

UQ Study Reveals Fermentation Microbes Shape Australian Chocolate Flavour

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Researchers at the University of Queensland (UQ) have found that naturally occurring microbes involved in cocoa fermentation play a more significant role in shaping chocolate flavour than the genetics of the cocoa tree itself, a discovery that could strengthen Australia's position in the premium chocolate market.

Conducted in collaboration with cocoa growers in Far North Queensland, the study analysed crushed cocoa beans (nibs) sourced from Fishery Falls, Mt Etna and Shannonvale. The research compared the aroma, flavour and chemical composition of the beans to understand the factors driving flavour development.

Food chemist Dr Marelize Bekker said the findings revealed that fermentation practices and local microbial communities had a greater influence on flavour than either the farm location or cocoa tree variety.

"We had different types of cocoa trees and we thought that would have a big impact on the flavour, but the tree's genotype had a much smaller role to play than the fermentation process itself," said Dr Bekker.

"Whatever is in the environment drives the natural fermentation; nothing is introduced and we know it is critically important for flavour and quality."

The research highlights the importance of Australia's unique fermentation environment, where naturally occurring microorganisms influence the development of complex flavour profiles during cocoa processing. According to the researchers, understanding these microbial interactions could enable producers to better control fermentation and consistently deliver premium-quality chocolate.

"Cocoa can display a remarkable diversity of flavour characteristics, ranging from classic chocolate and roasted notes to buttery and even tropical aromas," Dr Bekker explained.

"By understanding Australia's unique fermentation environment, we can intervene during the process and start to direct those flavour profiles."

The findings are expected to support Australia's growing speciality chocolate industry by providing scientific insights that can help differentiate locally produced chocolate in international markets.

Dr Bekker described the work as an initial step towards establishing Australia's reputation for premium cocoa and chocolate.

"This is a preliminary study, and we are hoping to do more work so we can position Australia on the world stage and show the unique characteristics Australia has," she said.

"We don't want to compete with mass-produced chocolates; it is about positioning Australia as a premium, unique market."

Industry stakeholders have also welcomed the study. Chris Jahnke, CEO of Australia's most awarded chocolate company, Charley's Chocolate Factory, and President of CACAO, said the research validates the industry's long-held understanding of the critical role that fermentation plays in flavour development.

"In Australia we have high labour costs compared to where most cocoa is grown in West Africa, so we are focused on an absolute premium product," Jahnke said.

"To have a premium product you must control the processes very tightly and understand the likely outcomes."

He added that the collaboration with UQ researchers provides valuable scientific evidence linking local microbial communities to flavour development.

"The study confirmed the mix of microflora present at a location influences the fermentation, which is a key part of flavour development," Jahnke said.

The research offers new opportunities for Australian cocoa producers to optimise fermentation practices and develop distinctive flavour profiles, supporting the country's ambition to establish itself as a producer of high-value, premium chocolate rather than competing in the global commodity cocoa market.