



factsheet



managing soil acidity

Acidification of soils as a result of both man made and natural processes, can lead to significant reductions in crop yield, leading to less profitable farming.

Acidification occurs through various processes:

- acid deposition from the atmosphere (acid rain)
- the production of acids from the decomposition of crop residues and organic matter
- plant growth alters the chemical balance in the soil through the uptake of nutrients (Mg, Ca) and the release of hydrogen ions
- leaching of Ca and Mg out of the rooting zone
- fertilisers containing ammonium nitrogen convert to nitrate, simultaneously releasing hydrogen ions which increase soil acidity

Application

These processes cannot be so readily avoided but their acidifying effects can be off-set by the application of lime to the soil.

As is well known, research has established that there are optimal pH levels for different crops. The optimum for general cropping is between pH 6 and 7.

Maintenance of optimal soil pH is essential as it affects the availability of nutrients to plants. For example N, P, K, Mg and Ca nutrients show large reductions in availability under acidic soil conditions. If a soil is too acidic nitrogen fertiliser may not be fully available to a crop and subsequently lost from the soil through leaching. The implications are reduced crop yields, combined with the loss of valuable fertiliser from the soil, reducing profits and potentially causing water pollution.

Soil management

As part of a good soil management regime soil pH should be routinely monitored, and a suitable rate of lime product applied to those fields shown to be of low pH.

There are a large number of materials available for agricultural liming, and each will have different characteristics such as fineness and calcium oxide (CaO) concentration. A finer product has a greater surface area allowing it to react within the soil at a faster rate. A material of higher CaO concentration will be more able to react in the soil when compared to materials with lower CaO content. In practice these two factors will vary for different products that are suitable for agricultural liming. The concept of a Neutralising Value (NV) has been introduced so that different liming materials can be described in terms of the percentage of CaO equivalent.

Neutralising value example:

100 kg of a liming material with a NV of 55% will have same neutralising value as 55 kg of pure calcium oxide.

As soils are variable in terms of their texture (relative sand, silt and clay composition), they will require different application rates of liming products to achieve optimal soil pH. It is therefore important to know what soil type the land is, and the relative amount of liming product required by that soil.

Lime stabilised biosolids

An application of nutri-bio lime cake with a NV of 3% applied at a rate of 21 tonnes/ha will supply the equivalent of 0.63 tonnes/ha of CaO equivalent, or in practical terms it will give the same lime benefit as 1.26 tonnes/ha of ground limestone of NV 50%. Assuming a ground limestone cost of £13 per tonne delivered and spread the biosolids lime value equates to £16.38/ha. On a light/medium soil, this can lift the pH by 0.1, thereby offering a liming value as a "sweetener".