Ash alkalinity of farm produce

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Soil acidification is a long term, continuous process and recent evidence suggests that agricultural systems are accelerating this process (1, 2, 3). Soil acidification has been quantified in terms of buffering capacity, nitrogen cycle acidification, carbon cycle acidification and plant product removal (4, 5, 6). This paper attempts to quantify the amount of alkali removed from the farm in plant and animal products. Figures presented in this paper enable the assessment of acidification due to product removal under current farm management systems.

Methods

The ash alkalinity of the following samples-lamb, wool, hay, grasses, grain and milk-was determined by heating a 2 g sample at 500?C for 2-3 hours or until complete ashing had occurred. Ashed samples were treated with 20 ml of 1 M HCL and a 5 ml diquot was titrated against 0.25 M NaOH.

Results and discussion

Ash alkalinity of all samples were calculated in terms of k moles H^+ per kg of product removed. These figures could be converted to the equivalent weight of $CaCO_3$ which would be required to neutralise the removal of alkali, given that 1 k mole H^+ requires 5 x 10^4 g $CaCO_3$ to be neutralised (Table). Results for pasture grass species are comparable to previously reported data (1). Tabulated figures are useful in that they can be used to calculate the exact amount of alkali exported from the farm during each year of commercial production. Together with soil acidification data based on buffering capacity, nitrogen cycle and carbon cycle acidification, a more accurate assessment of total agricultural acidification can be made. Therefore, more accurate figures for lime addition can be calculated so as to halt the current rate of soil acidity.

SAMPLE	Ash Alkalinity (kmoles/kg(litre) x 10^{-6})	CaCO3 equivalent (gm/kg (litre))
Sheep (Lamb)	340	17.0
Wool	284	14.2
Milk (Bovine)	80	4.0
Pasture Species		
- Phalaris	450	22.5
- Cocksfoot	440	22.0
- Clover	800	40.0
Hay - Lucerne	1200	60.1
- Mixed grasses	597	29.9
Wheat - grain	184	9.2
Lupin - grain	404	20.2

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