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PELLETIZED LIME - HOW QUICKLY DOES IT REACT

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Pelletized lime is made by granulating finely ground agricultural (ag) lime. It may be dolomitic or calcitic depending on the nature of the original limestone. The fine lime particles are bonded together with lignosulfonates during the pelletizing process. In general, the pelletized lime contains about 9% lignosulfonates. Pelletized limestone is a product that has been on the market for many years. The price of the material on a per ton basis is considerably higher than bulk ag lime, so its use has mainly been confined to specialty markets, with little use in production agriculture. However, the product is becoming more commonly used in production agriculture. Some questions have been raised about recommended rates of this material and the speed at which it reacts compared to standard ag lime.

How Much Can the Rates be Reduced for Pelletized Lime?

The recommended rates and the effect on soil pH of any agriculture lime product is related to the neutralizing value of the lime, which is a combination of the purity (calcium carbonate equivalent) and the fineness of grind (particle size). As these two properties of lime change, so does the recommended rate of lime and its effect on soil pH. The finer the lime particles and the higher the calcium carbonate equivalent, the more effective the lime and the lower the rate of lime needed to make the desired pH change.

Bulk ag lime sold in Kentucky has an average neutralizing value of 67% when averaged for all quarries. All lime recommendations in Kentucky are based on this value. Therefore, if the

neutralizing value of pelletized lime is substantially higher than 67%, then the recommendation should be lower. The information to calculate the neutralizing value should be on the pelletized lime bag, and the method to calculate the neutralizing value can be found in publication AGR-106, University of Kentucky College of Agriculture. For example, a high quality pelletized lime source may have a neutralizing value of 85. If this is the case, the lime rate can be reduced to 78% of what would be recommended for bulk ag lime. This is calculated by dividing the average neutralizing value of ag lime by the neutralizing value of the pelletized lime being used ($67 \div 85 = 0.78$). In this case, 1560 lbs/ac of pelletized would be required to equal one ton of ag lime. If less than this amount of pelletized lime is used, the expected soil pH change will probably not be obtained. As can be seen from this example, the recommended rates of pelletized lime cannot be greatly reduced as compared to bulk ag lime.

How Fast Will Pelletized Lime React?

The speed of reaction (rate at which the lime will change the soil pH) is mainly a function of surface area of the lime particles and their contact with the soil. The finer the grind of lime, the more the surface area, and the faster the reaction. Since pelletized lime is pelleted from finely ground lime, it is easy to assume that it will be faster reacting than bulk spread ag lime which has some larger, non-reactive particles as a part of its composition. **However, this is not true.** Based on research from several states, it appears that the pelletized lime reacts no faster to raise the soil pH than good quality ag lime applied at recommended rates. In fact, incubation studies at Michigan State University found the pelletized lime to have a slower

rate of reaction. Field research from other states indicate the rate of reaction is about equal to ag lime.

The slower than expected reaction of pelletized lime is probably due to two things: 1) the lignosulfonate binding, and 2) the distribution pattern. The lignosulfonate binding must break down by solubilization or microbial action before the lime is released to neutralize the soil acidity, which would delay the speed of reaction. When the pelletized lime is spread, it is distributed on the soil in pellets and results in small concentrated zones (spots) of lime after the binder dissolves. The fine, reactive particles of ag lime, in contrast, are spread as more of a dust so that the lime is better distributed and not in concentrated spots. The bulk spreading method will allow the ag lime to contact a larger amount of the soil.

Summary

Pelletized lime is an excellent source of high quality lime. Its use in agriculture has been limited due to the price. The recommended rate of pelletized lime should be based on the neutralizing value of the lime and will probably be about 75 to 80% of that for average-quality bulk ag lime. Contrary to popular belief, the speed of reaction of pelletized lime is no faster than that of bulk ag lime. Thus, when comparing the two materials, less pelletized lime is needed to raise the soil pH to the desired level, but the increase in pH is no faster than with ag lime if both are applied on the basis of their neutralizing values.


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