Ponds are limed to neutralize the acidity of bottom soils and to improve productivity. “Liming” refers to the application of various acid-neutralizing compounds of calcium or calcium and magnesium. The material most commonly used to lime ponds is finely crushed agricultural limestone, or agricultural lime. Liming ponds has three important benefits. Liming may enhance the effect of fertilization. Liming helps prevent wide swings in pH. Liming also adds calcium and magnesium, which are important in animal physiology (Wurts and Masser 2013).

There has been some interest in the potential use of pelleted lime and liquid lime products for liming ponds. Pelletized lime and “liquid lime” (lime suspensions) have been available for farm and home use for many years. Typically higher quality, finely ground agriculture limestone, “ag lime”, is used to make both. To form pellets, the lime particles are held together with lignosulfonates (less than 10 percent). Liquid lime is formulated by suspending finely ground lime particles in water, with a small amount of clay and dispersant added to the mixture. Sufficient quantities of either product must be used to match the acid neutralizing effectiveness of a bulk agricultural lime application.

**Neutralizing Value of Agricultural Lime**

Commercial liming materials vary in their ability to neutralize soil acidity — their neutralizing value (NV). Liming rates are dependent on the neutralizing value, which is dependent on purity and particle size. Pure calcium carbonate is the standard used for assigning relative neutralizing values to each of the liming compounds. Calcium carbonate is considered to have an acid neutralizing value of 100 percent. Agricultural limestone may have neutralizing values between 85 and 109 percent depending on its specific chemical composition, calcium carbonate or calcium magnesium carbonate.

Finely crushed agricultural limestone is composed of particles of different sizes. Small particles react faster and dissolve more rapidly and completely than large particles. Therefore, the neutralizing efficiency (NE) of agricultural limestone depends on the fineness of the mixture. The particle fineness and associated neutralizing efficiency are determined by passing limestone through a series of sieves. Particles that pass through a 20-mesh sieve but are retained by a 60-mesh sieve have a NE of 52.2 percent. Those passing through a 60-mesh sieve have a NE of 100 percent. 

**Practicality of Liquid Lime Suspensions and Pelleted Lime for Liming Ponds**

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percent. The various quantities of each particle size grouping and their associated NE values are averaged to arrive at an overall NE rating.

**Liquid Lime Suspensions**

A minimum quality dry agricultural lime could have approximately 90 percent of the particles pass through a 10-mesh sieve and only 50 percent pass through a 60 mesh sieve. However, in liquid lime, greater than 90 percent of the limestone particles will pass through a 200-mesh sieve. These finer particles react faster to neutralize soil acidity quicker. But suspending very fine lime particles in water does not necessarily make them more effective. The particles are suspended, not dissolved, and will settle out over time. These particles must be distributed evenly over the soil surface to be treated. This requires specialized spreading equipment that could be too expensive and cumbersome to distribute liquid lime over the entire surface of a pond, especially one already containing water.

The particles in liquid lime are much finer, react quicker with soil acid and their neutralizing value is high. Because of this, many assume less liquid lime is required to achieve the same results attained with coarser dry agricultural limestone. However, this is not true if the liquid suspension contains close to 50 percent water. A liquid lime suspension that is 50 percent water cannot contain more than 50 percent lime. The neutralizing value of a liquid suspension that is only 50 percent lime is reduced by half (NV = 100 × 0.5 = 50). If the neutralizing value of a dry agricultural lime application is 85, 1.7 (85/50) times more liquid lime is needed than the dry agricultural lime to effectively neutralize soil acidity.

**Pelleted vs. Agricultural Lime**

As the neutralizing value of an agricultural lime source increases, less lime is needed to achieve the desired soil pH. The average neutralizing value of agricultural lime in Kentucky, for all quarries, is 67. This value is used for making liming recommendations in Kentucky. Information about the neutralizing value of pelleted lime should be printed on the bag. If the neutralizing value of pelleted lime is higher than agricultural lime, less should be needed to achieve the desired results. For a neutralizing value of 85, 78 percent less pelleted lime would be needed than the bulk agricultural lime recommendation. Divide the average neutralizing value of Kentucky quarry lime by the neutralizing value of the pelleted lime (67/85). If the recommended application of agricultural lime is 4,000 lb, then 3,120 lb of pelleted lime would be needed. While less pelleted lime is required, the rate reduction is not substantially lower.

**Pellets and Liquid Suspensions or Finely Crushed Agricultural Lime?**

Pelletized lime may be easier to distribute than agricultural lime over small areas — especially if spread by hand for ponds already filled with water. But, because the fine lime particles are combined with a lignosulfonate binder and spread as pellets, pelletized lime is no more effective for reducing soil acidity than standard agricultural lime. The particle binder must break down before the lime particles are available to neutralize acidity. When the pellets break down, the lime particles are concentrated in small circles rather than evenly dispersed.

Liquid lime suspensions can react with soil acidity more quickly because of the finer particle size. However, for terrestrial use, research has shown more frequent applications may be needed to maintain desired pH/alkalinity. Liquid lime suspensions can contain as much as 50 percent water and require specialized mixing and spreading equipment. Distributing lime suspensions evenly over the surface of a pond filled with water could pose a daunting challenge. Furthermore, because the fine lime particles are suspended and not in solution, they will settle out of the water carrier if allowed to sit for too long. Both pelletized lime and lime suspensions are typically much more expensive to use than good quality agricultural lime with an equivalent neutralizing effectiveness (Wurts and Masser 2013).

**Notes**

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**References**