A powerful organic fungicide for powdery mildew

Powdery mildew (PM) is a hard disease to fight. It affects plants of multiple different species and causes big crop losses around the world. Although the best treatment against it is prevention, there are still ways to combat the pathogen and reduce crop losses once plants are infected. There are a lot of products currently being marketed to try to fight these fungi but many of these products are systemic fungicides that cannot be easily used in eatable crops, especially when getting closer to harvest dates. In this post, I want to share with you a formulation for an all-organic and powerful fungicide, backed by peer-reviewed research, that you can use as a strong line of defense against PM. Also checkout my previous post detailing the recipe for a natural fungicide based on a US patent to fight fungal disease.

A lot of research has been done to deal with PM. This disease is sadly not caused by a single species of fungus but is actually an array of different species of fungi that attack multiple different plants, showing similar symptoms. Thankfully, there are several organic treatments that have been found to be effective against many of the fungi that cause this problem.

Jojoba beans and oil

Vegetable oils have been some of the more effective solutions found. Sunflower oil was found to be quite effective in the treatment of PM in tomato crops (1). Emulsions of vegetable oils with yolk have also been found to be effective fungicides to treat PM in cucumber (2). As a matter of fact, many cooking oils, including safflower, olive, corn, and soybean, show some control properties against PM, especially when they are properly emulsified and can spread evenly on leaves. Their main mode of action seems to be to inhibit the germination of spores.

More chemically active plant oils have also been found to work against powdery mildew. This review (3) highlights some of the research that was done until 2014 for the control of PM using this sort of chemicals. Essential oils such as Hyssop (4), citronella, lemongrass, eucalyptus, cinnamon, tea tree (5), and many others have been tried, but although active in PM control, few have been able to give broad efficacy across multiple plant species. However, Jojoba oil has been one of the few oils with consistent results across multiple plant species (6, 7, 8). Japanese knotweed oil has also proved effective (9, 10, 11), although it is considerably more expensive.

Comparison of multiple different treatments in the inhibition of powdery mildew spore germination. Taken from this article.

It is also key to realize that the effectiveness of the above oil treatments hinged on the proper emulsification of these oils with water. This means that an adequate formulation should contain a surfactant to help disperse the oils into the water. The papers cited above use either completely synthetic emulsifiers – such as Tween 20 – to natural emulsifiers such as milk or yolk. However, one of the most popularly used and effective organic emulsifiers, yucca extract, could help us better emulsify these oils for their use as foliar sprays.

To prepare the organic fungicide for the prevention and treatment of PM, use 1g/gal of yucca extract, 45mL/gal of Jojoba oil, and 25mL/gal of sunflower oil. Add the yucca extract first and mix till it's all dissolved, then add the oils and mix well before application. Ensure the oils are completely emulsified before performing an application. You can apply this as a foliar spray once per week.