

CHEMISTRY

Waste Detergent Solution

A method for removing waste detergents from water in sewage plants by forcing air into the sludge and then removing the froth has proved successful, Elisabeth Mitchell reports.

► CHEMISTS have developed a method that removes waste detergents from water.

Foam in drinking water is a problem in some areas, and sewage plants everywhere find it a big nuisance, Dr. P. H. McGauhey of the University of California told SCIENCE SERVICE. A five- or six-foot layer may foam above the waste water at sewage plants, and it is slippery and dangerous to workers there.

Sometimes high winds blow the froth, a tempting plaything, into a nearby school yard. In recreational streams and lakes, even a small motor boat can whip up an unattractive and sometimes hazardous foam.

This foam can be removed, Dr. McGauhey explained, by forcing air into activated sludge, causing frothing. A cover is placed at the top leaving a small space, and as the air is forced in at the bottom, foam and air bubbles have to come out through the space and are removed safely and economically.

These bubbles carry with them up to 90 per cent of the organic residues in the waste water, he said. These include greases, herbicide and insecticide residues, and other toxic materials.



Bell Telephone

MONOLAYER BOND—Dr. Harold Schonborn deposits a single layer of stearic acid molecules (monolayer) onto the surface of water in a trough in his new method of bonding metals to thermoplastics developed at Bell Telephone Laboratories. Bonds formed between the two materials by this technique are more permanent than any previously achieved.

About 2,000 new chemical products come out each year, and consequently an unknown amount of waste residues is put into the water. Not all of these may be poisonous or harmful, but “if you put everyone in jail, you are bound to catch the thief,” Dr. McGauhey told the American Chemical Society meeting in Cincinnati.

Foam removal is not yet an objective of water waste treatment, and may never have to be, the scientist said. The detergent wastes are not toxic to people or fish, and are not considered a public health menace. However, “we can no longer afford just to discard purified water from sewage plants, especially in water-scarce areas in the Southwest.

“We probably will not ever have to use this water for drinking in this country,” he said, “but it is being used for recreational lakes, for watering lawns and for cooling processes in industry.”

The foam removal method is being used commercially at Barstow, Calif., where the Santa Fe Railroad washes its trains with detergent and large amounts of water. Previously this water soaked into the ground and eventually turned up foaming in artesian wells.

The method is now being studied as a practical way of salvaging water by removing contaminants either to a greater degree or in greater variety, Dr. McGauhey concluded.

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CHEMISTRY

Blistering Chemical From Celery Fungus Isolated

► CHEMICALS which blister the hands of celery pickers have been isolated and identified.

The irritants, which are activated by sunlight, were extracted from “pink-rot” celery, Dr. Lester D. Scheel, U.S. Public Health Service Center, Cincinnati, told the American Chemical Society meeting in Cincinnati.

Contact with pink-rot, a fungus disease of celery, and 30 seconds of summer sunlight are enough to produce a reddening of the skin in 24 hours and a swelling in 48 hours. Five minutes of sunlight produce a blister, Dr. Scheel said. Now that the cause is known, a chemical preventative is possible, he reported.

Scientists have definitely proved that only the fungus and not the celery causes the irritation.

The two methods of guarding against skin damage used today—sun-shielding chemicals and heavy clothing—are ineffective, he explained.

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BIOCHEMISTRY

Body Chemical That Can Predict Age Extracted

► A CHEMICAL extracted from the body can accurately predict age, scientists were told in Cincinnati.

Collagen, the most abundant protein in the body, can be partly dissolved and extracted. The amount of this soluble part decreases with age, Dr. Seymour Bakerman, University of Kansas Medical Center, reported at the American Chemical Society meeting.

This change follows an orderly process that can be described mathematically, he said. The equation is one of the few quantitative descriptions of a chemical change in the body during growth, development and aging.

The equation does not hold for persons with certain diseases and wounds, he reported, where, in all but one case, the “collagen count” decreased beyond that predicted for the age of the patient.

“We are now studying the chemical change of the soluble collagen with age,” Dr. Bakerman told SCIENCE SERVICE. However, he cautioned, the physiological implications of the decrease are unknown and further research is necessary before we can take “longevity pills.”

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BIOCHEMISTRY

Cancer Patients Excrete Antibody Chemicals

► CANCER PATIENTS lose their ability to produce the antibody chemicals that fight invading disease.

Chemicals excreted in large amounts by cancer patients are related to antibodies, scientists were told at the American Chemical Society meeting in Cincinnati.

Antibody chemicals play a major role in protecting higher animals against infectious disease, Dr. Gerald M. Edelman of Rockefeller Institute, New York, told the meeting. These giant protein molecules cause gamma globulins to merge specifically with the disease molecules.

Then, folding their long chains around the invading antigen—the combining disease molecule—and joining at an active site, they make the invader ineffective. The antigen itself is thought to determine chemically the final structure of its destroyer, Dr. Edelman said, so that each specific antibody has a structure different enough to attack specifically.

When the giant chains are broken down chemically in the laboratory, they divide into two groups, called light chains and heavy chains by the scientists. The light chains appear to be present in all the gamma globulins and are the common link with the cancer excretion.

The inference, Dr. Edelman said, is that in cancerous multiple myeloma patients, large amounts of this protein molecule do not become part of the gamma globulin molecule, and the patients lose their raw materials for possible antibody production.

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