

Extraction processes used for botanical ingredients: applications in ready-to-drink beverages

BORNHORST E. (1), SONG B. (1), SUBRAMANIAN K. (1)

1 PepsiCo, Research and Development, Valhalla, New York, United States

Plant-based, botanical ingredients have been processed and extracted for use in food and dietary supplement applications to treat ailments and improve health for centuries. Although botanicals have a long history of use worldwide, they have experienced a recent rise in consumer demand and consumption due to their clean label, as well as their functional and nutritional benefits. In the United States, most botanicals are sold as dietary supplements, with over 1,600 plant materials and their derivatives being sold as dietary supplements, and over 250 botanical extracts being added to food. Botanicals in foods and beverages are frequently used in the form of concentrated extracts; their functionality is broad, ranging from color, fragrance, flavor, thickening, preservative activity, and functional benefits. Using a botanical extract in a beverage that was designed for use in a dietary supplement is not ideal and can result in product development challenges and process optimization opportunities. Extraction techniques and processing parameters, such as time, temperature, pressure, solvent, and plant matrix properties, are critical to the success of a botanical extract for use in a food or beverage. Botanical compounds can be extracted from plant materials using a variety of traditional and non-conventional processing methods. Many traditional extraction methods use the extraction ability of different solvents and the application of heat and/or mixing. Non-conventional methods are more newly developed processes that typically produce a higher quality of extract, have a reduced operational time, better yield, and are more environmentally friendly due to decreased use of synthetic and organic chemicals. Examples of traditional extraction methods are maceration and hydrodistillation, while non-conventional methods include supercritical fluid extraction, ultrasound assisted extraction, and pressurized liquid extraction. There are many factors that impact the quality and purity of a botanical extract; optimizing the extraction process for a botanical ingredient is critical to its successful application in a ready-to-drink beverage.

The views expressed are those of the author and do not necessarily reflect the position or policy of PepsiCo, Inc.