

Sodium Issues on Compost

At A&L Canada we are conducting growouts in our growth rooms to demonstrate the damage on plant growth by typical sodium levels found in compost. In the slides to follow compost has been mixed to dilute sodium to different levels to demonstrate plant injury symptoms due to sodium. This demonstration is designed to help as a guide to the interpretation of sodium in the analysis and assist the facility operator in understanding the potential of their finished product. This research will continue looking at other plants species and compost mixes.

Another project underway at A&L is looking at heavy metal uptake by plants from different coomposts and metal concentrations. In this project we will select known compost where metal contamination exceeds guidelines and growout various plants and monitor metal uptake. Again this information will aid in the interpreatation of the analysis that we preform on compost.

→ SODIUM (Na)

Plant injury resulting from excessive soluble salts or sodium may first occur as a mild chlorosis of the foliage, later progressing to a necrosis of leaf tip and margins. This type of injury is largely attributed to the mobility of soluble salts within the plant. As these salts are rapidly translocated throughout the plant they accumulate at the leaf tips and margins. Once the salts reach a toxic level they cause the characteristic "burn" associated with excessive salts. Roots injured by salts cause interference with nutrient and water uptake and results in excess wilting and poor growth. Often salt injury to roots will predispose the plant to a wide range of root diseases such as phythium, fusarium etc.

Only a few plant species can tolerate high sodium levels and for the most part sodium levels greater than 1% saturation in media are toxic to root systems. Sodium competes with calcium and potassium uptake and damages root tissue when in excess. A reading of greater than 1% saturation of sodium on the exchange complex causes germination and emergence problems for a number of plants. This indication of sodium availability will suggest possible damage to plant growth long before a calculated SAR may suggest problems.

As sodium is naturally occurring in nature it is everywhere and when we compost materials sodium concentrates in the finished product. Depending on the feedstock, and maturity, sodium levels will vary in compost. An example of this is compost developed from source separated residential waste will have naturally high sodium even when mature and will require an additional resting phase in order for the sodium levels to drop to a safe level. Addition of calcium sources such as gypsum will help this process and reduce the impact that the sodium will have on plant growth.

A general rule is that plant media should have a base saturation of less than 1% sodium (Na) to be safe, however some plants can tolerate higher levels. If the end use is not known it is best to stay below 1% saturation of sodium. If you understand your target market and the type of plants that will be grown in the compost it is possible to get away with higher levels of sodium. Understanding the sodium tolerance of the plant species that will be growing in the compost will give you a guide to what level of sodium that you can tolerate.

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