

Tuning chocolate flavor through yeast research

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Chocolate. Credit: Wikimedia Commons

Researchers of Leuven University and VIB in Belgium have shown that the yeasts used to ferment cocoa during chocolate production can modify the aroma of the resulting chocolate.

"The set of new yeast variants that we generated makes it possible to create a whole range of boutique chocolates to match everyone's favorite flavor, similar to wines, tea, and coffee" says Dr. Jan Steensels, one of the lead researchers involved in the project. The results were published November 20 in *Applied and Environmental Microbiology*, a publication of the American Society for Microbiology.

Looking for robust yeast strains for chocolate

production

Initially the researchers sought robust yeast strains that could outcompete the many invading yeast strains that flood the cocoa beans during fermentation. "After harvesting, the cocoa beans are collected in large plastic boxes, or even piled in large heaps on the soil, right in the farms where they are grown. The beans are surrounded by a gooey pulp, which is fermented by yeasts and bacteria. Any species in the environment can get into the mix, leaving little control over the ultimate flavor. But by outcompeting other microbes, robust yeast strains could prevent such infelicitous variability in taste." Says Esther Meersman who carried out much of the field trials in a cocoa farm in Malaysia.

Different yeast strains - different tastes

The investigators noted striking differences in aroma among the chocolates made from fermentations using different robust yeasts. That was remarkable since only the yeast strains were different: the fermentations were performed identically, and the same recipe was used each time. The team set out to breed novel yeast hybrids that would combine robustness with strong flavor production. Esther Meersman: "We were initially surprised that the volatile flavor compounds are retained in the beans during drying and roasting. We think that the volatiles are protected from evaporation since they are dissolved in the fat fraction."

A new era of chocolate...?

The investigators, who closely collaborated with the R&D team of Barry Callebaut, the world's largest chocolate producer, have combined two critical characteristics of yeast in single hybrid variants: the ability to dominate cocoa fermentations, and to produce a specific flavor. "This

means that for the first time, chocolate makers have a broad portfolio of different yeast strains that are all producing different flavors. This is similar to the current situation in beer brewing and wine making." Adds prof. Kevin Verstrepen, who led the research.

"A completely natural process - refined during a hundred years of winemaking and beer brewing - now makes it possible to unlock the [flavor](#) and aroma precursors in the [cocoa beans](#). A Belgian artisan product will now contribute to a new national pride. We could not make this story any more Belgian", said Gino Vrancken, Global R&D Program Manager Cocoa at Barry Callebaut.

Provided by VIB (the Flanders Institute for Biotechnology)

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