

Natural ingredients in supplements, nutraceuticals get a new type of barcode

June 26 2019

Increasingly, shoppers are choosing nutraceuticals, cosmetics and herbal remedies with natural ingredients, and these products are readily available in many drug stores and supermarkets. But some consumers, health professionals and policy makers have raised concerns about the safety, quality and effectiveness of some of these health products. Now, researchers in ACS' *Journal of Agricultural and Food Chemistry* have developed a method to authenticate botanical ingredients by giving them each a unique "chemical barcode."

In the U.S., natural health products are considered neither food nor drugs, but dietary supplements, which are not routinely tested for safety and quality. Previously, scientists have used a technique called DNA barcoding to authenticate [natural ingredients](#). This method uses [genetic markers](#) to identify botanicals, but it cannot distinguish among different parts, such as roots, flowers and leaves, of the same plant. Moreover, DNA barcoding can't detect chemical contaminants, fillers or pharmaceuticals. Therefore, Fabrice Berrue and colleagues at the National Research Council of Canada and Dalhousie University wanted to develop a method that would create a unique chemical—rather than DNA—barcode for each natural ingredient that is easy to interpret.

To develop their method, the researchers analyzed the substances in 20 natural ingredient samples, including Korean ginseng, boysenberry liquid, milled organic cherry and others, with nuclear magnetic resonance (NMR). The researchers then converted these chemical fingerprints into barcodes by assigning a 1 or a 0 to substances with

NMR signals above or below a set threshold, respectively. A statistical analysis procedure correctly grouped the same and similar samples together, and could also distinguish products with inactive ingredients or fillers from pure materials. The new method could someday be used to authenticate natural health products, once a library of reference chemical barcodes from verified ingredients and products is built, the researchers say.

More information: "Chemical Barcoding: A Nuclear-Magnetic-Resonance-Based Approach to Ensure the Quality and Safety of Natural Ingredients" *Journal of Agricultural and Food Chemistry* (2019).

pubs.acs.org/doi/abs/acs.jafc.9b01066

Provided by American Chemical Society

Citation: Natural ingredients in supplements, nutraceuticals get a new type of barcode (2019, June 26) retrieved 19 April 2024 from <https://phys.org/news/2019-06-natural-ingredients-supplements-nutraceuticals-barcode.html>

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