

Quality Raw Materials and Technology for Authentic and Natural Apple and Citrus Flavors

Naturalness is the strongest trend in the food and beverage sector, resulting in stronger demand for natural and fruit-derived flavors.

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Editor's note: *The natural flavors market could be worth \$5 billion by 2017, according to a recent report.^a*

“The global market for natural flavors in terms of revenue was estimated to be worth around \$3,546.3 million in 2011, and is expected to reach \$5,078.0 million by 2017, growing at the CAGR of 6.2% from 2012 to 2017,” the report notes. “Europe is the largest market. The demand for natural flavors is expected to rise in North America due to an increase in regulations banning artificial flavors.”

This growth in the market, according to the report's authors, is driven by worldwide regulatory pressure on the flavors used in food production, healthy perception of natural flavors by consumers, new technologies that are making natural flavors more cost-effective, and merger and acquisition activity in the service of increased capacities and capabilities.

Here, author Roman della Peruta discusses the technical and sensory potential of this booming category.



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The move toward naturalness is the strongest trend in the food and beverage sector, resulting in stronger demand for natural and fruit-derived flavors. Among the best natural flavors are products isolated solely from the botanically authentic fruit or plant, so-called FTNF/FTNJ/FTNS (from the named fruit/juice/source) flavors. These natural fruit extracts comprise water phases/essences, flavor fractions, isolates and extracts of the individual fruits, plants and sources.

A Range of Technologies

Ingredients derived from natural sources are always a challenge in terms of consistent qualities. Flavor components can vary from harvest to harvest. To guarantee consistent FTNF/FTNJ/FTNS flavors and compositional flavors, state-of-the-art separation technologies are used. Otherwise, much flavor gets lost to solid material during its separation from juice, followed by pressing or centrifuging.

Vacuum distillation is used for sophisticated separation tasks at gentle temperatures, producing, e.g., water phases and

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essential oils. Liquid-liquid extraction allows for the extraction of valuable components of essential oils at low temperatures. In solid-phase extraction (chromatography), appropriate stationary phases are used to process the different raw materials in order to produce final isolates and flavors with specific characteristics. Molecular distillation employs a special setup of a condensing system, which results in an efficient distillation of high-boiling components at very low pressures and temperatures.

These techniques isolate the different flavor components, which are later used to formulate tailor-made “reproducible” flavors.

In addition to these separation technologies, global access to high-quality fruit, plant and vegetable raw materials is fundamental for the production of premium natural flavors, and to guarantee authentic taste profiles. This is especially true for the most popular fruits, such as citrus and apple, from which not only tailor-made flavors can be extracted, but also a

^a“Global Natural Colors and Flavors Market by Types, Applications and Geography: Forecasts up to 2017”; www.reportlinker.com

comprehensive portfolio of extracts, fractions and isolates of the highest quality. In addition, customized ingredients (e.g. valencene ex orange essence oil) of different concentration levels can be achieved.

Orange

From sweet to sour, from green to ripe, the taste nuances of citrus fruits are more diverse than those of almost any other fruit. No other flavor category has a greater acceptance. This is where cutting-edge technology can be applied to obtain flavor materials such as water phases, essence oil and cold-pressed oil.

Orange essence oils may include 1-fold, 5-fold and 10-fold varieties; light-fraction and low-volatile varieties; and orange essence oil carbonyls. Cold-pressed orange oils may include 5-fold and 10-fold varieties, enriched oils, and special 5-fold and 10-fold low-residue oils with values far below legal requirements. Extracts from oranges comprise fractions and isolates such as ethyl butyrate, decanal, valencene and orange acetaldehyde fraction.

These FTNF and FTNJ flavors are produced by physical processes, using only natural food-grade solvents. As a result, preferential and stable access to the best and freshest raw materials is an important basis for any such building blocks and flavors. The reproducible natural fruit-derived flavor fractions constitute essential building blocks for the formulation of natural flavors. As such, they can be used by flavorists to obtain more natural and intense flavor profiles.



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Apple

Along with citrus, apple is one of the most well-loved flavors for beverages. Whether sweet and mild like a Red Delicious, or sour and tangy like Granny Smith, countless apple cultivars exist around the globe. When processing apple juice, evaporation is used to concentrate the juice, during which approximately 80% of the water is lost. The flavor that evaporates along with the water is recovered through a distillation step in an integrated flavor recovery system in the form of a 150-fold apple water phase, thus concentrating the essence volatiles. This process is done not only with apple but with several other fruits to gain high-quality FTNJ flavors/waterphases/essences.

Depending on the geographic origin and harvest time of the apples used, as well as the processing techniques, the apple water phase/essence 150-fold may vary in its concentration of aroma volatiles/flavor components and, therefore, taste. To guarantee a consistent sensory profile, as well as a reproducible concentration of flavor components, high-performance systems for the gentle concentration of apple water phases by way of distillation have been developed. Apple water phases/essences of particularly high quality, with a concentration of 2,500- to 15,000-fold, are the result of a concentration process of 17- to 100-fold and further specialized captive processes. This process allows individual flavor profiles to be reproduced from crop to crop, and has additional advantages in terms of higher flavor stability, and optimized shipment and storage costs and shelf life.

The range of fruit-derived FTNF/FTNJ/FTNS flavors includes manifold taste characteristics. By using concentrated water phases and the technique of fractionating, typical taste profiles of green, yellow or red apple types can be achieved; e.g. *trans*-2-hexenal is a typical component of a more green apple, while ethyl butyrate is more typical of red apple. Thus, specific needs of a flavorist can be addressed using unique water phase flavors. As such, the items can be the basis for innovative and individualized flavor profiles for unique applications.

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