

## TECHNICAL SUMMARY

# FERMENTATION OF PACKED HONEY

Steve Howse, *Analytica Laboratories*

Analytica shares its findings following an unusual enquiry about fermentation testing occurring in some overseas markets.

Fermentation of honey is well known among beekeepers—particularly those who have been on the receiving end of having to clean up after fermented honey has ‘exited’ a drum under pressure. What many of us have less understanding of is the consequence of honey fermenting when it is packed in a jar for sale to a consumer.

An article on fermenting honey appeared in a previous edition of the journal (Howse, 2018), which provided a description of why honey ferments and what happens when it does.



## References and further reading

Bogdanov, S. (2007). Authenticity of honey and other bee products: State of the art. *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca*. Retrieved August 10, 2020, from [https://www.umf.org.nz/wp-content/myimages/2017/02/Bogdanov\\_2007\\_Authenticity-of-honey-and-other-bee-products-state-of-the-art.pdf](https://www.umf.org.nz/wp-content/myimages/2017/02/Bogdanov_2007_Authenticity-of-honey-and-other-bee-products-state-of-the-art.pdf)

Codex Alimentarius Standard 12-1982 for Honey. Retrieved from: [http://www.codexalimentarius.org/download/standards/310/cxs\\_012e.pdf](http://www.codexalimentarius.org/download/standards/310/cxs_012e.pdf)

Howse, S. (2018, November). Managing the risk of fermenting honey. *The New Zealand BeeKeeper*, 26(10), 13–15.

Under normal circumstances, bees will process or ‘ripen’ nectar or honeydew into honey with around 17–18% moisture in it. When moisture levels are this low, the very high sugar concentration in the honey makes it more or less impossible for yeasts to grow.

If moisture levels are higher, certain yeasts (osmophilic yeasts) are able to survive and grow. They use the sugars in the honey as an energy source, and in doing so form ethanol (the form of alcohol found in beer and wine) and carbon dioxide (which builds up and causes pressure to grow inside the storage container). Honey with moisture levels of 19% or higher appear to be at high risk of fermenting.

## Fermentation matters because it affects the taste and smell of the honey

When honey ferments, it produces a smell that many people do not like and develops a sour flavour. None of these are attractive in a product being sold as a food for a premium price.

The internationally recognised CODEX honey standard specifies that honey should not be fermented or fermenting. This standard is used by a number of countries as a way of confirming that something being sold as honey is a genuine and quality product.

## Testing for fermentation

Bulk honey producers tend to use moisture as an indication of the risk of fermentation in honey. The CODEX standard certainly references moisture as being an important thing to test in honey (for just about all honeys, CODEX specifies that moisture needs to be below 20%).

We have come across examples where other tests are carried out in-market on packed honey to confirm that it’s not fermented.

The most common one, which is specified in CODEX, is free acidity.

- When the ethanol in fermented honey becomes exposed to oxygen, it converts into acetic acid (vinegar), which causes the free acidity of the honey to increase. Honey should have a Free Acidity of less than 50 meq acid/kg.

Earlier this year a client was told their honey been tested for ethanol and glycerine. This was new to us, and we did some research into them as tests.

- As described above, ethanol is a normal result of yeasts using sugars as an energy source. While there are no official levels, we were informally told by a European laboratory that a level above 100 mg/kg would probably be considered as being evidence of the honey fermenting.
- Glycerine is another form of alcohol produced by yeasts, and a level of 300 mg/kg or higher would be considered to indicate that the honey has fermented.

## Prevention is best

A requirement to test for free acidity, ethanol, or glycerine is not all that common in our experience. However, it’s a real challenge to find yourself in a situation where honey has been tested for one or more of them overseas, if the results come back indicating that they may exceed guidance values for fermentation.

Ensuring that honey has low moisture (less than 18%) when it is packed is probably the single most important thing that can be done to manage the risk of fermentation. Secondly, checking for osmophilic yeasts in honey with higher moisture content can also be a good idea.

