

CHEMISTRY

# Tapioca Substitute

**It will be Leoti pudding and Leoti stickum on stamps if plans of farmers and agricultural scientists to find a home-grown substitute succeed.**

► IT WILL BE LEOTI pudding, instead of tapioca, and Leoti stickum on stamps, envelopes and the like next year, if present efforts of prairie farmers, agricultural scientists and manufacturers succeed.

These groups have been working intensively since early spring to give America a homegrown substitute for tapioca and other imported root starches used in foods, in the textile industry and for making adhesives and plywood for interiors.

Leoti is one of several varieties of waxy-seeded sorghums that have been grown in the United States for syrup, grain or forage since 1854. Until recently there was no special use for the waxy seed itself. About three or four years ago, however, cooperative investigations at the Iowa Agricultural Experiment Station revealed that starch from waxy corn and sorghum had properties similar to those of tapioca and sweet potato starches.

Last spring, with war in the Pacific cutting off the root starches formerly imported from the Orient, agricultural officials in Nebraska and Kansas cooperated in locating supplies of pure seed of waxy sorghums and encouraged farmers to plant it.

## Sorghum Difficulties

Waxy sorghum offers certain difficulties in the extraction and purification of the starch by usual methods, U. S. Department of Agriculture officials point out. Unless the methods of manufacture and the quality of the waxy varieties are improved, the extraction of starch from sorghum seed is likely to be expensive. Despite these limitations, however, Department officials believe that waxy sorghums offer a hope for meeting immediate requirements for waxy starch during the present emergency. It is expected that most of the starch will be used for food purposes. Any surplus will go for adhesives.

Commercial waxy-seeded sorghum varieties in the United States are Leoti and McLean sorgho, certain strains of Gooseneck sorgho, and a brown-seeded grain sorghum called Schrock or Sa-

grain. Most of the waxy sorghum production in the United States consists of the Leoti variety grown for forage, largely in Nebraska. According to one story, Hoosier farmers were the first to grow this variety. Nebraska and other prairie states seem to have taken over Leoti production but Leoti is coming back to Indiana for processing at a mill famous for its fine cake flour, operated by General Foods. Sugar rationing having cut down somewhat on housewives' production of angel food and other cakes requiring fine flour, the mill has been largely turned over to Leoti processing.

Leoti is one of the real finds of the first war year of American agricultural science. It is the only satisfactory substitute of the imported starch that could be raised in quantity during the 1942 crop season. This season's harvest in south central Nebraska was estimated at some 500,000 bushels.

## Named for Town

Prof. R. M. Sandstedt, chemist at the Nebraska State College of Agriculture, "discovered" the new crop. Leoti had been grown in a small way in a limited area in the state for some years, principally for fodder, to some extent also as a source of syrup. This sorghum variety was named for the town of Leoti, in Kansas, where it seems to have first appeared; but the cultivation center have long since shifted into Nebraska.

What gives it its peculiar value is the chemical constitution of the starch in the dull-coated, waxy-looking seed, which contrasts with the harder, shinier "finish" of ordinary sorghum seed. Incidentally, despite the name, there is no wax in the seed; it only looks waxy. The starch has the property of taking up quantities of water, to become the half-gelatinous, slippery stuff that many persons like as tapioca. Given a different chemical treatment, it also becomes a good adhesive, either for paper (as on stamps and envelopes) or for binding veneer sheets into plywood.

This capacity of waxy sorghum seed to furnish a good gummy substance is no new thing, Prof. Sandstedt declares. There are references to it in Egyptian

literature. In ancient China, "slippery" puddings were made from it; they were rather special desserts, for festive occasions. It seems to be a genetic property that crops up from time to time spontaneously. Being a recessive trait, it is masked and covered up in hybrids, only to reappear later.

Corn shows the same tendency toward the production of waxy-grained strains, which have starch of the same gummy properties. At present, U. S. Department of Agriculture geneticists and chemists are hard at work on a waxy corn, which is also considered as a possible replacement for lost "stickum" sources. However, waxy sorghum is a this-year's crop; waxy corn is still only a future possibility.

## Kinship of Starches

Close kinship between the starches of the two waxy grains, which are botanically second cousins, is indicated further by their peculiar behavior in the presence of iodine. As everyone knows, ordinary starch turns blue or purple when heated with iodine; starch from waxy sorghum or waxy corn turns red.

At present, farmers are getting high enough prices for Leoti to pay them well for cultivating it. Whether this prosperity will continue after the war, when casava competition can be expected again, is a problem for the future. Prof. Sandstedt is hopeful that cultivation costs and manufacturing efficiency can be pushed to a point where the domestic crop can hold its own against the foreign product.

Leoti, like other sorghums, is a good crop for parts of the country where drought may occur at any time during the growing season. It is also a good soilbinder, holding fields against erosion.

*Science News Letter, December 5, 1942*

GEOLOGY

## Geologist Named to Receive Penrose Medal

► DR. C. K. LEITH of the University of Wisconsin has been named the Penrose Medalist for 1942 by the Geological Society of America. The award will take place during the abbreviated annual meeting of the society to be held in New York the week after Christmas, because of the cancellation of the full meeting scheduled for Ottawa.

Dr. Leith has been working during the war effort with the War Production Board, the National Academy of Sciences and other federal agencies.

*Science News Letter, December 5, 1942*