

mineral complexes. Torula yeast has the flavor of roasted chestnuts.

This particular yeast is the despair of beer brewers if it gets into unfermented beer wort, however, since it will only grow more yeast cells instead of fermenting the grain sugar.

Torula yeast, which contains 50% protein by weight, may be compared with other high-protein foods such as porterhouse steak, 23% protein; round steak, 27%; eggs, 12.8%; tuna, 29%; soybean flour medium fat, 42.5%; peanut butter, 26.1%; non-fat dry milk, 35.6%; wheat germ, 25.2%; milk, 3.5%; Swiss cheese, 27.5%; lamb chop, 24%; veal cutlet, 28%; swordfish, 27.4%; beef chuck, 26%, and almonds, 18.6%.

Using 100 pounds of sugar as a base, torula yeast will convert the sugar into 65 pounds of edible yeast, whereas a pig would convert the same amount of sugar into six pounds of pork, a cow would yield two pounds of dry milk solids, a chicken would make 1.5 pounds of meat and a steer would yield 1.2 pounds of dried beef.

### Concentrates as Supplements

A protein concentrate must be a dry, stable product that can be economically produced, stored without refrigeration and blended into various foods. In addition to food yeast, other protein concentrates now being tested to help relieve the world's protein deficiency are pure amino acids, semi-purified protein flour from fish or animals, defatted grain germs, and oil seed concentrates from cottonseed, corn, sesame, peanut, soy and sunflower seed.

These concentrates are being used in nutritional supplements such as the Multi-Purpose Food sent overseas by Meals for Millions, and the anti-kwashiorkor formula called Incaparina. A typical INCAP formula, for example, contains 55% grain, 38% oilseed meal, 3% dried torula yeast, 3% kikuyu leaf meal and 1% calcium carbonate.

These supplementary formulas supply different amounts of amino acids and vitamins, depending on the particular shortage in a particular country. But the annual deficiency of the world is about 30 million to 40 million tons, equal approximately to all the protein drawn from beef slaughtered in the U.S. since 1900.

In order to take advantage of the minimum space, economic production, and rich proteins and vitamins offered in food yeast, man can use resources that he has right now. For example, the human race uses only 0.2% annually of all the plant matter produced to satisfy food, clothing, fuel, and shelter needs. Perhaps some of the 360 billion tons of carbohydrates produced by marine and freshwater algae could be used as the basic raw material in which to grow the yeast. Or more of the 500,000 tons of fermentable sugar from sulfite pulp mills wasted every year could be used.

The oldest, domesticated microbes in existence are thus seen to have a place in the future. Their origin, at least as ancient as bacteria, dates back to the Devonian age, about 400 million years ago. Fossils from this age show evidence of "budding" fungi.

When people in ancient times made bread, the finished loaf was hard and flat. But at

some time or other, a piece of dough was left out in the air and wild yeast cells settled and multiplied. As the cells fermented the sugar, carbon dioxide gas bubbled up through the dough, causing it to rise. Yeast became domesticated.

### Varied Uses of Yeast

Since that time Swedish scientists have used it for toothpaste, plumbers have recommended it for treating septic tanks and cess pools, and cosmeticians have favored it for curing skin ailments such as pimples and wrinkles.

When a pioneer woman went west, she carried in a pouch against her breast a yeast culture kept alive in a potato and water mixture to use each time she made bread.

Physicians used the powder of dried brewers' yeast as a food supplement for persons with pellagra.

To watch yeast cells at work, open a barrel of pickles preserved in sugar and vinegar that has been standing for a long time. Or examine the fungus-like growth that settles at the bottom of fermenting grape juice.

That grayish-looking scum or film contains millions of tiny yeasts and other microbes, microbes that can help to feed the malnourished millions of the world.

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### MEDICINE

## Apaches Have High Blood Pressure, Few Coronaries

➤ APACHE INDIANS in Arizona have more high blood pressure than other Americans and almost never have heart attacks, although high blood pressure is usually thought to increase susceptibility to coronary disease.

The tribe's diet is a partial explanation, Dr. Nathan J. Clifford, Buena Vista Medical Clinic, Ventura, Calif., suggested in his report of a two-year study of the White

Mountain Apache tribe, presented at the meeting of the American Heart Association's Council on Arteriosclerosis at Los Angeles.

The Apache's total caloric intake is relatively low and only 24% of the calories are obtained from fat, in contrast to the average American diet, which consists of from 40% to 45% fat. The Indians consume very little cheese, eggs, bacon or whole milk, foods rich in animal fats, which tend to raise the cholesterol and other fat levels in the blood linked to heart disease risk.

A check of blood cholesterol levels in 188 Apache men and women more than 20 years old showed the levels to be considerably lower than those of the general American population. In 147 Apaches above 40 not a single case of coronary disease turned up when electrocardiograms were recorded during the two-year period of study.

In contrast, a study of nearly 6,000 Jewish men at Beth-El Hospital, Brooklyn, N. Y., showed that high blood pressure, or hypertension, tripled the heart attack risk between the ages of 36 and 50, and doubled it for those between 50 and 65. If hypertension was combined with high cholesterol levels the risk became five times greater.

Reporting the Apache study with Dr. Clifford were Dr. John J. Kelly Jr., San Diego, Calif., Dr. Thomas F. Leo, Hempstead, N. Y., and Dr. Howard A. Eder, The Bronx, N. Y. Dr. David Spain collaborated with Drs. Morris Gellis and Daniel J. Nathan, all of Beth-El Hospital.

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