

Sugar reduction game changer? Hershey, ASR Group invest in startup paving way for 'mass market adoption' of allulose, tagatose

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Bonumose – a Virginia-based startup with patented technology it claims could enable the “mass market adoption” of rare sugars – has raised a Series B* round led by Hershey and sugar refining giant ASR Group, to support commercial production of allulose and tagatose in early 2022.



The funding round will also support R&D work on allulose, and other low-glycemic, low-calorie, non-cariogenic rare sugars with similar properties to sucrose that could be alluring additions to the sugar reduction toolkit, were it not for their hefty price tag.

Allulose – which is found naturally in a variety of plants but produced on a commercial scale via a complex, multi-step process typically starting with corn starch - is particularly attractive to formulators seeking to replicate the sensory and functional properties of sugar without the calories.

The tooth-friendly ingredient - which has 70% of the sweetness of sucrose but only 0.4 calories per gram (vs 4cals/g for sucrose) – has a negligible effect on blood sugar and insulin, and has garnered a lot of interest following the [FDA's decision](#) to exclude it from the total and added sugars declarations on the Nutrition Facts panel.

As it has the texture and bulk of regular sugar, allulose can be used to reduce or replace sucrose in everything from beverages, yogurt and ice cream to baked products and candies, and now features in brands from Magic Spoon and Country Archer's new Zero Sugar Beef Jerky to Nick's ice cream.

It also browns during baking (unlike erythritol), depresses the freezing point when making frozen products, and disperses well in batters and dough without the need for additional water.

Paving the way for mass market adoption of rare sugars

The problem is, while there are now several major players producing it commercially (Tate & Lyle, Ingredion/Matsutani, CJ CheilJedang etc) it's still fairly costly, claimed Ed Rogers, co-founder and CEO at [Bonumose](#), which has developed a patented process for producing allulose, tagatose, and other rare sugars

that Rogers says eliminates some processing steps and significantly increases yields, paving the way for their "mass market" adoption.

Bonumose's process – developed by co-founder and CSO Dr. Daniel Wichelecki - can also utilize other ingredients as a feedstock (beyond commodity corn starch) such as by-products of plant-based protein production that have not been valorized.

Right now, said Rogers, firms manufacturing allulose on a commercial scale deploy a multi-step process that takes them from corn starch to maltodextrin, to glucose, to fructose, which is then converted into allulose using enzymes, a "low-yield process with multiple separation and purification steps."

Bonumose, he said, also starts with starch, but has enzymes that can convert the maltodextrin directly to allulose, with a very high yield, a potential game-changer in the market.

Tagatose: Exciting rare sugar with a hefty price tag

Tagatose – another non-cariogenic, low-glycemic rare sugar with 92% of the sweetness of sucrose, but only 38% of the calories (it has 1.5cal/gram) – is also an attractive alternative to sugar as it has bulk and sugar-like sweetness, with fewer calories and a negligible impact on blood sugar.

Right now, it still counts as sugar on the Nutrition Facts panel, but following the FDA's recent [request for comment](#) on sugars that are not metabolized in the same way as traditional sugars, many industry stakeholders are hoping the agency will soon exclude it from the added and total sugars declaration on the Nutrition Facts panel ([as it has already done with allulose](#)).

Bonumose – which has submitted a citizen's petition urging the FDA to classify tagatose as a dietary fiber – says there is also evidence that it serves as a prebiotic, inducing the production of the short chain fatty acid butyrate and stimulating the growth of beneficial bacteria in the large intestine.

Tagatose production process has 'an extremely high yield, that's fully-plant based and low cost'

Like allulose, tagatose is found naturally in a variety of foods but is produced on a commercial scale via a complex, multi-step process typically starting with lactose (milk sugar) that comes with a price tag putting it out of reach of many food manufacturers, claimed Rogers.

The lactose is hydrolyzed by lactase or acid hydrolysis to form glucose and galactose. The latter is then isomerized to tagatose either chemically or enzymatically and then isolated by a combination of filtration and ion exchange chromatography.

While [new technology](#) using yeast fermentation to produce tagatose interesting, he says, the economics of this approach at a commercial scale are not yet clear.

Bonumose, however, has developed a production process "with an extremely high yield, that's fully-plant based and low cost," he claimed.

"Our process for tagatose is just like what we're doing with allulose; it starts with starch and then maltodextrin and we can go straight to tagatose. At a very large scale, we could probably make it even more efficiently than high fructose corn syrup."

The plan is for a commercial launch in early 2022, he said: *"The new funding will get us to commercial production, albeit at a modest scale. But we're already lining up partnerships for larger scale production partners in the form of feedstock suppliers but also in the form of manufacturing partners, not just here [in the US], but also in other countries."*

ASR Group: 'It's about trying to offer a wide range of sweetening options that are closer to sugar without all the trade-offs'

So what sparked the interest of ASR Group and Hershey as investors?

Rob Sproull is SVP sales, marketing & product development at ASR Group, which is Bonumose's distribution partner for food, supplements, personal care and pharmaceutical customers in the US, Mexico, Canada, the UK, Ireland and much of mainland Europe.

And its approach to rare sugars production could be a game changer, he said: *"Rare sugars have been around forever, but they are pretty expensive, and that's historically been the challenge, but they offer some unique opportunities for the food and beverage industry."*

"For us, it's about trying to offer a wide range of sweetening options that are closer to sugar without all the trade-offs... and we think these [produced by Bonumose] will be significantly more cost-effective."

From a formulation perspective, rare sugars don't behave in exactly the same way, he said, so you need to pick the right option for any given application: *"Allulose is more hygroscopic than sucrose [it has an affinity for water] so that can present challenges in some applications, but holding moisture is a benefit in some baked goods, for example. Tagatose, on the other hand, is less hygroscopic, and works well in confectionery, ready to eat cereals, dairy, yogurts and so on."*

Hershey: 'Focusing internal efforts and external investments to develop future breakthrough sugar reduction capabilities'

Hershey, in turn, said this week that it will expand its portfolio to deliver more reduced sugar options, *"focusing internal efforts and external investments to develop future breakthrough sugar reduction capabilities."*

The investment in Bonumose is via Hershey's C7 Ventures arm, which invests in *"disruptive or emerging platforms focused on new occasions, technologies and go-to-market opportunities,"* said the confectionery giant on Wednesday.

"This investment enables a research and development partnership to advance the tastes of not only zero- and reduced-sugar chocolate, but also Hershey's broader better for you snack offerings going forward."

Hershey president, U.S. Chuck Raup added: *"In response and as part of our strategic vision, we're making strategic investments, both internally and externally, and have a focused plan that allows us to make reduced and zero-sugar"*

2/18/2021

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chocolate that still has the same amazing taste consumers know and love."

*According to an SEC filing, Bonumose raised \$9m in the latest round, although none of the parties have commented on the sum.

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