environmental sciences

NUTRITION

Enriched bread enhances rat growth

A special enrichment formula, which would cost about three cents a loaf, caused rats to grow about seven times as fast as rats fed the so-called enriched bread now commercially available, reports a University of Texas biochemist.

In fact, says Dr. Roger J. Williams, two-thirds of the rats fed only the ordinary white bread died within 90 days.

"Nutritionists had known for a long time," he says, "that ordinary white bread is so deficient that it is intolerable. My experiments were aimed at showing how it could be improved."

The improved bread had additions of small amounts of magnesium oxide, manganese sulphate, copper sulphate, calcium phosphate, folic acid, vitamins A and E, cobalamine pantothenate, pyridoxine and the amino acid lysine. Additives to today's commercial white bread include only niacin, iron, riboflavin and thiamin.

Dr. Williams says improved processing to retain natural nutrients would make today's commercial bread more nutritional (SN: 9/19, p. 252), but he says his enrichment formula would make it even better without the need for changing the processing.

WASTE RECYCLING

Europeans move faster

European cities are well ahead of United States cities in recycling and other beneficial uses of waste, concludes Dr. Hartmut H. Bossel, of the University of California in Santa Barbara, as a result of studies he has done.

And the net result is not only reduction of pollution but also actual net income. Paris, for example, burns its garbage in a power plant, and the net income from its garbage-power operation is $1,250,000 a year.

"This is generalizable to modern waste disposal techniques in other cities," says Dr. Bossel. "It pays to install these new technologies."

The Europeans not only use their waste beneficially, but also keep pollution from these uses down, he says. Most European garbage incinerators, for example, achieve 99.9 percent efficiency in particulate removal from stack gases by the use of electrostatic precipitators; the United States average is 58 percent.

(He adds, however, that technology for removing sulfur dioxide and other gaseous pollutants is about equal in Europe and the United States.)

Dr. Bossel suggests that to be efficient, garbage recycling and burning for power must have a base of about one million people. He suggests establishment of garbage districts comparable to present air pollution control districts.

AIR POLLUTION

Seawater for SO_2 scrubbing

Sulfur dioxide is a widespread and damaging air pollutant, and for the most part technology for abatement is still too primitive or too expensive to be economically feasible (SN: 8/29, p. 187). One promising technique is removal of SO_2 from stack gases by chemical scrubbers. But, as with other techniques, the expense is high.

A scientist at the University of California at Berkeley says a cheap method for such removal, at least in coastal areas, might be feasible through the use of seawater.

Dr. Leroy A. Bromley says a simple scrubbing tower using seawater removed 90 percent of SO_2 from stack gases. A more elaborate system, using a column designed to increase the amount of interface between sea water and the gases, was 99 percent efficient.

The system requires a flow of seawater which returns to the sea from the scrubber with a 10 percent higher sulfate content and a small increase in hydrogen ions. Dr. Bromley says these are already present in seawater and not likely to damage marine life, although he concedes that more biological and ecological research is necessary.

EUTROPHICATION

Feedlots contribute nitrogen

It has been thought that most eutrophication occurred from direct addition of nutrient phosphorus or nitrogen compounds to lakes or other waterways (SN: 7/4, p. 17).

Now two scientists with the Agricultural Research Service in Fort Collins, Colo., Dr. Frank G. Viets Jr. and Gordon L. Hutchinson, report another, more subtle, source of nitrogen.

The two researchers say that ammonia evaporates from cattle urine in feedlots. Then the airborne ammonia is conveyed to nearby lakes where it is absorbed by the water. The ammonia is absorbed at the rate of 30 pounds per acre per year in a lake a mile away from a 90,000-head feedlot in Colorado, "enough to eutrophy a lake averaging 20 feet in depth to two to three times the concentration needed for algal blooms," the scientists report.

AERIAL ECOLOGY

Clouds may be ecosystems

Clouds in the sky may contain living microbial ecosystems, says a Virginia Polytechnic Institute researcher.

Dr. Bruce C. Parker emphasizes that so far his work on the aerial ecosystems has produced only a presumption that such systems exist. He says he first became interested when he discovered that rainwater contained vitamin B_{12} and that there was no correlation between the amount of B_{12} and the amounts of dust in the rainwater. His speculation was that the vitamin was produced in clouds.

To test his hypothesis, he trapped airborne dust in filters 50 feet and more above the ground. Using radioactive carbon dioxide, he determined that metabolic activity, in the form of CO_2 uptake into organic material, occurred in the dust over a 24-hour period, whereas it did not occur in sterilized control dust.

Scientists have long known that microorganisms are taken into the atmosphere, but they had thought they remained dormant there.

Dr. Parker says that because the microorganisms are the right size to form nuclei for water condensation, they would have a supply of water in clouds. Other basic nutrients are also available in the atmosphere. These include CO_2, nitrogen and oxygen.

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