
Studies on Deleterious Effects of Decomposed Tree Leaves on Vegetable Seedlings

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Under natural or cultivated conditions, it is known that certain plants prevent other plants from growing under or near them. This could be competition, but it might be due to antagonism, called allelopathy. A number of compounds produced by plants have been shown, experimentally, to be allelopathic. These materials can be released by roots or may be released upon decomposition of leaves after they fall to the ground. To determine if

leaves of several common plants might be allelopathic after decomposition, those leaves were subjected to the rapid compost method in which compost can be made in as short a time as 16 days, after which they were tested for deleterious effects by germinating various seeds in the finished composts.

Eucalyptus and black walnut leaves were chosen because of their supposed inhibition. Also composted were leaves of live oak, because live oak leaf compost is considered a safe soil amendment.

Before composting, the leaves were chopped by putting them through a WW Grinder with a coarse screen. Mixed with refuse from an herb processor and freshly mowed grass, both of which provided nitrogen to aid in the decomposition process, each type was composted separately for approximately three weeks and then was allowed to sit until used.

Seeds of carrots, cucumber, lettuce and radish were sown in the pure composts and also in U.C. Mix (half fine sand, half peat) as a control. Emergence rates and percentages were recorded as were the seedling heights after one month of growth. The pH's of the finished composts also were recorded at the time of planting.

Results were variable with the plants. Carrot and cucumber seeds germinated at the same speed in U.C. Mix and eucalyptus compost. They were slower in live oak and black walnut compost. Lettuce and radish germinated faster in U.C. Mix and in descending order in eucalyptus, live oak and black walnut composts. More carrot seeds germinated in U.C. Mix than in the other three where the germination was similar. Cucumber and radish germinated approximately the same in all materials. Lettuce seedlings emerged in equal numbers in U.C. Mix and eucalyptus compost but did not do well in live oak compost and did very poorly in black walnut compost. Carrot and lettuce grew much taller in U.C. Mix than in any of the composts. Cucumber was tallest in U.C. Mix and in descending order in eucalyptus, black walnut and oak composts. Radish seedlings were only slightly taller in U.C. Mix and next taller in live oak compost.

The pH of the medium did not seem to be a determining factor. It was highest in eucalyptus compost and in descending order, black walnut, U.C. Mix and live oak. Interestingly, all pH's were above 7.0.

Because seeds rarely would be started in pure compost, another experiment was initiated in which composts were diluted so that the resulting mixes were 50-percent and 25-percent composts. Seeds of lettuce, cantaloupe

and radish were planted in these, in U.C. Mix and also in diluted mixtures of composted Monterey pine needles.

Germination percentages were similar but usually were higher in the 25-percent composts than in the 50-percent composts, except in the pine needle experiment where they were better in the 50-percent compost. Cantaloupe germinated better in walnut than in eucalyptus or live oak composts, but germinated equally well in the pine compost. Lettuce germination was inhibited considerably in the 50-percent walnut compost but only slightly in the 25-percent walnut compost.

After one month, the seedlings were harvested, oven dried and weighed. In nearly all composts, plants from the 25-percent composts were decidedly heavier than those grown in the 50-percent mixtures. Lettuce and radish plants were heavier in U.C. Mix than in any of the com-

posts except the radish from the 25-percent pine compost. Cantaloupe was similar in all composts.

On the basis of these experiments, it appears that there may be an allelopathic effect on some seedlings when grown in undiluted eucalyptus, black walnut or live oak composts. With increased dilutions, the effects become less severe, suggesting that under natural conditions—where the dilution factor would be far greater than 25 percent—there would be little or no damage from these leaves and that possibly other factors might be the reason for growth failure under these tree. Further tests are in progress.

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