

All Sweeteners May Not Be the Same When Managing Type 2 Diabetes and Complications

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(PhysOrg.com) -- Recent research by Kalidas Shetty of the University of Massachusetts Amherst and Lena Galvez Ranilla of the University of San Paulo, Brazil, shows that when it comes to managing Type 2 diabetes, all sweeteners may not be the same. Some sweeteners, including date sugar and less refined, dark brown sugars, showed potential for managing Type 2 diabetes and related complications – information that could help Type 2 diabetics make better dietary choices.

“Depending on their origin and grade of refining, many sweeteners contained significant amounts of antioxidants, which have the potential to control diabetes-linked high blood pressure and heart disease,” says Shetty, who adds that these were in vitro laboratory studies performed outside of living organisms. “Several types of sweeteners also showed an interesting potential to inhibit the action of a key enzyme related to Type 2 diabetes, which is also the target of drugs used to treat this condition.”

Additional members of the research team include food scientist Young-In Kwon of UMass Amherst and Maria Ines Genovese and Franco Maria Lajolo of the University of San Paulo, Brazil. Results were published in the most recent issue of the Journal of Medicinal Food.”

The team started by collecting an exhaustive array of sweeteners, everything from the complete line offered by Domino, to unprocessed,

dark brown sugars from Mauritius and Peru. Pure maple syrup, corn syrup-based sweeteners, “natural” sugar products like sucanat and sugars from Asia, India, South America and China rounded out the list.

Extracts of the sweeteners were first analyzed to determine their total content of a group of antioxidants known as phenolic compounds, the same plant chemicals that give red wine and tea their heart-healthy benefits. Testing showed that when it comes to sugar, darker is definitely better. Dark brown sugars contained up to 4,741 micrograms of phenolic compounds per gram, compared to 18 micrograms per gram for white sugar. The highest antioxidant levels were found in the darkest sugars.

Further testing showed that these phenolic compounds had significant antioxidant properties, scavenging harmful free radicals that can damage the delicate machinery of cells. According to Shetty, high blood sugar levels in diabetics can cause the overproduction of these free radicals, contributing to high blood pressure and accelerating the development of heart disease.

Date sugar produced in the United States and dark brown sugars from Peru and Mauritius packed the biggest punch, racking up the highest antioxidant levels and scavenging an impressive 82 to 88 percent of free radicals in laboratory in vitro tests.

Sweeteners were then tested for their ability to inhibit the activity of alpha-glucosidase, an enzyme that moderates blood glucose levels by controlling the passage of sugars from the small intestine. “Diabetes is characterized by a rapid rise in blood glucose levels after meals,” says Shetty. “Inhibiting alpha-glucosidase, which is the target of several drugs used to treat diabetes, can help prevent this spike.”

Most sweeteners derived from sugar cane inhibited alpha-glucosidase action by 26 to 50 percent, including the dark brown sugars and natural

sugar products from evaporated cane juice. Date sugar inhibited the enzyme by 75 percent.

Surprisingly, several sweeteners based on corn syrup inhibited alpha-glucosidase levels by 77 to 81 percent, although they contained low levels of phenolic compounds. “This level of inhibition could be due to sugar polymers known as oligosaccharides that are not completely broken down, mimicking the action of certain drugs that inhibit alpha-glucosidase,” says Shetty. “This investigation is continuing.”

Date sugar and sweeteners based on corn syrup also inhibited an enzyme that plays a role in high blood pressure, a common complication of diabetes. According to Shetty, the reason for this is not clear based on current studies.

“Replacing sugars in processed foods and beverages with low calorie and noncaloric sweeteners is one long term strategy for Type 2 diabetics,” says Shetty. “But these results indicate that a strategic choice of dietary sweeteners, especially less refined sugars close to the original nature of the ingredients found in whole plants, also has potential in managing Type 2 diabetes and related complications. This provides a strong rationale for further animal and clinical studies for better diet design.”

Provided by University of Massachusetts Amherst

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