

BIOCHEMISTRY

Chemicals in Bananas

Scientists have found that bananas contain two of the world's most powerful compounds, serotonin and norepinephrine, a discovery that may lead to future health aids.

► BANANAS can produce "false positive" indications of certain tumors in man without the tumors being present.

This banana counterfeiting and other startling facts about the popular fruit have been uncovered by a team of scientists at the National Heart Institute, Bethesda, Md.

Bananas contain two of the world's most powerful compounds, serotonin and norepinephrine, the latter also known as norepinephrine.

The presence of these compounds in bananas caused one scientist to comment, "bananas are now hot potatoes." But, he added, there is no indication that eating bananas is harmful to man.

The presence of the two compounds has led the research team to the following preliminary conclusions:

1. Eating bananas may lead to wrong chemical diagnoses of carcinoid tumors and pheochromocytoma, a high-blood-pressure producing tumor.

2. Bananas should be eliminated from the diets of those patients whose urine is being tested for these substances in tracking down other diseases, such as mental disease, where serotonin and norepinephrine have a known relationship to brain function.

3. The two chemicals may play an important role in turning bananas brown.

4. The two chemicals may lend laboratory truth to many of the traditional banana remedies used to treat such disorders as celiac disease in infants and children, peptic

ulcers and constipation. Serotonin, for example, is known to inhibit gastric secretion and stimulate the smooth muscle of the intestine.

5. The banana research findings have led to the development of tests that may in turn lead to the discovery of new drugs for the treatment of angina pectoris and high blood pressure.

The way in which the Heart Institute scientists found the compounds in bananas—this is the first known report of norepinephrine in plant material—is almost as startling as their findings.

Dr. J. A. Anderson and his associates at the University of Minnesota Medical School were conducting experiments with a monkey. At the end of the study, the monkey was given a banana as a reward. The reward, normal monkey fare, yielded an unusual laboratory finding for Dr. Anderson, however: the banana-fed monkey produced an increased urinary excretion of the serotonin metabolite, 5-hydroxyindoleacetic acid.

This finding led to further experiments at the Heart Institute and was explained when the scientists found serotonin to be present in bananas.

Shortly thereafter the NHI banana research team held a staff conference at which they were discussing skin pigmentation and albinism, an abnormal disorder in which the afflicted person has no skin or hair pigmentation and is known as an "albino."

One scientist suggested that the reverse pigment change occurs in bananas when the banana peel changes from yellow to black.

The banana problem went back into the laboratory and what emerged was the discovery that bananas also contain norepinephrine, the most powerful drug of its kind and in wide use today in the treatment of cardiovascular collapse.

Both serotonin and norepinephrine were found through a series of complicated biochemical tests involving chromatography, or chemical fingerprinting, and fluorescence.

Each banana pulp, the part that is eaten, tested yielded about one-quarter of a milligram of norepinephrine and almost four milligrams of serotonin. The peel, on the other hand, contained more than seven milligrams of norepinephrine and a slightly higher amount of serotonin than did the pulp.

Just how the two compounds affect humans when given orally is not known, although studies are now underway to try to determine this. It is known that up to 20 milligrams of serotonin can be taken orally without physical effect. This would be equivalent to eating six bananas or more at one time.

In contrast, the scientists say, as little as one milligram of serotonin injected into man can produce marked effects.

Far into the cautious future is the hope that drugs capable of blocking the break-up of serotonin in the body also may prove to be successful palliatives for angina pectoris and high blood pressure. This parallel research, however, is in the very early stages of experimentation.

Preliminary findings in the banana study, reported in *Science* (March 21), are the work of Drs. T. Phillip Waalkes, Albert Sjoerdsma, Cyrus R. Creveling, Herbert Weissbach, and Sidney Udenfriend, of the section of experimental therapeutics and laboratory of clinical biochemistry, National Heart Institute of the National Institutes of Health.

Science News Letter, April 5, 1958

NUTRITION

Nutrition, Food Experts Study Eskimo Diet

► TEN NATIVE Eskimo villages in Alaska will be visited by a team of food and nutrition specialists in the first wide-scale study to determine the nutritional status of our neighbors to the far north, the Public Health Service has announced.

Approximately 1,000 Eskimos will participate in physical examinations and studies to show how adequately native diets meet nutritional requirements. Two Eskimo battalions of the Alaskan National Guard will be included in the study.

The survey team is under the supervision of the Government's Interdepartmental Committee on Nutrition for National Defense. The Public Health Service's Arctic Health Research Center (AHRC) is also assisting.

The types of food in the native diet have been under study for the past two years by Dr. Christine Heller, of the AHRC.

Science News Letter, April 5, 1958



APHID-RESISTANT ALFALFA—A greenhouse flat, planted with non-resistant and aphid-resistant Buffalo alfalfa seed, vividly demonstrates the damage caused by the spotted alfalfa aphid. The three bare rows had been planted to non-resistant strains. The green seedlings are resistant Buffalo alfalfa, a "synthetic" alfalfa selected by scientists at the Kansas Agricultural Experiment Station. Further tests have to be made to determine the yield, winter hardiness, etc., of the new grass.