



## Chloride is Crucial for Crops!

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While we all are aware that the big three, nitrogen (N), phosphorus (P) and potassium (K) are needed for healthy plants, many of us don't give much thought to the dozen or so trace elements that while needed in tiny quantities are also vital to good plant growth. One of them is chloride (Cl) which is needed for photosynthesis in plants. Chloride is an essential anion in maintaining electrical balance in tonoplasts and cell turgor in stomates, which is important in nutrient uptake, storage, relocation, as well as water uptake. It is needed for the synthesis of proteins and growth regulators. Chloride is also important in enzyme activities, lodging prevention in wheat, disease suppression, and physiological leaf spot control in cereal crops. Sufficient chloride availability can decrease the incidence of blossom-end rot and reduce injury of gold speck on tomato fruits.

The existence of chloride can impact plant nutrients uptake by interactive effects with other nutrients. There is an antagonism between chloride and nitrate ( $\text{NO}_3^-$ ) in plants. The uptake of chloride is inhibited by nitrate, and vice versa. There are possible benefits of partial nitrate replacement in the root environment by an equivalent chloride content. For example, increasing the Cl: $\text{NO}_3^-$  ratio in the nutrient solution can decrease the incidence of blossom-end rot in tomatoes.



From: <https://www.maine.gov/dacf/php/gotpests/diseases/images/blossom-end-rot3-big.jpg>

Unfortunately, it can also increase gold speck injury on tomato fruits. Some research has shown that chloride can enhance calcium uptake by tomatoes, which may explain the reduction of blossom-end rot. However, chloride toxic effects on tomato plants could happen in chloride

sensitive varieties and this effect is dependent on accompanying ions, such as sodium (Na), potassium (K), and phosphorus (P). High chloride content in soil or soilless medium can impose a potential risk to negatively affect potato yield and quality.



Gold speck on tomato. Photo by Gerald Brust, [www.extension.umd.edu](http://www.extension.umd.edu)

Another potential benefit from sufficient chloride supply is its interactive effect with nitrogen fertilizer applications on plant nitrogen uptake. Reducing the nitrate content of vegetables is important for human and animal health. Chloride can suppress nitrate accumulation in green leafy crops, such as lettuce without affecting vegetable yield.

Chloride deficiency in wheat has been reported in wheat producing regions of the U.S. and in Canada. Physiological leaf spot, the typical chloride deficiency symptom, is commonly observed in many cultivars of winter wheat in that region.

Grain crops yield can benefit from chloride containing fertilizer applications, however, the benefit is dependent on plant cultivars. If chloride deficient, 10-20 lbs/acre of chloride should do the job for commercial crops. Home gardeners can select fertilizers that contain chloride. Common fertilizer sources of chloride include potassium chloride (KCl), which is also referred to as muriate of potash and ammonium chloride (NH<sub>4</sub>Cl). Both the potassium (K) and chloride contained in the muriate of potash fertilizer are crop essential nutrients. If your soil is potassium deficient, muriate of potash fertilizer is a good choice because your crop can benefit from both chloride and potassium. Ammonium chloride contains both chloride and nitrogen and may be more economical when your soil is not potassium deficient. And there could be a positive interactive benefit between ammonium and chloride making for a more abundant harvest.

For information about plant nutrition or for other gardening questions, contact the UConn Home & Garden Education at (877) 486-6271 or [www.homegarden.cahnrc.uconn.edu](http://www.homegarden.cahnrc.uconn.edu) or your local Cooperative Extension Center.