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LIME QUALITY—DOES IT MATTER?

There are four major factors that affect the successful neutralization of soil acidity by agricultural limestone. They are: 1) lime rate; 2) lime purity...compared to pure calcium carbonate ...expressed as calcium carbonate equivalent (CCE); 3) lime particle size distribution or fineness of grind; and 4) degree of incorporation or mixing with the soil.

Soil test laboratories make lime recommendations based on a measurement of soil pH (active acidity) and some indication of soil texture or buffer capacity, which is the resistance to change in soil pH. Most soil testing laboratories usually assume the ag lime has a CCE of at least 80 to 90 percent and an excellent fineness of grind (i.e. large majority of particles passing a 50 to 60-mesh sieve).

Different states have different regulations governing lime quality, and many land grant universities offer guidance in selecting good quality ag lime. Often, lime quality is expressed as "effective calcium carbonate equivalent", "relative neutralizing value", or "effective neutralizing material." These expressions involve some consideration and factoring of both lime purity and fineness of grind.

The rate of reaction or the dissolution of lime particles increases as their size decreases. For example, after 3 to 4 years, ag lime particles larger than 10 to 15-mesh (about 1 to 1.7 millimeters in diameter) will have dissolved little, while the majority of ag lime particles in the 50 to 60-mesh size range will have dissolved. Particles larger than 10 to 15-mesh have little effect on soil acidity, while the smaller, finer-grind particles react rapidly to neutralize soil acidity. It may take twice as long (or longer) for particles between 15 to 30-mesh to react, compared to particles smaller than 50 to 60-mesh (about 250 to 300 micrometers), assuming their purity or CCE is the same.

With the expansion of conservation tillage and no-till systems, there are fewer opportunities to incorporate ag lime via plowing or discing. So, lime quality may be even more important in these reduced-tillage systems than in older, traditional tilled systems.

High crop yields are essential to economic success in farming. Most farmers and crop advisers recognize the importance of managing soil pH at optimum levels in the crop root zone to achieve high yields. When acidity increases to the point that root growth slows, nutrient and moisture uptake are impaired, the function of certain herbicides becomes limited, and yields decline...can one afford to purchase and apply poor to mediocre-quality ag lime?

Because of the recent changes in production costs associated with higher energy costs, farmers and their crop advisers are seeking greater confidence that each input will result in economic benefits. When purchasing and applying ag lime to acid soils, it pays to know both the ag lime purity and fineness of grind. **Size really does matter when it comes to ag lime: finer or smaller ag lime particles are better.**

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