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Paramecia Affected by Leaf Extracts

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Leaves and needles from deciduous and coniferous trees play a major role in the formation of soil in their respective forests and thus help to determine the type of life that can successfully live there. Because of the known effects of leaf and needle litter on larger invertebrate life, earthworms, millipedes, etc., it was decided to experiment with infusions of paramecia derived from both leaves and needles to see if they were similarly affected.

Paramecia infusions were prepared using silver maple (*Acer saccharinum*) leaves and Douglas fir (*Pseudotsuga taxifolia*) needles. Leaves and needles were collected from surface deposits under the respective trees. The maple leaves were yellow and still pliable. The fir needles were dry and brown. Both infusions were checked periodically for population increases. The fir needle culture had an increase in number, but the maple leaf culture showed none. These observations led to further investigations of the maple leaf cultures in an attempt to determine why the maple leaf culture would not support paramecia.

Maple leaf extracts were made by shredding 15 g. of maple leaves and boiling them in 700 ml. of tap water until the solution turned dark brown. The mixture was filtered to remove the debris. The filtrate was boiled again, and at five-minute intervals a 10 ml. sample was taken and set aside to cool. Each extract sample was then tested with paramecia infusion using a ratio of one drop of leaf extract to one drop of infusion. The tests were observed with the compound microscope.

After the extract and the infusion drops were mixed, the paramecia showed an avoidance reaction, and their movements began to slow. The smaller paramecia were affected first. Movement ceased completely within 10 to 15 minutes even though contractile vacuoles and cilia action were still evident. The cytoplasm was streaming, and the paramecia appeared normal. Contractile vacuole contractions slowed to one contraction every 30 seconds. Some of

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the paramecia showed six contractile vacuoles in operation. Finally, the paramecia would swell and burst. The extract samples most effective in causing the death of paramecia due to bursting were those boiled for 15 to 20 minutes.

The maple leaf extract seemed to narcotize the paramecia and to reduce their ability to remove excess water entering their cytoplasm. It is thought that the extract possesses a chemical that interferes with the structure of the plasma membrane or the pellicle, thus allowing water to pour into the cytoplasm of the organism. Prior to bursting, the paramecia were stationary, even though their cilia were beating. A possible explanation of this lack of motion might be that the resultant internal pressure on the ciliary neuro-motor organelles rendered them ineffective or uncoordinated. The bursting of the organism appeared first as a small bubble of plasma membrane extruded through a small opening in the pellicle.

The observations made with maple leaf extracts point out the possibilities that these extracts possess a chemical that affects the paramecium's ability to control its internal osmotic pressure causing it to swell and burst. The pressures created seem to affect the neuro-motor system, thus rendering the paramecium immobile. If this chemical could be isolated and purified, it may provide scientists with a new technique for learning more about the neuro-motor apparatus in ciliates.

Revolutionary Chemistry

A chemistry course is "telling it like it is" at the University of Wisconsin in Madison.

Titled Revolutionary Chemistry, the new honors course for non-science majors puts the emphasis on student needs and interests. It is the brainchild of University of Wisconsin chemist, Robert C. West.

Speaking at a symposium on Chemistry Instruction and Social Concern, West pointed to the traditional lack of faculty interest in science courses for non-science majors.

"Past emphasis has been on research and graduate training of chemists. These are the things that received recognition in the form of salary increases and promotions," he said.

Because of this emphasis, people who were not interested in becoming chemists were often lumped together in beginning courses with aspiring chemistry students.

But things are now changing, he explained. Students are forcing changes, demanding courses relevant to their lives.

Increasing faculty concern for the image of science in the public mind has also helped spur creation of science courses specifically for liberal arts students, West said.

The Wisconsin course is built around existing student interests. Chemistry's relationship to social and environmental problems is stressed along with topics in organic chemistry, biochemistry and nuclear chemistry.

Students do not use a text. Instead they read from selected paperbacks—among them Paul Ehrlich's *Population Bomb* and Rachel Carson's *Silent Spring*.

Revolutionary Chemistry, currently in its second year, has had fantastic student response, West said.