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JOHN'S CORNER

ORGANIC FERTILIZERS AND NUTRIENTS - 29: CORN MEAL and CORN GLUTEN MEAL

by John Ferguson

I was at The Woodlands Home & Garden show this weekend and the subject of corn meal came up. So this week we are going to look at the two common corn products that are used in horticulture; corn meal and corn gluten meal. Both of these products have generated a lot of controversy in the gardening and horticultural industry.

CORN MEAL

Corn meal is the whole meal unlike corn gluten which is only part of the corn meal. Corn as a grain is a mix of proteins, sugars and other carbohydrates that varies greatly depending on the cultivar and the quality of soil it was grown on.

As in all grains it has some fertilizer value although much less than alfalfa or cottonseed meals. Typically it is applied at the rate of 10-20 pounds per thousand square feet of lawn or garden and is a naturally slow release source of nutrients. It should not be over applied, since corn meal has the potential to become very odorous if it gets wet and sours before it breaks down.

The controversial issue on corn meal is its anti fungal effects in gardening. Thousands of people have reported good results in suppressing fungal pathogens in lawns using corn meal while others have had zero results. Similarly university studies have shown fungal control while others have shown no beneficial results.

A number of years ago I was invited to lecture at a research center in Costa Rica. While there I went rafting, trips through the rain forest and to the volcanoes. During the visit I picked up some form of fungus that attacked my crotch area which was very painful. First my doctor tried various medications to no avail and then sent me to specialists whom performed tests and cultures, prescribed various additional medications that also did not solve the problem. After reading about corn meal as a natural fungicide for years, in desperation I

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ground up some agricultural corn meal in my coffee grinder and applied it as a paste a couple times a day and within a few days I started healing. I ran out of corn meal and continued treatment using a corn starch based baby powder. Within two weeks I was free of the fungal infection.

As a result I started wondering why does corn meal work for some and not for others.

It is well known in soil microbiology that sugars stimulate the growth of bacteria. A species of soil dwelling bacteria (trichoderma) is known to feed on many species of pathogenic fungi that live in the soil. The sugars in corn meal have been shown to stimulate the growth of this bacteria in the laboratory. Other studies have shown that other sugars like those found in molasses stimulate this bacteria in the soil, hence it is reasonable to assume that sugars in corn might also have this effect.

As a result, it is theoretically possible that many species of fungal pathogens would be suppressed.

Many years ago I read a report by the USDA on this subject. They tested 14 brands of store bought corn meal. They found that most provide varying to little beneficial effect in suppressing fungus except for Aunt Jemima stone ground corn meal which provided suppression. Hence there was a difference due to brands, processing and even corn cultivars that could explain the differences in results found in the literature.

Over the years as we have hybridized plants like corn for flavor and sweetness they have lost many of their nutrients and chemicals that naturally protect them from insects and disease. It is possible that the older varieties that are found often in agricultural corn meal (lower cost seeds and more resistant to environmental stress) would have more of the fungal fighting ability.

CORN GLUTEN MEAL

Corn gluten meal is a by-product of corn milling that contains several types of proteins hence it is often used in animal feed. Due to the higher protein levels corn gluten meal has a fertilizer value (NPK) around 10-1-0 that varies a little between brands. It is a natural slow release source of nitrogen for our gardens and lawns. Corn gluten meal can be found as a fine powder, granulated or pelletized for easier spreading.



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The controversy with corn gluten meal is in its use as a pre-emergent herbicide. Researchers at Iowa State University first discovered the herbicidal properties of corn gluten meal. It only works on newly germinated seedlings and does not affect established plants. It works by inhibiting root formation in newly germinated seeds of most all plants.

After application it requires a light wetting to activate it. Results also seem to get better with repeated applications. Due to its high protein content it will stimulate many species of fungus as it is degraded. Many of our plant species that we call weeds prefer soils that are bacterial dominated. Hence repeated application might shift the fungal-bacterial ratios to a fungal dominated microbial community that would naturally select against these weedy species increasing its effectiveness over time.

Research has shown that the effectiveness of corn gluten has a temperature dependence and does not work well after the soil has warmed up in the spring. Corn gluten meal is most effective when applied in late winter to early spring when soils are still cool (55-65^o F) and the effects typically last between 5 to 6 weeks depending on the weather.

SUMMARY:

Thousands of gardeners have had very good success using these products. At the same time there are others that have tried them with little effect. There are many variables that come into play and we need a lot more research to understand how to use these products in a more efficient manner. They both provide some nutritional benefit and add small amounts of organic matter to the soil, hence go ahead and try them as they can only help and provide benefits that vary depending on weather, soils, and type.

PROS:

- source of a nitrogen
- small amounts of minor and trace elements
- releases nutrients relatively slowly
- may control fungal problems in lawns
- may work as a pre-emergent herbicide
- corn gluten can be a nitrogen source for compost piles.

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CONS:

- not a balanced fertilizer
- may cost more than alternatives
- results and benefits vary.