

Straw into fuel or feed via fungus

Fairy goblet fungus may be the magic wand that converts useless plant material to precious sugars. This fungus, also called bird's nest fungus because of its tiny (5 millimeter diameter) cups containing spore cases, ranks at the top of the microorganisms tested to remove lignin from wheat straw. Lignin is the natural polymeric cement that binds cellulose fibers in plant stems and prevents enzymes from digesting the cellulose into glucose sugar. Once lignin is removed, the straw, corn stalks and other plant material might be used as cattle feed or as a source of glucose for yeast to produce fuel alcohol.



SEA-USDA

Donald T. Wicklow of the U.S. Department of Agriculture first suspected the fairy goblet fungus, *Cyathus stercoreus*, of lignin-digesting powers when he found it growing on aged dung in a Michigan cow pasture. He reasoned that life on aged dung requires a "natural specialist," a fungus that can use what is left after the grass is digested by cattle and the dung fed upon by insects and microorganisms.

In laboratory tests, the fairy goblet fungus, growing on wheat straw for 62 days, digested 45 percent of the straw's lignin and exposed 61 percent of the cellulose. In that process, the fungus itself used up an additional 20 percent of the cellulose. Scientists at the USDA North Regional Research Center are also looking for microorganisms that digest lignin in wood. The leading wood-rotting fungus is the edible oyster mushroom, *Pleurotus ostreatus*. During 50 days' fermentation on straw the mushroom made 72 percent of the cellulose available for digestion.

Quick oats: A laboratory challenge

Single cells from some plants, such as tobacco and potato, can be coaxed in the laboratory to undergo cell division and ultimately regenerate an entire plant. However, cells from cereal plants have been more recalcitrant. Arthur W. Galston of Yale University now gives a boost to hopes of genetically improving such cereals through laboratory manipulations. Galston and colleagues Ravindar Kaur-Sawhney and Hector Flores discovered why oat cells whose cell walls have been removed do not multiply in laboratory culture. The cells make adequate protein and RNA, but do not make the new DNA necessary to carry genetic information into descendant cells. The scientists treated the cells with chemicals called polyamines, which increased the DNA synthesis. The chemicals also increased the frequency with which nuclei divided, as in cell reproduction. Polyamines stimulate DNA synthesis and trigger cell division in numerous animal and microbial cells also, the scientists say. Galston hopes eventually to make individual oat leaf cells develop into complete plants. Such a procedure would allow faster development of more productive and disease-resistant varieties of oats, the world's fifth largest cereal crop.

New at the zoo

A Barbados sheep in the San Diego Wild Animal Park recently gave birth to a lamb that was not her own. A fertilized embryo had been removed from another Barbados sheep and at the 8-cell stage surgically implanted into the surrogate mother's womb. The transfer was the first ever accomplished by a zoo, according to a park announcement. The eventual goal is to bolster the ranks of endangered animals by using surrogate mothers of similar but more common species.

Synfuels-fund stalemate ends

House and Senate conferees finally reached accord last week (May 21) on a \$25 billion synthetic-fuels development bill. It came six months after they first sat down to caucus. Passage of the mammoth bill — whose details must first be rendered into hundreds of pages of complicated regulations — is expected late next month. Chief among its many proposals is creation of a Synthetic Fuels Corp., a federal institution to channel billions of dollars into the financing of energy-production facilities. Together with passage of the windfall-profits tax (SN: 4/12/80, p. 238) and energy-mobilization board (SN: 5/3/80, p. 282), this legislation completes the energy package President Jimmy Carter proposed last year.

A cornerstone of the bill is a program that would use government funds to develop an industry for manufacturing synthetic oil and natural gas from materials such as coal and oil shale. The goal is production of 500,000 barrels of synthetic fuels daily by 1987, 2,000,000 bbl per day by 1992. Aid could take the form of direct loans, loan guarantees, purchase agreements, government-owned facilities or joint government-industry ventures.

It is anticipated that federal subsidies disbursed from the initial \$20 billion "energy-security reserve" appropriated by Congress last year will be doled out as follows: \$2.2 billion for existing synfuels-development programs being marshaled by the Energy Department; \$3 billion for defense-fuels projects; \$1.45 billion for gasohol and projects to generate power from wood and urban refuse; \$1 billion for solar and conservation programs (administered through the Department of Housing and Urban Development's Energy Bank); and \$12.3 billion for the synfuels corporation. The conferees agreed that four years from now the corporation could ask for up to \$68 billion more.

Nuclear India in limbo

Three weeks ago President Carter approved the sale of an additional 40 tons of enriched nuclear fuel for India's Tarapur reactor. Little more than a week later, the five-member Nuclear Regulatory Commission unanimously challenged the President, saying it couldn't justify nor approve licensing the export since it would require waiving provisions of the Nuclear Nonproliferation Act (SN: 10/8/77, p. 231). Congress now has 60 days to rule on whether to overturn or support the NRC decision.

In 1963 the United States signed a pledge to fuel Tarapur for 30 years. But when the Nuclear Nonproliferation Act passed, continued sales of fuel to India beyond March 1980 required India's acceptance of safeguards, something the Gandhi government has refused.

Only two months ago, the United States tried to block the sale of nuclear equipment to Argentina by Switzerland on grounds that it risked nuclear-weapons proliferation. The Carter administration has pegged its approval of the fuel for Tarapur to a need for strengthening Western alliances with Asia after the Russian move into Afghanistan. But many worry that Carter's apparent waffling on nonproliferation issues weakens U.S. bargaining power in issues related to the growing demand by developing nations for nuclear fuel and technology (SN: 3/8/80, p. 148).

News notes

- With Shirley M. Hufstедler at its helm, the Department of Education opened May 4. What is left of the Department of Health, Education and Welfare is now Health and Human Services.
- A seven-year suit against the University of Minnesota charging sex discrimination was won by Shyamala Rajender, a chemist denied tenure, yielding her \$100,000 in "compensation."