

PLANT ALLELOPATHY

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Plant allelopathy is the 'chemical warfare' among the plants imposed by one plant on another to suppress the latter and take advantage from that suppression. The word allelopathy comes from two Greek words allelon and pathos; where allelon means 'each other' and pathos means 'to suffer'. Thus in the phenomenon of plant allelopathy, allelopathic plants create adverse conditions to other neighboring plants by reducing their seed germination and seedling growth. The allelopathic plants are very effective in weed killing and known as Nature's Weed Killers.

WHY ALLELOPATHY IS IMPORTANT

Using synthetic chemical compounds in agriculture has brought various types of ecological and environmental disasters to the present world. These toxic chemicals are damaging the ecological balance to a severe extent and introducing many fatal diseases. That's why the demand of sustainable agriculture and eco-friendly alternatives to chemical compounds has been increased. Plant allelopathy is a great alternative of using toxic chemical herbicides in weed management.

HOW ALLELOPATHY WORKS

Competition is a very common phenomenon in the Earth's Biosphere. Like other living organisms, plants also compete for sunlight, nutrients, water, space etc. and this competition is the basis for allelopathy. Some plants, known as allelopathic plants, use their chemical tools to win the competition and use the available resources more efficiently. Allelopathy can be carried out by allelopathic plants by the following processes-

- Allelopathic plants release chemical compounds from their roots into the soil, and these chemicals suppress or even kill the neighboring plants when they are absorbed by the plants. The harmful chemicals released by allelopathic plants are known as allelochemicals. Some allelochemicals change the amount of chlorophyll production in a plant and thus, they slow down or stop the photosynthesis process of that plant which ultimately leads to the suppression or death of that plant.
- Many allelopathic plants release allelochemicals in gaseous forms. These gaseous allelochemicals are released from the small pores of their leaves. When the neighboring plants absorb these gasses, they are suppressed or killed.
- When leaves drop from the allelopathic plants to the ground, they are subjected to decomposition; when the leaves decompose they release their noxious chemicals as a way to inhibit the growth of other neighboring plants.

Though most of the allelopathic plants store their chemical weapon, allelochemicals, within their leaves, allelopathic properties can be stored within a number of organs of the allelopathic plants. The allelopathic characters can be found in roots, barks, flowers, fruits, seeds, pollen, foliage etc. of the allelopathic plants.

PLANT ALLELOPATHY READING QUESTIONS

Answer the following questions in complete sentences in your notebook

1. What is 'allelopathy'?
2. Now, what does allelopathy literally mean?
3. Why is allelopathy important?
4. Create three different drawings of how allelopathy works.

ALLELOPATHY LABORATORY EXPERIMENT

MATERIALS

- Petri dish
- 7 radish seeds
- Paper towel
- Marker
- 20 sagebrush leaves (experimental setup only)
- Graduated cylinder
- 10 mL water
- Growth light

PROCEDURE

1. Cut out 3 layers of paper towel that will cover the bottom completely of your petri dish.
2. Place two layers of paper towel on the bottom of the petri dish.
3. Put 7 radish seeds in a row across the paper towel.
- 4a. IF YOU ARE THE CONTROL SETUP: Add 10 mL of tap water.
- 4b. IF YOU ARE THE EXPERIMENTAL SETUP: Add 10 mL of distilled water and 20 sagebrush leaves.
5. Place the third piece of paper towel on top of the seeds.
6. Place the lid on the petri dish to prevent excessive evaporation and set it in your class's lab area.

