system – separation, treatment of separated liquid with reverse osmosis or other hi-tech method. Several systems have been developed in Europe	high cost but highly effective way to treat manure 30-35% of waste hauled off farm
0	Concentrate manure in barns by minimizing water use and by roofing outdoor storage, and haul all manure off farm	effective if hauling distance is short 100% of waste hauled off farm

Originally written by: **Hog Producers Sustainable Farming Group
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For further information on related topics, please visit our website
Resource Management Branch
www.agf.gov.bc.ca/resgmt
 Linking to our
Publications and Conceptual Plans

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