

The Mystery of Potassium

Many of us have learned from experience that giving our plants more potassium makes them more colorful in every way - darker green leaves as well as bigger and more colorful flowers. The skeptical types among us ask if this is just our imagination, or is it really true? Some of us have tried growing plants side-by-side with and without extra potassium to see the difference, and amazingly the difference is visible. But fertilizers with high enough levels of potassium are still so hard to find! So how can it possibly be true that higher levels of potassium are better for plants? Our plants look better with extra potassium, but are they actually healthier, or is it just a gardener's illusion?

The short answer is yes, they are actually healthier with more potassium. When leaves are greener, it means they have more chlorophyll, better hydration, more photosynthesis, more protein, and more sugar to support the plant. Bigger and more colorful flowers are a symptom of good health, just as bigger, better looking fruits are a symptom of better health in food crops. Higher doses of potassium produce not only more attractive and cosmetically beautiful plants. They also produce healthier, more vigorous plants.

How Does Potassium Work?

The mystery of potassium is that plant cells are not actually made of potassium. It's not used in the molecules that make up leaves, chlorophyll, stems or flowers. And yet, plants go downhill and die if they don't get enough of it. What does potassium do that is so important for plants?

Molecules ~ The Factory Raw Materials

Think of a plant like a factory full of parts that will eventually go together to make something. The parts are the molecules that make up the plant. These parts, the molecules, go together to make leaves, stems, flowers, roots, every part of the plant. More molecules make up the nutrients that feed the plant, water, air, fertilizers, nutrients from the soil, etc. All these parts are vital to the plant, of course! But without workers and machines to put them together, they are just separate, loose parts. How do these molecules get put together to make a plant grow and bloom?

Enzymes ~ The Factory Machines

The machines that put the molecules together are called *enzymes*. We think of enzymes as chemicals in our stomach that help us break food apart, but enzymes all through nature serve many different purposes, both for building and for taking apart. Plant enzymes are no different. They are like little chemical cogs that grab onto molecules, put them together, take them apart, or both. These enzymes are all through every part of a plant, from root tips to flower tips, working like little machines to do all the things that plants need to do throughout their lives. But these machines don't work on their own. Something needs to make them start and stop. Something needs to move the molecule parts to where the machines are, connect them up, and

turn the little enzyme machines on and off. How does this happen? What makes it all start working?

Potassium ~ The Factory Workers

Potassium! Potassium is like busy workers all through the factory. It is everywhere in the plant, all through every part of the plant. It turns the enzyme machines on and off so they can turn molecules into cells, food, leaves, stems, roots, flowers and everything else that makes up a plant. Tiny potassium *ions* shape the molecules and enzymes so that they fit together, like cogs and gears that have to fit together perfectly to make the machinery work. Without potassium, nothing fits together and the machinery doesn't get turned off and on.

Potassium's worker role is important in other ways too. It moves water all through plants, and along with the water, it moves nitrogen, phosphorus, trace minerals and nutrients - all the nutrients in the fertilizer we feed our plants, and all the goodies it picks up from air, water, and soil. It turns out that almost everything that needs to travel through a plant is moved by potassium. Water is the conveyer belt and potassium makes it all move along exactly where it's supposed to go.

Too Little Potassium ~ The Factory Shuts Down

No wonder potassium is so important! Without potassium, everything shuts down in a plant. Think of a factory when all the workers go on strike, when machines sit idle, and parts gather dust and rust, when raw goods don't get carried to conveyer belts, when production lines stop and nothing new is made. This is a plant without adequate potassium. It can't grow new cells. It can't use sun and carbon dioxide to build sugars for food. It can't repair injuries. It can't make new chlorophyll or leaves. It can't get nutrients where they need to go. Flowers get smaller and duller until they finally disappear. Leaves get paler and smaller. The oldest leaves start to lose their chlorophyll and turn yellow and brown, as the plant tries to save the youngest leaves in the growing tips. Finally the whole plant turns yellow, brown, and shriveled and will eventually die if the potassium deficiency continues. It doesn't matter how much nitrogen, phosphorus, trace minerals, water and sun are there. Without potassium to turn the enzymes off and on, and to transport the goodies all through the plant, the factory can't function. The plant can't function. It all grinds to a halt.

We have experienced this firsthand in our early days with hibiscus, before we discovered just how much potassium our plants needed. A lot of trial and error and listening to the wrong "professional" advice gave us very bad results at times, until we learned to just ignore everything we heard and follow what actually worked. In those days we didn't understand how or why potassium worked. We just knew that it did, that it was necessary, and that our hibiscus needed a lot more of it than anyone else seemed to think they should. Now, thanks to research in crop areas like wine grapes and legumes, as well as flowers, our understanding of how potassium works is growing every year, and we no longer feel like lone renegades with our constant advice to hibiscus lovers to use more potassium.

Of course, the role of potassium in plant health is more complex than this, and probably much more complex than science even knows right now. But a basic understanding helps us make better decisions about how to care for our hibiscus, and our other plants as well. Plus, as every kid will tell you, a little bit of science is always fun!

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