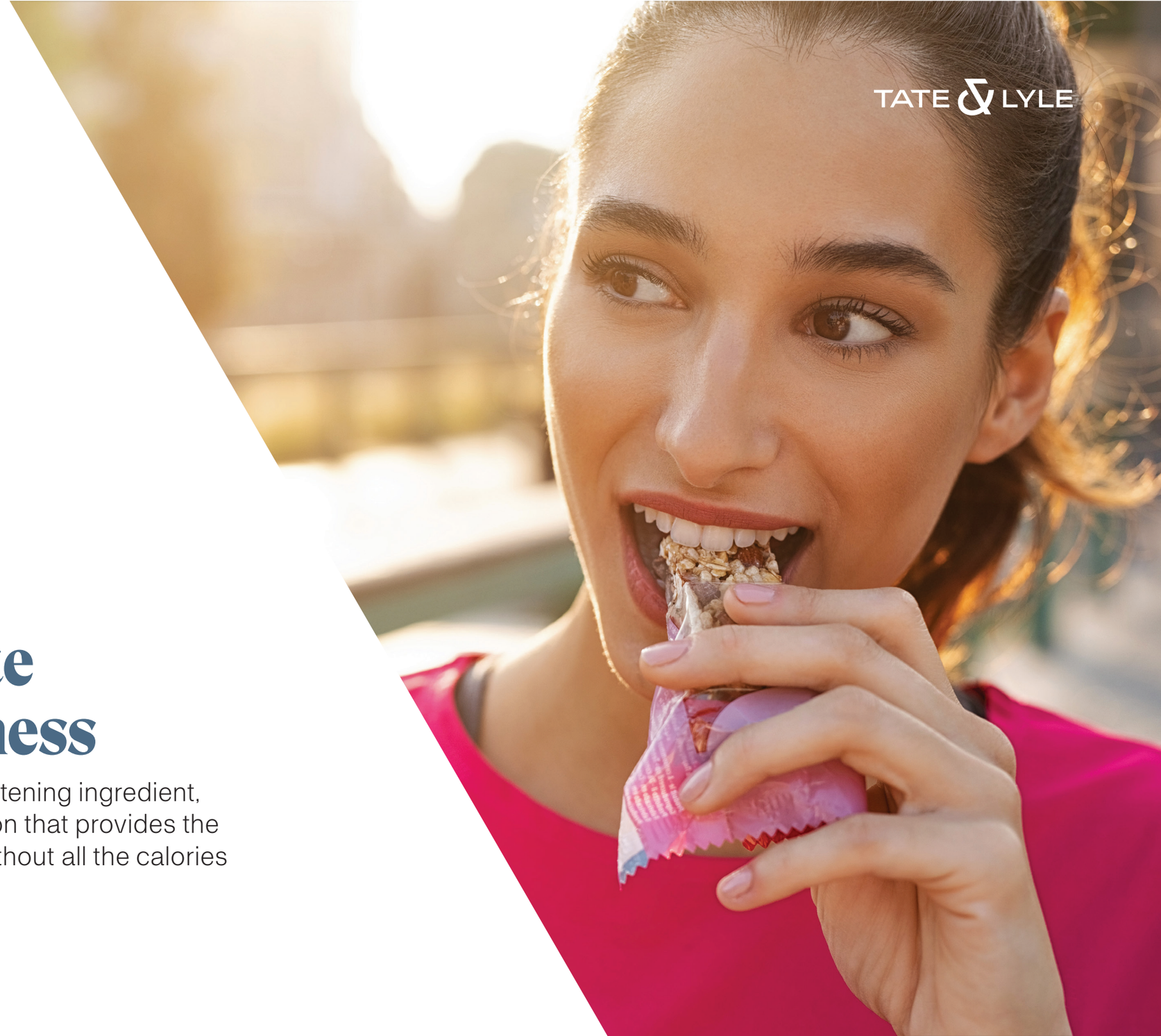
DOLCIA PRIMA®
Allulose

TATE & LYLE



Balancing taste and healthfulness

DOLCIA PRIMA®, a low-calorie sweetening ingredient, is the great-tasting sweetening option that provides the full taste and enjoyment of sugar, without all the calories

