

BIG BOLD HEALTH[®]

Soil Inoculation Study

Modern day agriculture is increasingly industrialized. Corn, wheat and soy represent the vast majority of crop acres planted each year. In the process of optimizing for maximum yields of these monocrops, farms have experienced degradation of soil nutrient and microbe quality, which is linked to lower nutrient quantity and diversity in crops.

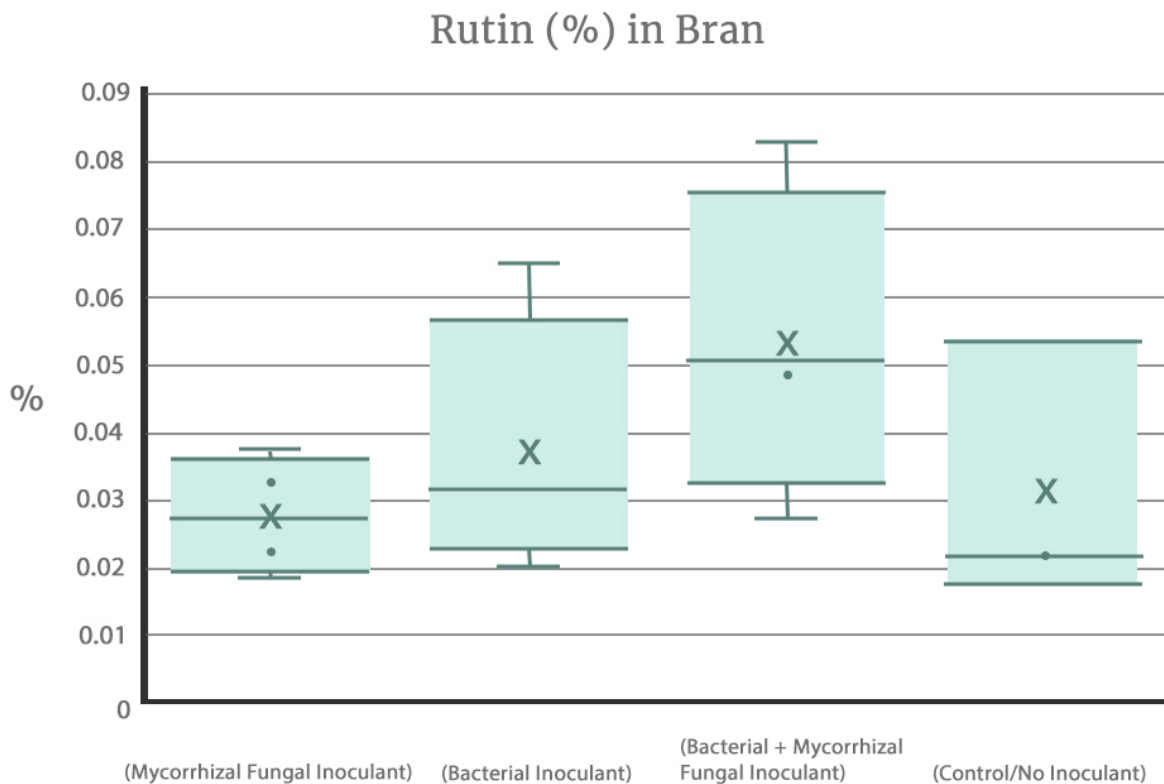
In an effort to improve the health of farmland as well as the nutrient quality of crops, many have now looked to reintroduce beneficial microbes into the soil. One group of food nutrients linked to human health that may be [impacted](#) by soil microbes are polyphenols, a subgroup of plant molecules called *phytonutrients*. Higher polyphenol intake has been shown to correlate with decreased risk for a number of chronic and immune-mediated health conditions. Multiple studies have found that introduction of specific soil microbes into various steps of the growing process can enhance [plant growth](#) and [nutrient content](#). The overarching importance of soil health also features prominently in conversations about the benefits of organic and regenerative agriculture.



Tartary buckwheat is known to be enriched in a number of plant nutrients linked to human health. Relative to grains and other seeds it contains notably higher concentrations of polyphenols, especially rutin, a flavonoid that may have positive effects on metabolic as well as immune state. Tartary buckwheat is also [known](#) to be significantly impacted by the health of the soil microenvironment including soil microbes.

In this pilot study, we evaluated the effects of inoculation of Tartary buckwheat seeds with bacteria, fungi and a mixture of the two. After coating the seeds, the Tartary buckwheat was planted, allowed to grow and subsequently harvested for evaluation of nutrient content in leaves and seeds (flour + bran). A general observation of the soil quality was also performed.

While there were no statistically significant differences in the study outcomes, there was a notable trend towards an increase in polyphenol content in the bran milled from Tartary buckwheat inoculated with the combination of fungi and bacteria. Specifically, there appeared to be a trend towards increased rutin concentration in the bran.



This preliminary study was designed to test the viability of inoculation of seeds of a known high-polyphenol crop (Tartary buckwheat) with bacterial and fungal strains linked to improved crop and soil health. The work showed an interesting trend towards increased production of rutin in crops treated with a combination of bacteria and fungal inoculants, consistent with the idea that a



diverse and healthy link between soil microbes and plants may serve to increase plant resilience and nutrient content.

With the rise of high-output monocrops that promote development of highly processed food, soil, plants and humans have all experienced a decline in health, making further research on the soil-plant-human health connection an ongoing priority for planetary health. Regenerative and organic methods of farming that advocate for improved soil health are key contributors to this conversation. An ongoing examination of the role of soil fungi, bacteria and other microbes to enhance nutrient and especially

phytochemical yields of crops is an important consideration for promoting wellness of multiple interconnected ecosystems in the 21st century.