

# Better popping potential for popcorn

June 1 2021, by Emily Matzke

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Yellow popcorn is the type most people are familiar with. This is the type commonly used by movie theaters. Credit: Maria Fernanda Maioli

Popcorn. What would movies and sporting events without this salty, buttery snack? America's love for this snack goes beyond these events.

We consume 15 billion quarts of popped popcorn each year.

When it comes to [popcorn](#), consumers want a seed-to-snack treat that leaves more snacks than seeds when popped. This means when they pop the corn, there shouldn't be many unpopped kernels left in the bowl.

Maria Fernanda Maioli set out to determine the properties affecting popping expansion in popcorn. The team's research was recently published in *Agronomy Journal*, a publication of the American Society of Agronomy.

"The way kernels expand is a basic, yet very important characteristic of popcorn," says Fernanda Maioli. This is referred to as "expansion ratio."

"Very hard grains burst when heated. This expansion multiplies the initial volume of the grains by more than 40 times. In the case of popcorn, it produces a unique and tasty food."

The major factors that influence popcorn quality are kernel moisture, expansion ratios, and popping ratios. Higher quality popcorn is associated with kernels that expand more. This popped corn has a better texture and softness.

There have been several past studies on the ways popcorn kernel expand. These studies report that popping expansion has a strong association with higher starch content in kernels.



Purple popcorn kernels have a gorgeous hue and contain more antioxidants than traditional yellow kernels. Credit: Maria Fernanda Maioli

Previous research also shows that popcorn varieties with a thicker protective outer seed coating—have a greater expansion ratio.

Popping ability is also affected by how well the starchy substance inside kernels transfer heat during the popping process. Fernanda Maioli and her team's study measured this performance, which makes this research unique.

"We observed how this heat transfer inside the popcorn kernel relates to



the expansion ratio," she adds. "It allowed us to understand how other characteristics may also relate to expansion."

"The purpose of our study was to identify popcorn characteristics related to expansion," says Fernanda Maioli. "This will help us efficiently identify popcorn varieties with good agronomic characteristics as well as good popping quality."

The team evaluated 49 types of popcorn for different traits. The traits included grain yield, kernel length, popping expansion, kernel and protective layer thickness, heat transfer ability, and the amount of protein in kernels.



Credit: American Society of Agronomy

Then the researchers studied the influence of those characteristics on the popping expansion.

"Our results showed that the thickness of the [kernel](#)'s outer layer is a key trait for selecting popcorn with greater popping expansion," says Fernanda Maioli.

Understanding which popcorn traits are related to the expansion capacity will help future researchers identify and breed high quality popcorn. Researchers will not need to spend time and money to look at other unrelated characteristics.

The team hopes they can identify relationships between other key traits. Future research will continue to improve the tasty, buttery snack.

**More information:** Marcelo Akira Saito et al, Influence of agronomic and kernel-related properties on popping expansion in popcorn, *Agronomy Journal* (2021). [DOI: 10.1002/agj2.20645](https://doi.org/10.1002/agj2.20645)

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