

Episode one 401 – Indiana Agriculture (Life Science)

Indiana often gets labeled as “The Corn State” -- but, as one Indiana amusement park has stated, “There's More Than Corn in Indiana”. That's true, there's soy, tomato and popcorn – just to name a few. WFYI's newest program, The Science of Agriculture, gives you an in-depth look at how some of the products you have in your pantry or refrigerator are made right here in the Hoosier state. We're going to take you to Eldwood and go inside the Red Gold plant to see how ketchup is made, along with a trip to Cousin Willie's Popcorn operation in Ramsey, Indiana. We'll also take you inside one of the POET Biorefining plants to show you how ethanol is created.

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What Makes Popcorn Pop?



Ira Weaver
Weaver Popcorn



Orville Redenbacher
Orville Redenbacher Popcorn



Wilfred E. Sieg
Cousin Willy Popcorn

Who invented popcorn?

You might think that Orville Redenbacher, Ira Weaver, or Cousin Willy invented popcorn. But did they? In fact, it is believed that the first use of wild and early cultivated corn was for popping.

History of Popcorn

2000 BC

The oldest ears of popcorn ever found were discovered in the Bat Cave of west central New Mexico. These ears ranging from smaller than a penny to about 2 inches are estimated to about 4,000 years old.

16th and 17th Centuries

In the early 16th century, popcorn was in integral part of Aztec Indian ceremonies. In the 17th century, Peruvian Indians toasted a certain kind of corn, pisancalla, until it burst and used it as a confection.

1890 – 1930's

Popcorn was very popular from 1890 through the Great Depression as it was a low cost “luxury” that most families could afford.

1950's

Popcorn went into a slump during the early 1950s, when television became popular. Attendance at movie theaters dropped and, with it, popcorn consumption. When the public began eating popcorn at home, the new relationship between television and popcorn led to a resurgence in popularity.

1990's

Microwave popcorn accounted for \$240 million in annual U.S. popcorn sales in the 1990s and boosted popcorn consumption.

Today

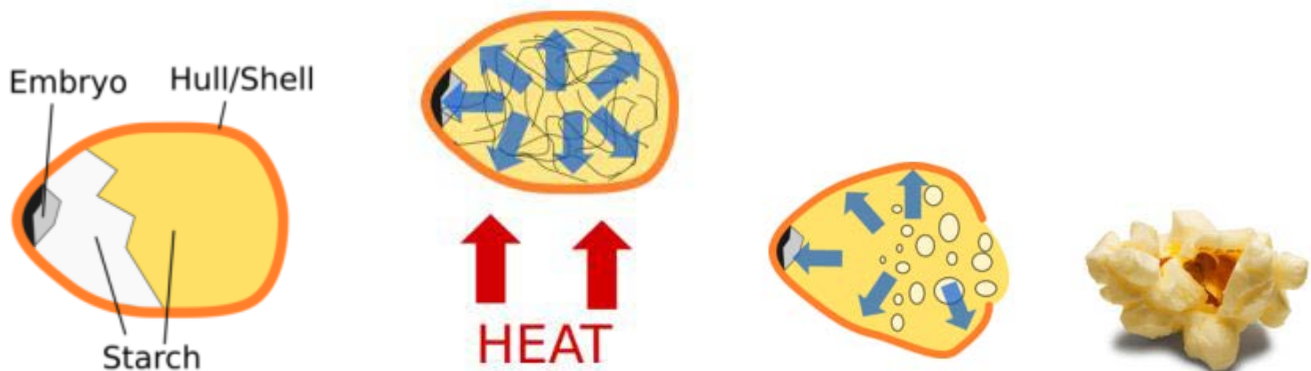
Americans today consume 17 billion quarts of popped popcorn each year. The average American eats about 54 quarts.

What makes popcorn pop?

Popping corn is just a specially bred form of corn, a bit like a less sweet form of sweet corn. Inside a seed there is lots of starch and it has a very tough outer shell.

As popcorn kernels are heated, the water inside the kernels gets hot but the hard outer shells of the kernels which can support up to 10 atmospheres of pressure stop the moisture from expanding into steam. The water in the kernels keeps heating up above 100°C, building up more and more pressure. The heated moisture in the kernel alters the starch stored inside forming a kind of jelly similar to how corn flour thickens soups.

Eventually the temperature can reach 180°C, increasing the pressure inside the shell enormously and causing the shell to burst and release the pressure. The drop in pressure causes the water in amongst the jelly-like starch to boil immediately, expanding by a factor of 2000 or more thereby blowing the jelly into foam. As most of the water in the foam has been liberated as steam, the starch dries out, becomes hard and can support itself even when the popcorn cools down and the water condenses again.



You may view the lesson science lesson – Steam Explosion: The Science of Popcorn at <http://www.thenakedscientists.com/HTML/experiments/exp/steam-explosions-the-science-of-popcorn>

and

History of Popcorn at www.popcorn.org