MICROBIOLOGY

From our reporter at the meeting of the American Society for Microbiology in New York

From straw to cattle mash

Two microbiologists from Oregon, the world center for straw research, have come up with an answer to a common agricultural problem: What do you do with the 200 million tons of cellulosic agricultural waste produced annually in the United States after the valuable grain has been removed and it is lying in the fields? Farmers used to burn it off—some still do—but many states are now prohibiting this practice. It would be nice to feed it to cattle, but it's not very digestible or very nutritious, so that's out, too. Hauling it away to make paper and wall board or letting it pile up have been the only alternatives for many farmers.

Maybe feeding it to cattle is not out, say Youn W. Han and A. W. Anderson of the USDA Agricultural Research Service and Oregon State University at Corvallis. They have developed an inexpensive, simple way to increase the digestibility and protein content of straws from ryegrass, rice, wheat, oats, barley and other grasses.

The new approach is to ferment the straw by treating it with dilute acid, ammonia, and then adding yeast. Fermentation of straw is not a new idea, but past methods have been too expensive and unproductive to warrant much attention. The team's method uses simple equipment ("It could be done in an old cement mixer," Han says) and no special controls for pH, temperature, foaming or aeration.

After fermentation, the protein content has risen from 3.5 percent to about 13 or 14 percent, and the digestibility is up from 30 percent to 45. These figures approach those for alfalfa and other preferred feedlot grasses.

The team currently is seeking funds to build a demonstration plant in Oregon, and hopes that within two or three years, a young straw-feed industry will be in ferment.

Controlling leukemic-cell machinery

A nucleic acid, transfer RNA (tRNA) plays a major role in the regulation of protein synthesis in leukemic cells. This discovery, reported by three biochemists from the University of California at Irvine, may lead to treatments for acute childhood leukemia and other types of cancer. One team member, G. Wesley Hatfield, was awarded the 1975 Eli Lilly Award for this and other work on the autoregulation of gene expression. The other team members are Donald R. Simpson and Stuart M. Arfin.

It has been shown that some cancer cells, including leukemic cells, cannot make their own supply of the amino acid asparagine and must be supplied it if they are to grow. This substance is available in the body. Many scientists are working on ways to deprive cancer cells of this substance. The team found that a complex of tRNA and asparagine is needed before the cell can turn on its protein-building machinery. The complex, therefore, acts as a regulator substance. As more is learned about this regulator, it may be possible to control it and other tRNA's that allow the leukemic cells to use asparagine, thereby depriving them of an amino acid essential to their growth.

Hospital germs from 'sterile' water

Hospitals are crawling with germs. This is not a criticism. When hundreds of sick people, many infected with transmittable diseases, are put into the same building, there's an inevitable germ problem. Patients aren't the only germ receptacles, though. Physicians and researchers have discovered a plethora of breeding places: sinks, windows, tables, floors, pails, mops and flower vases. This knowledge is helping them to wipe up the problem.

Now comes the report of another breeding place for bacteria, this one more worrisome than the others. Don G. Brown, director of environmental health and safety for the University of Michigan Hospital at Ann Arbor, found that hospital "sterile" water is not always that. Bottled water and saline solutions are used for irrigating wounds, in humidifiers and many other purposes around a hospital. Although they come from suppliers in sterile condition, once opened they can harbor bacteria, Brown found.

He tested 200 opened but unemptied bottles of water and saline from bedside stands and storerooms in several midwestern hospitals. He found that 23 percent of the saline solutions, often applied directly to patients' wounds, contained potential pathogenic bacteria and that 15 percent of the distilled water bottles were contaminated.

To reduce the risks associated with this problem, Brown recommends that smaller bottles be ordered and emptied sooner, that each bottle be used on only one patient, and that bottles should be dated and thrown out after 24 hours.

Spreading hepatitis: Beyond blood

It has been estimated that as many as 18 percent of patients receiving blood transfusions contract post-transfusion hepatitis. This can produce chronic liver disease and sometimes death. Scientists now know that the disease is different from infectious hepatitis, and is caused by a virus, hepatitis B virus. But they don't completely understand the transmission process. It can spread by way of transfusions, but can it spread by other routes?

Researchers Moti L. Tiku, B. L. Kaul, R. I. Ramirez and P. L. Ogra of the Children's Hospital in Buffalo, N.Y., now report evidence of transmission by way of body secretions. Nasal washings, urine and feces of hepatitis patients had been suspected routes of transmission, but the evidence was inconclusive. The Buffalo team noted that in one closed institutional setting with a high incidence of hepatitis cases (10 percent of the population) many new cases appeared in a one year period. These additional cases were found in the same building with the highest previous incidence. Analysis showed virus present in as many as 30 percent of the body secretions sampled.

This study, for the first time, correlates the presence of new cases with virus-positive secretions. This evidence, although not direct, should help researchers design new procedures to prevent transmission of the infectious agent.

Antibiotics: A new source?

All the antibiotics now used clinically are produced by microorganisms that are not pathogenic to man. Two biochemists from the University of Wisconsin have now found antibiotic activity in a pathogenic organism, mycoplasma.

David Perlman and T. Sakai found that a mycoplasma, a tiny bacteria-like organism without a cell wall that can kill mammalian cells, gives off an antibiotic substance. The substance can inhibit the growth of several types of bacteria and yeasts. It is especially active against *Pseudomonas* and related bacteria. These pathogens have become increasingly resistant to many other antibiotics.

Mycoplasmas are often associated with arthritis, abortion and bacterially infected cancer tissue, and the fact that they produce antibiotic chemicals may complicate the diseases.