Updating the Mary Poppins solution with a better bitter blocker

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With millions of adults and children avoiding nutritious foods because of the bitter taste, and gagging or vomiting when forced to take bitter liquid medicines, scientists today reported an advance toward a high-tech version of Mary Poppins' solution. It's not a spoonful of sugar to help the stuff go down, they reported at the 241st National Meeting & Exposition of the American Chemical Society (ACS), but a new and improved "bitterness blocker."

"A lot of people are very sensitive to bitter taste in medicines, calorie-free sweeteners, and foods," said Ioana Ungureanu, who described the new substance at the ACS meeting, one of the largest scientific conferences of 2011. "We'd like to be able to make their diets more enjoyable by masking the off-putting flavors of bitterness. Blocking these flavors we call off-notes could help consumers eat healthier and more varied diets. It could encourage them to switch to non-calorie soft drinks and help children and seniors swallow bitter-tasting medications."

Ungureanu, a research scientist with Givaudan Flavors Corporation in Cincinnati, Ohio noted, for instance, that green, leafy vegetables like spinach and broccoli are excellent sources of calcium and other nutrients important for good health. But calcium, magnesium, zinc and other key minerals and vitamins in nutritious foods unfortunately have a taste that people find unpleasantly bitter. Though it is unlikely that the bitterness of these fresh vegetables will be masked any time soon, there are many other food and beverage products that are becoming much more palatable.

Taste cells with specific receptors blanket the tongue. Scientists have identified 27 receptors for different shades of bitterness, which along with salty, sweet, sour and savory (or umami), make up the human taste palate. The new bitterness blocker, known only at this point as GIV3616, works by blocking some of the bitterness receptors.

Givaudan scientists previously discovered the first commercially feasible substance capable of blocking bitter taste in humans. Called GIV3727, it inhibited taste receptors involved in people's ability to detect the bitter aftertaste from artificial sweeteners, including saccharin and sucralose. But Givaudan scientists immediately realized that it could be used as the model for developing blockers for other taste receptors, including substances that might make liquid medicines or bitter foods more palatable.

The new compound, Ungureanu said, is more potent and can dissolve more quickly in foods and beverages. "It works at levels on the order of parts per million and blocks flavors using 10 times less material than what was needed previously."

"Sensitivity to many foods is partly due to genetics," Ungureanu said. "Recent studies have estimated that a large portion of the population — almost 25 percent, or 75 million people — are known as supertasters who have heightened sensitivity to bitter foods. "Our compound could one day make supertasters' coffee more smooth or their veggies more appetizing."

The discovery of compounds like GIV3727 and GIV3616 is part of an ongoing revolution in research on flavors and taste. In the past, the food and drug industry relied on salt, fat, and sugar to hide bitterness and other unpleasant flavors. But concerns about the health effects of those three ingredients have shifted the focus. Instead of hiding unpleasant tastes, chemists, molecular biologists and other scientists are developing

ways to change how the tongue senses tastes.

Givaudan Flavours is a trusted partner to the world's leading food and beverage companies, combining its global expertise in sensory understanding and analysis and consumer-led innovation in support of unique product applications and new market opportunities. From concept to store shelves and quick serve restaurants, Givaudan works with food and beverage manufacturers to develop flavors and tastes for market leading products across five continents.

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