

## How Does So Little AGGRAND Liquid Lime Work So Well?

It primarily comes down to the fact that 100% of the particles within the AGGRAND liquid lime product are NO MORE than about 50 microns in size (because 100% of our product will pass through a 300 mesh sieve). In contrast, typically no more than 50-60% of the particles in an aglime product will pass through a 60 mesh screen. Thus, only 50-60% of the particles are less than 250 microns. The other 40-50% can typically be much larger.

Thus, all of the particles in an aglime product are AT LEAST 5 times as big as the particles in our liquid lime and, on the average; the particle size is probably more like 10 times as large or more. Since lime neutralizes acid by physical surface contact between the lime particles and the soil particles, the smaller the particle size, the more surface area is contacting the soil particles.

As an example: take one of those Rubik's cubes that used to be so popular. If you were to measure the actual TOTAL surface area of one of those cubes it would have been about 54 square inches (give or take a little bit). But, when you couldn't solve the puzzle and took the thing apart (so you could put it back together in perfect order and pretend that you had solved it) you had 26 little 6 sided cubes (no actual cube in the center made it 26 instead of 27 cubes). Each cube individually had a TOTAL surface area of a bout 6 square inches. Multiply that by 26 cubes and you've got nearly 156 square inches of total surface area, compared to only 54 on the original cube.

Same principle here. With particles on average 10 times larger, the particles in an aglime will have approximately 1/3 the surface area of the particles in our liquid lime product. That fact alone accounts for a significant increase in the speed of pH adjustment as well as a corresponding decrease in the amount of product needed. But that is only a small part of the story.

For the particles in a lime product to actually affect a pH change, they have to penetrate the surface of the soil and work their way down in. That is why it is typically recommended that bagged lime products are tilled in to affect a faster pH change. With particles so large in a typical bagged lime product, unless you are applying it to a very coarse sandy soil, the particles are actually too large to pass in between the soil particles.

AGGRAND liquid lime particles, on the other hand, penetrate the soil profile very easily because the particle size more closely resembles that of a silt/loam type soil. Even on clay soils, where the soil particle size is under 2 microns (considerably smaller than even the liquid lime particles) it is still much easier for the liquid lime particles to penetrate the soil profile than the aglime particles.

Also, the acid reduction reaction can only take place when the soil is moist. Since the "liquid" lime product is applied with a large quantity of water to begin with, this speeds the process even more. One other benefit of a liquid lime product is that it provides an immediately available source of calcium and magnesium to whatever you apply it to.

For any application that does not readily offer the option of tilling in your lime application, a liquid lime is ideal, since pH is adjusted very quickly with NO tilling necessary.

## ***How Much Lime is Necessary?***

Well, that question depends upon what you intend on accomplishing. Liquid lime can be used in one of two ways. It can either be used as a direct substitute for aglime, which can be much more convenient but also more costly, OR it can be used as a method of avoiding the pH issue altogether.

Allow me to explain myself a bit ...

If you are truly looking for a **major** pH adjustment, then, although using our liquid lime will be much more convenient, it will also likely be more costly than aglime because it is more expensive and you will need quite a bit (although not NEARLY as much as would be recommended if you use aglime). Also, the pH adjustment that comes from a liquid lime will likely be more short-lived than with an aglime product.

Remember, it takes aglime MUCH longer to affect a pH adjustment than an liquid lime. It can be 9-18 months or more before the entirety of an aglime application is “used up” and affects a change in pH. Of course, over that time, if you’re using crop/turf management practices that are acidifying the soil, such as the use of synthetic fertilizer products, you’ll probably never get the full pH adjustment that you were looking for because you’ll be counteracting your own liming efforts. But, the lime will continue to work over the whole 1-2 year period.

Unfortunately, while you’re waiting for the aglime to work, all of your other efforts will be hampered by the fact that your pH isn’t “up to snuff”. Thus, you’ll be wasting money on fertilizer and labor that is not accomplishing all that it could if the pH was where it should be.

In contrast, pH adjustment with our liquid lime will be very quick, but short-lived. If enough product is used, you could see a significant pH adjustment within a month or less, which means that all of your efforts in the short term will be MUCH more effective. But, if you continue to utilize management practices that lower soil pH, the adjustment will be short-lived and you’ll be back where you started.

Once our product affects the pH adjustment, it’s done. The product is used up. In order to keep a more neutral pH and minimize the need for continued liming of the plot, you must transition to crop/turf management practices that will not consistently lower pH. If not, you could be applying liquid lime quite frequently and in significant quantities in order to keep soil pH where you want it.

So, how much liquid lime? Well, differing soil types and conditions can obviously affect the answer to this question, but, on the average, you should expect to apply at least 6-10 gallons per acre to affect a 1 point pH change. Understand this number is not an exact one and, again, if you continue to use management practices that acidify the soil or you are working in a geographic region that typically has acid soil, liquid lime will be a pretty temporary fix.

## ***An Alternate Option***

There IS an alternative that is less expensive, but, to take advantage of it, will require a change in your thinking. So, allow me to ask you a question ...

Why are you trying to adjust pH in the first place? To improve plant growth and health while keeping costs reasonable enough to make a profit, right? In the end, that's the whole point, isn't it?

So, if there was a less expensive, completely effective way to accomplish that goal without actually having to raise soil pH, would that be acceptable? If you're in business to make money, I would think that it would be.

We have numerous commercial growers, turf managers and food plot growers who are doing just that. They are growing phenomenal crops and turf with soil pH in the 5.0 range, much lower than would typically lend itself to good growth.

How are they doing it? By using the AGGRAND liquid lime product as a temporary buffer instead of as a pH reducer. By applying just ONE gallon per acre of our liquid lime product along with our AGGRAND Organic Fertilizer, they are basically fooling their crops and turf into thinking that soil pH is where it should be, so that the plants can make efficient use of the fertilizer being applied.

Typically, they'll do this 2-4 times per season – in the same application with our liquid fertilizer (avoiding the hassle of doing separate liming applications). So, instead of applying upwards of 10 gallons per acre of our liquid lime product (to actually raise pH to “acceptable levels”), they apply 2-4 gallons per acre per season to buffer the soil enough to get good growth WITHOUT raising soil pH much at all.

So, what does that cost? About \$10/gallon (at commercial account prices) or \$20 - \$40 per acre per season. All with **NO LIME DUST, NO NEED TO STORE TONS OF LIME, NO EXTRA LIME APPLICATIONS (APPLY WITH YOUR LIQUID FERTILIZER), AND NO WAITING.**