

## Does Vinegar Kill Weeds?

**Introduction** We field many questions about alternatives to synthetic herbicides for weed control. One common question is whether vinegar, or acetic acid, works as a herbicide. The answer is, it depends!

**Herbicide Attributes of Acetic Acid** Understanding the way acetic acid affects plants can help explain when it might be effective for weed control. First, acetic acid acts as a contact herbicide, meaning it impacts only the parts of the plant it touches. Acetic acid ruptures plant cells, causing fluids to leak and plant tissues to dry out. It does not translocate or move within the plant to the roots or other plant parts. Good coverage of leaves and growing points at the top of the plant is necessary. Another attribute of acetic acid is that it is non-selective, meaning it injures any plant it touches. Finally, acetic acid does not have residual activity in the soil, so it does not provide control beyond its first contact with leaves and shoots.



Sunflower seedling one day after treatment with household vinegar (5% acetic acid).

**Factors Influencing Acetic Acid Efficacy** There are several important factors to consider to use acetic acid effectively. Some of the most important include acetic acid concentration; weed growth stage; and weed species susceptibility.

**Acetic Acid Concentration:** Vinegar with a higher concentration of acetic acid tends to control weeds more effectively. Household vinegar is generally 5% acetic acid. Some herbicidal vinegar products are 20% or 30% acetic acid. In general, 20% or 30% acetic acid is more effective because it more completely kills young leaves and growing points. If a plant is not completely killed by vinegar, it can resprout.

**Weed Growth Stage:** Smaller and younger weeds are generally more susceptible to vinegar. Seedlings at the two- to four- leaf stage are ideal because all leaves can be contacted by the spray solution, leaving the plant with inadequate resources to resprout. The growing point at the top of the plant can also be killed, which may kill the plant. Perennial plants are unlikely to be controlled because they can resprout from roots even if the tops of plants are killed.

**Weed Species Susceptibility:** Although vinegar is non-selective, species differ in their susceptibility to vinegar. For example, broadleaf plants tend to be more easily controlled with vinegar than grasses. Also, some broadleaf plants are more susceptible than others because of their morphology. Leaves that angle up and away from the stem may hold more spray solution for longer than leaves that angle down. Leaves that angle up may also direct solution toward the vulnerable newest shoots of a plant. Leaves that are broader with more surface area can hold more solution, and less hairy leaves allow solution to contact leaf tissue more readily.

**Other Considerations:** Repeated applications will be necessary to control new weeds as they germinate and emerge. Acetic acid tends to work best in hot and sunny conditions, and surfactants may improve efficacy. Like any pesticide, herbicides containing acetic acid have a label that must be followed. For example, formulations containing 20% and 30% acetic acid are strong acids, and applicators should wear personal protective equipment to protect eyes and skin.