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 Laboratories 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 Laboratories has developed an Effluent report format (refer to the example report on the following page) which gives the results of the effluent in kg/m^3 (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 FAR, Winter Results Road Show, 2008.

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ANALYSIS REPORT

Client:	Footrot Flats Farm Ltd	**Lab No:**	123456	FENPv1
Contact:	Wallace Footrot	**Date Registered:**	07-Jul-2009	
	Footrot Flats	**Date Reported:**	17-Jul-2009	
	Farm Rd	**Quote No:**	43210	
	RD 3	**Order No:**		
	Raupo	**Client Reference:**	Effluent testing	
		Submitted By:	Cooch Windgrass	

Sample Type: Sludge

Sample Name:		Top	Middle	Bottom		
Lab Number:		123456.1	123456.2	123456.3		
Farm Effluent Samples						
Dry Matter	g/100g as rcvd	21	22	-	-	-
Volume Weight*	g/mL	-	-	1.06	-	-
Total Nitrogen*	kg/m³	-	-	2.4	-	
Total Recoverable Phosphorus*	kg/m³	-	-	0.79	-	
Total Recoverable Potassium*	kg/m³	-	-	3.6	-	
Total Recoverable Calcium*	kg/m³	-	-	0.92	-	
Total Recoverable Magnesium*	kg/m³	-	-	0.74	-	-
Total Recoverable Sodium*	kg/m³	-	-	0.28	-	-
Total Recoverable Sulphur*	kg/m³	-	-	< 2.4	-	-
For an application depth of 10 mm						
Nitrogen applied*	kg/ha	-	-	240	-	
Phosphorus applied*	kg/ha	-	-	79	-	
Potassium applied*	kg/ha	-	-	360	-	
For an application depth of 20 mm						
Nitrogen applied*	kg/ha	-	-	490	-	
Phosphorus applied*	kg/ha	-	-	160	-	
Potassium applied*	kg/ha	-	-	720	-	-
Total Nitrogen*	kg/tonne	5.5	5.2	-	-	-
Total Recoverable Phosphorus*	kg/tonne	1.9	1.6	-		
Total Recoverable Potassium*	kg/tonne	7.7	7.0	-		
Total Recoverable Calcium*	kg/tonne	3.2	1.8	-		
Total Recoverable Magnesium*	kg/tonne	1.7	1.5	-		
Total Recoverable Sodium*	kg/tonne	0.86	0.55	-	-	-
Total Recoverable Sulphur*	kg/tonne	< 4.2	< 4.5	-	-	-

Liquid Effluent results in kg/m3

Liquid Effluent results in kg/ha. Both 10mm and 20mm applications would breach the WRC regulations.

Solid Effluent results in kg/tonne

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Sludge

Test	Method Description	Default Detection Limit	Samples
Farm Effluent Solids Nutrient profile			
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction.	-	1-3
Dry Matter (Env)	Dried at 103°C (removes 3-5% more water than air dry) for 18hr, gravimetry.	0.10 g/100g as rcvd	1-3

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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.