Technical Note

FARM EFFLUENT TESTING

Why Test Effluent?

Effluent has historically been viewed as a waste product to get rid of, but in fact it is a valuable source of nutrients. It can be used as a fertiliser replacement for a significant portion of the farm which can save a lot of money that would usually be spent on purchasing and applying fertiliser. Dairy effluent is particularly high in nitrogen and potassium which makes it an ideal fertiliser for maize paddocks as maize takes up a great deal of the same nutrients from soil. In addition, the nutrients in effluent applied to land tend to be slow in release with only 50% of the N and P available in the first year of application[1] (K is almost all available). This means that paddocks which have a long history of effluent application may have a large "bank" of nutrients in the soil which have yet to be utilised. This explains why paddocks of this nature show no response to added fertiliser in the first year out of pasture[2].

Effluent testing should be seen as an important part of nutrient management. The more nutrients that can remain on-farm, the more money will be saved by the farmer and the better it will be for the environment. Most Regional Councils have limited the application of nitrogen for dairy pasture, e.g. the Waikato Regional Council limits are 150kg N/Ha/year, and 200kg N/Ha/year for maize paddocks. Unless the effluent is measured for its nutrient content, the application rates of nitrogen can only be calculated using assumptions of the effluent composition. This can (and does) lead to over application of nutrients as farmers tend to "throw a bit more on just in case".

As there is a strong correlation between nutrients such as nitrogen and solids content, a one-off test from an effluent source which has a wide variation in solids content will provide little information for nutrient calculations and budgeting. This is why it is strongly advised that care is taken when designing the effluent handling system so that it produces a consistent effluent composition. Once this has been achieved, the effluent can be tested for its nutrient content

Taking an Effluent Sample

Hill Labs has set up a Dairy Effluent kit which contains a 1L unpreserved plastic container, a gel pack to freeze, a submission form, a return courier ticket and instructions on taking the sample.

The sampling instructions are based on the idea that it is best to take a sample of the effluent as it is being applied to the land. To achieve this, 4 (or more) ice-cream containers are laid out in front of an effluent spreader in the shape of a square and the effluent spreader passed through the middle of them. The depth of effluent in each container is measured and the average depth used in further calculations. The effluent in each container is then combined into the 1L plastic container supplied and sent to the lab (remember to fill out the submission form).

Understanding the Results

Hill Labs has developed an Effluent report format (refer to the example report on the following page) which gives the results of the effluent in kg/m3 (if a liquid) and kg/tonne (if a solid). In addition, the application rate of the liquid effluents have been calculated in kg/ha for a 10mm and 20mm application rate. Once the effluent nutrient composition is known, the farmer is then able to apply the nutrient amount actually required by pasture, without running the risk of over application and of wasting valuable nutrients. In terms of what actions to take once the report has been read and understood, please contact a farm consultant or fertiliser rep to provide assistance with nutrient management practices.

[1] Wrigley, R., Managing Dairy Shed Wastes: Vol. 2, Dairy Research and Development Corporation, Victoria Australia, 1993.
[2] AR, Winter Results Road Show, 2008

For more information, freephone 0508 HILL LAB 44 555 22 mail@hill-labs.co.nz hill-labs.co.nz

Sample Type: Sludge		
Sample Name:		
Lab Number:		
Farm Effluent Samples		
Dry Matter	g/100g as rcvd	25
Total Nitrogen*	kg/tonne	1.9
Total Recoverable Phosphorus*	kg/tonne	0.15
Total Recoverable Potassium*	kg/tonne	0.52
Total Recoverable Calcium*	kg/tonne	0.94
Total Recoverable Magnesium*	kg/tonne	0.19
Total Recoverable Sodium*	kg/tonne	0.07

Solids Effluent results in kg/tonne

Sample Type: Aqueous		
Sample Name:		
Lab Number:		
Farm Effluent Samples		
Total Nitrogen	kg/m^3	1.04
Total Phosphorus	kg/m^3	0.139
Total Potassium	kg/m^3	0.29
Total Calcium	kg/m^3	2.4
Total Magnesium	kg/m^3	0.154
Total Sodium	kg/m^3	0.042
NPK applied for a 10 mm application depth		
Nitrogen applied	kg/ha	104
Phosphorus applied	kg/ha	13.9
Potassium applied	kg/ha	29
NPK applied for a 20 mm application depth		
Nitrogen applied	kg/ha	210
Phosphorus applied	kg/ha	28
Potassium applied	kg/ha	57

Liquid Effluent results in kg/m3

Liquid Effluent results in kg/ha for 10 mm and 20 mm application depths

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