R & D Captures Essence of Fruit and Flowers: Sensory Treat

New research designed to build scientific understanding of fruit genes could revolutionize the way foods, cosmetics and perfumes are created. Researchers at New Zealand-based life sciences company HortResearch say they have fine-tuned the science of gene discovery to such a degree that they can accurately determine which genes create the individual flavors and fragrances found in fruits and flowers. Combined with traditional biofermentation techniques, this means that it should be possible for the natural tastes and aromas of fruit to be recreated. Dr. Richard Newcomb, HortResearch Industrial Biotechnology scientist, says that's exciting news for the world's food, perfume and cosmetic producers, who have for years sought synthetic solutions to mimic nature's flavors and fragrances in products ranging from ice cream to shampoo. "While manufacturers have largely been successful in copying natural tastes and scents, they generally do so either through a chemical synthesis process or extraction from harvested raw ingredients," he explained. "Neither approach is ideal. Chemical synthesis requires heat and pressure, so is reliant on increasingly expensive and polluting fossil fuels for energy. What's more, chemical synthesis can never truly recreate nature. The flavor or fragrance will typically be slightly different to that found naturally in fruits and flowers. Extraction is expensive and produces only limited quantities of product, reducing the number of commercially viable options for the extract." Biofermentation, however, can produce large amounts of a desired compound at low cost with little environmental impact. Because biofermentation uses the actual genes that plants use in the wild, the resulting flavor or fragrance compound has exactly the same molecular make-up. While the possibility of "fermenting" genes to produce compounds has been well understood for many years, science has generally lagged behind in identifying which genes are needed to produce the desired outcome. HortResearch has now overcome this issue by using research initially intended to speed up the process of fruit breeding, says Newcomb. "Through decades of fruit breeding research, HortResearch has developed extensive fruit gene and compound databases. Now, we have developed techniques that help determine which genes create each compound and how those compounds combine to create a flavor or fragrance. It's a complicated and time-consuming process. Some fruit flavors, for example, may be comprised of over 30 different compounds, each in a precise volume. Much of this information is fed back into the breeding program, allowing naturally bred new fruit varieties with desired traits to be quickly recognized amongst young breeding populations that frequently number in the tens of thousands. However, it is also possible for us to isolate genes that produce desirable flavor and fragrance compounds for use in industrial biotechnology applications." HortResearch has proven the bioproduction concept can be used to produce fruit flavors and fragrances by perfectly recreating a fruit compound called alpha-farnesene, responsible for the distinctive aroma of green apples. The company has filed international patent applications on the use of the applicable gene in creating the fragrance as well as for another plant gene

responsible for making a compound that smells like the heady scent of red roses.

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