White Potatoes

Scientists at the Eastern lab were excited enough about development in 1954 of a method for making dehydrated potato flakes to hold a rare press conference to report the research, one of their most significant accomplishments in food process engineering. They explained how potatoes are pre-cooked, cooled, cooked under carefully controlled conditions, mashed, and spread onto a heated drum. They pointed out that starch granules are not broken in the process—an important key to the quality of the product—and that the dried potatoes come off the drum in a thin sheet that is broken into flakes.

To find out if the product could be produced commercially, a carload of Maine potatoes had been processed into flakes at a pilot plant constructed inside the ERRC. Subsequent market tests of the finished product indicated that consumers would buy and use potato flakes. The first commercial production began in 1957, just 3 years after the press announcement.

Development of the flakes helped reverse a downward trend in per capita consumption of potatoes in the United States. Before the flakes came along, powdered dehydrated potatoes had been marketed but found little favor with consumers. The ERRC product, however, was different. Prepared according to directions, the flavors and consistency, according to taste panels, were excellent. Once on the market, many restaurants and institutions, as well as home cooks, soon stopped peeling potatoes in favor of the new product.

In 1960, six processors converted more than 4 million bushels of fall potatoes into flakes, an unusually quick application of a new process by industry. Today about 400 million pounds of potato flakes worth $400 million dollars are produced each year in the United States. Many undergo further processing into a variety of deep-fried products, including new types of potato chips.

By 1960, the Western lab followed the ERRC's research with development of a satisfactory potato granule. Its success depended in part on the use of a fluidized bed dryer, adapted by WRRC engineers to process the granules. The dryer consists of a long box or trough with a porous ceramic bottom. Warm air, blown up through the bed, suspends the granules and dries them quickly and gently. Potato granule manufacturers soon began using variations of the bed dryer to produce their product, considered by some consumers as an improvement in flavor over potato flakes.

Other products followed: explosion-puffed potatoes in ERRC; a way to make crisper french fries using infrared lamps at the WRRC. The high heat from the lamps forms a thin shell on the potatoes so that they get crisp while absorbing less fat.

One result of potato product research at Department of Agriculture labs and at other research facilities is that people eat more potatoes today than they did in the 1950's. Another result is that 60 to 65 percent of the potatoes purchased by the American consumer today are processed. Only 1 potato in 3 is peeled at home.

Sweetpotatoes

Sweetpotatoes grow in many shapes and sizes, some of them too large or misshapen for either the fresh or canning market. In 1960, SRRC researchers found a use for these odd-sized potatoes by developing a dehydrated sweetpotato flake. The process was similar to one developed earlier at Wyndmoor for white potatoes. Addition of hot water yields mashed sweetpotatoes. The product has been used for school lunches and for military use overseas, as well as for other institutional purposes.

Engineers in ERRC pilot plant process mashed potatoes into a continuous sheet that can be broken up into instant potato flakes.

Harvesting Cherries Mechanically

About three-fourths of America's red tart cherries—pie cherries—are grown in Michigan. In the 1950's, annual production in that State was about 190 million pounds, all harvested in a scant 3 weeks by an army of 45,000 migrants. But it was getting harder every year to recruit pickers (and to afford them), and there was pressure on Congress to reduce the supply of foreign migrants. (At the end of 1964, it finally happened.) What was needed, agreed ARS engineers at Michigan State University, was a machine that would shake the cherries off the tree. And in the early 1950's, despite catcalls from critics who warned that machine harvesting would damage cherries too much, they began to work seriously on the project.

A motor started and the tree shook violently, a storm of cherries falling into a net spread below. The crazy contraption worked!

Meanwhile, in Pennsylvania, ERRC chemists were taking a critical look at the impact of hand-harvesting on red tart cherries. They were more concerned with improving product quality than with economics or labor. The number one reason for downgrading cherries in canneries, they found, was bruising, and they proved that human beings caused most of the bruising as they picked the cherries and dropped them into pails. Perhaps cherries would bruise less, they speculated, if they made a softer landing in something like a minnow net. Before long, the ARS engineers in Michigan and the ARS chemists at Wyndmoor were working together. The result of their collaboration was the mechanical cherry harvester, first demonstrated to growers in a Michigan orchard in 1959. They watched skeptically as a tractor pulled an odd-looking machine into position underneath a cherry-laden tree and a clamp at the end of a mechanical arm was secured to a branch. A motor started and the tree shook violently, a storm of cherries falling into a net spread below. The crazy contraption worked!

Like most major innovations, creation of a prototype machine was but the first step down a long rocky road. ARS engineers improved their invention, got the bugs out. Growers, dubious at first, grew enthusiastic as they found out that one mechanical shaker with a crew of 5 could harvest as many cherries in a day as 100 handpickers.

But canners remained unsold. The team of ERRC chemists kept working with them and with manufacturers of processing equipment to help solve their problems. In time, aided by the invention of an electric cherry sorter in 1963 and a device to remove stems from cherries without bruising them, processors began to welcome cherries harvested by machine. In 1966, for instance, only about 22 percent of Michigan's cherry crop was machine-harvested; in 1967, it was 50 percent. Today most of the crop is harvested with shakers, and production of red tart cherries, a crop that once seemed doomed, is higher than ever.