

Local plant to make shampoo, soap oils

Genetic engineers have taken the first steps toward creating a domestic crop capable of producing a major ingredient in cosmetics. That ingredient, laurate, represents one of several commercially important fatty acids — straight-chain, carbon-based molecules in fats and oils, says Toni A. Voelker, a molecular biologist at Calgene, Inc., in Davis, Calif. Most plants produce fatty acids with 16 or 18 carbon atoms, but laurate contains just 12.

Currently the 100 million tons of laurate produced annually come from tropical palms. To get a temperate-zone plant to make this fatty acid in large quantities, H. Maelor Davies and his colleagues at Calgene first identified the enzyme responsible for laurate production in oil seeds of a plant called California bay. Voelker then cloned the gene that encodes this enzyme and transferred that gene to rapeseed and to common wall cress. The enzyme interrupts fatty acid synthesis, so some molecules in these genetically altered plants now contain just 12 carbon atoms, the scientists report in the July 3 *SCIENCE*.

They have since produced rapeseed seeds in which laurate represents half the fatty acids present, says Voelker. Next Calgene hopes to produce eight-carbon fatty acids useful in substitute fats or 14-carbon ones for detergents.

Making whey (and ice) go away

A process for converting whey left over from cheese processing into acetic acid could dramatically reduce the cost of a noncorrosive, environmentally safe deicer now in limited use.

This two-stage fermentation process requires no oxygen, so it produces acetic acid much more efficiently than other processes, says Shang-Tian Yang, a chemical engineer who developed the technique at Ohio State University in Columbus. First, bacteria commonly used for making cheese turn the milk sugars in whey into lactic acid. Then, different bacteria take up lactic acid for energy and produce acetic acid as a metabolic by-product with almost 100 percent efficiency, he says.

If Yang adds dolomitic lime during this second step, the acetic acid reacts with the lime to form calcium-magnesium acetate, known as the deicer CMA.

In the past, the relatively high cost of acetic acid made this biodegradable deicer 50 times more expensive than salt. The new process not only deals with the dairy industry's annual need to get rid of 28 billion pounds of surplus whey, but also can cut the cost of acetic acid by more than half, says Yang. He described this process in the 1992 *Proceedings of the Dairy Products Technical Conference*.

I'll have my antibodies over easy

The goose may have laid the golden egg, but it's white leghorn hens whose yolks yield potentially useful therapeutic and diagnostic antibodies in large quantities. "We can literally make tons of antibodies for everything," says Mark E. Cook, a poultry scientist at the University of Wisconsin-Madison. He calculates that one immunized hen's 260 eggs a year could yield about 39 grams of antibody — enough in some cases to meet the lifetime needs of a diagnostic test.

Wisconsin mycologist Harold H. Burdsall Jr. uses one egg-yolk antibody in a quick immunoassay to distinguish species of a root-rot fungus that devastates trees and shrubs. And Ophidian Pharmaceuticals, Inc., a Madison biotechnology company, uses egg antibodies instead of horse serum to make antivenom for snake bites. An upcoming report in the August *Toxicon* will describe this antivenom's effectiveness against rattlesnake bites, says Ophidian immunochemist Douglas Stafford. Also, since the antibodies do their job even after the egg is cooked, says Cook, medicine may someday come with toast and bacon.

Gene variety and psychiatric drugs

Individual differences in the structure of genes that create important chemical receptors on brain cells may help explain why a substantial portion of people with schizophrenia and related mental disorders do not benefit from antipsychotic medications, according to a report in the July 9 *NATURE*.

Further study may show that certain of these genetic variations heighten the susceptibility to psychiatric conditions such as schizophrenia and manic depression, assert neurobiologist Hubert H.M. Van Tol of the Clarke Institute of Psychiatry in Toronto and his colleagues.

Van Tol's group screened genetic information previously obtained from several hundred individuals. The researchers isolated examples of a gene governing the production of a protein that forms D4—one of three known brain-cell receptors for the chemical messenger dopamine. Clozapine, an antipsychotic drug touted as an effective treatment for many schizophrenics (SN: 5/23/87, p.324), preferentially binds to D4.

The gene studied by Van Tol's group occurs in at least five forms. A small stretch of DNA on the gene repeats two, three, four, five, or seven times, depending on the individual. Clozapine binds most consistently to the longest version of the gene, the investigators note.

Genes directing the production of the other dopamine receptors, which have been linked to the actions of many antipsychotic drugs, may also vary structurally from one person to another, the researchers suggest.

Depression after divorce: Male call

In the aftermath of divorce or separation from a spouse, men — but not women — face a heightened risk of developing severe depression for the first time, conclude epidemiologist Martha L. Bruce and psychiatrist Kathleen M. Kim, both of Yale University School of Medicine in New Haven, Conn. Overall, however, the breakup of a marriage leads to comparable rates of severe depression among men and women, the researchers report in the July *AMERICAN JOURNAL OF PSYCHIATRY*.

Bruce and Kim obtained data on 695 women and 530 men interviewed during the early 1980s and then reinterviewed six months and one year later. Interviews took place in the New Haven area as part of a national investigation of psychiatric disorders. Over the study period, 53 participants separated from or divorced their spouse; 708 reported happy marriages; 259 described unhappy marriages; and 205 had separated from or divorced their spouse before the study began.

Approximately 21 percent of the women who reported a marital split during the study experienced severe depression, a rate three times higher than that for happily married women and twice as high as that for unhappily married and previously divorced or separated women. Nearly 17 percent of the men who reported a marital split during the study developed severe depression, a rate nine times higher than that for happily married men and about twice as high as that for men in the other two groups.

When the researchers considered only those participants with no history of severe depression, 14 percent of men citing marital splits during the study experienced severe depression, far more than men in any of the other groups. In contrast, depression occurred at a rate of 3 percent to 5 percent in all four groups of women.

The greater risk of first-time depression for newly divorced or separated men supports prior studies suggesting that men derive more psychological benefits from marriage than women, the researchers assert. In a related finding among the New Haven participants, happily married women suffered nearly four times as much severe depression as happily married men.