

# Mescal worm test shows DNA leaks into preservative liquids

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Just because you don't swallow the worm at the bottom of a bottle of mescal doesn't mean you have avoided the essential worminess of the potent Mexican liquor, according to scientists from the Biodiversity Institute of Ontario (BIO) at the University of Guelph.

They have discovered that the liquid itself contains the DNA of the agave butterfly caterpillar - the famously tasty mescal "worm".

As part of a study to test their theory that DNA from a preserved specimen can leak into its preservative liquid, the BIO team tested a sample of liquid from a bottle of Monte Alban brand mescal. The liquor was found to contain DNA, which they amplified and sequenced to obtain a DNA barcode.

When this was compared to thousands of records of Lepidoptera DNA barcodes stored in the Barcode of Life Data Systems (BOLD) database, it was confirmed that the mescal liquid contained DNA related to the family *Cossidae*, of which the agave butterfly is a member.

Apart from the mescal, the scientists also successfully amplified and sequenced DNA barcodes from the 95 percent ethanol preservative of 70 freshly collected specimens - including whole insects (caddisflies and mayflies) and plant leaves - as well as seven archival specimens from diverse phyla that were collected seven to 10 years earlier.

A report on their study - entitled "Direct PCR amplification and

sequencing of specimens' DNA from preservative ethanol" - is published today in the online edition of the journal *BioTechniques*. The study is part of the technology development phase of the International Barcode of Life project (iBOL).

"These results suggest that DNA extraction is a superfluous step in many [molecular biology] protocols," the report says. "Preservative ethanol can be used as a source of [genetic material](#) for non-invasive sampling or when no tissue specimen is left for further [DNA analysis](#)."

The scientists said that the successful identification of the agave caterpillar DNA is "a surprising result" given that mescal is an imperfect preservation medium containing only 40 percent ethanol and many impurities that can degrade DNA. And while they could not obtain a full-length DNA barcode from the mescal, when they repeated the process on the 95 percent [ethanol](#) preservatives used for the freshly collected specimens, their success rate was near perfect.

"Showing that the DNA of a preserved specimen can be extracted from the preservative [liquid](#) introduces a range of important possibilities," said Dr. Mehrdad Hajibaebi, a member of the research team. "We can develop inexpensive, high-throughput and non-invasive genetic analysis protocols for situations where the original tissue cannot be touched or when there is simply no sample left for analysis."

**More information:** [www.biotechniques.com](http://www.biotechniques.com)

Provided by International Barcode of Life

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