Health indicators driving the need for calorie reduction

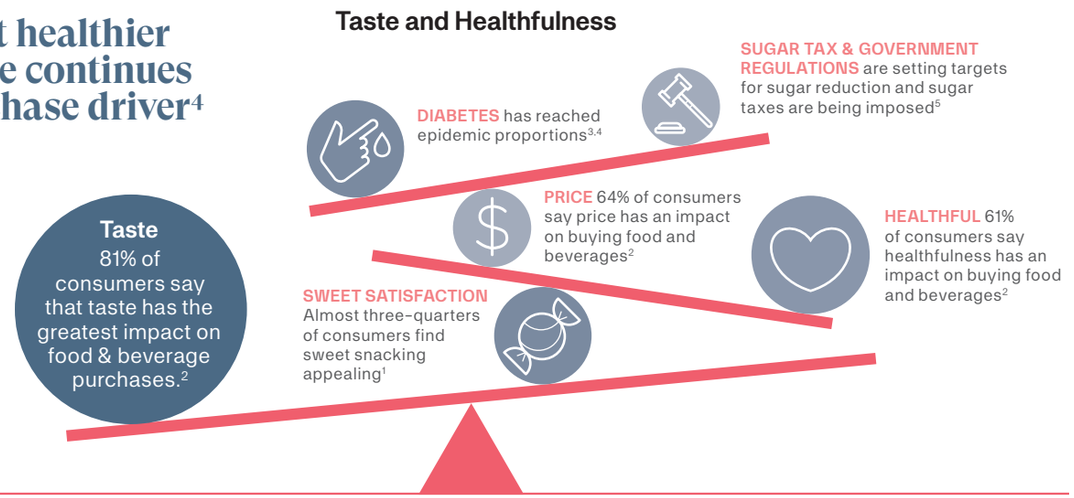
- Obesity
- Diabetes
- Heart disease

According to the World Health Organization, worldwide obesity has more than doubled since 1980.[1] To curb the obesity epidemic, balancing calories consumed, and calories expended is key.[2]

Evidence supports the use of low and no calorie sweeteners

A scientific statement from the American Heart Association (AHA) and American Diabetes Association (ADA) concluded non-nutritive sweeteners, when used carefully, may aid in reducing total energy intake and assist with weight loss/ control, while providing beneficial effects on related metabolic parameters.[3]

Consumers want healthier options, but taste continues to be the #1 purchase driver[4]



A sugar with 90% fewer calories. All the taste. All the texture.

Allulose is a rare sugar, found in nature in small amounts in raisins and figs. It is a non-artificial sweetening ingredient that provides the sensory experience (taste and texture) of sugar without the calories.

- Contains 0.4 calories/gram compared to sugar at 4 calories/gram[1]
- Delivers sweet, sugar-like taste, as well as sugar's texture, bulk and mouthfeel
- Non-artificial and no aftertaste
- Generally Recognized as Safe by the FDA (GRN 400, 498, 693)[5]
- Digestively tolerated in healthy adults at 30 grams per day[6–7]
- Is non-cariogenic (is not approved as an FDA claim)[8]
- Low in calories because it is not metabolized[9–10]
- Does not raise blood glucose or blood insulin levels[11–12]
- Modestly reduces postprandial glycemic response when consumed in combination with other carbohydrates[13–15]

Intended Use Levels
GRN 400, 498, 693[5]

Guideline for Consumption
30 grams/day[6–7]

	INTENDED USAGE LEVEL	GRAMS PER SERVING
Baked goods	10%*	4.0 g
Sweet sauces and syrups	10%	4.0 g
Ready-to-eat cereals	10%	4.0 g
Sugar substitutes	100%	4.0 g
Frozen desserts	5%	4.0 g
Dairy and yogurt	5%	8.5 g
Beverages	3.5%	12.3 g
Filled and frosted goods	10%	12.5 g
Puddings and gelatins	10%	14.0 g

Excellent tolerance at approved usage levels

- Human studies assessing the absorption, excretion and metabolism of allulose reported that the sugar is absorbed in the small intestine, but is not metabolized[8–9]
- Digestively tolerated in healthy adults at 30 grams per day[6–7]

Nutrition and clinical studies

- In studies where allulose was consumed alone, it does not raise blood glucose or blood insulin levels in healthy individuals or when consumed by people with type 2 diabetes[11–12]
- Modestly reduces postprandial glycemic response in people with type 2 diabetes, prediabetes, and with healthy blood glucose when consumed in combination with other carbohydrates[13–15]
- Is non-cariogenic (is not approved as an FDA claim)[8]

About Tate & Lyle

We are a leading global food and beverage ingredients and solutions supplier, with a 160-year history of ingredient innovation. Through our purpose, *Transforming Lives Through the Science of Food*, we believe that together, we can successfully grow our businesses whilst having a positive impact on society. Partner with us to create healthier, tastier and more sustainable food and beverage solutions for consumers.

Nutrition facts label for products containing allulose

- Included in total carbohydrates
- Reduce sugars[16]
- Reduce calories[16]

Category: Soft confection **Serving size:** 1 bar (43g)

Without Allulose

Nutrition Facts	
Serving size	1 bar (43g)
Amount Per Serving Calories	220
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 8g	40%
Trans Fat 0g	
Cholesterol 10mg	3%
Sodium 35mg	2%
Total Carbohydrate 25g	8%
Dietary Fiber 1g	4%
Total Sugars 24g	
Includes 24g Added Sugars	48%
Protein 3g	
Vitamin D 0mcg	0%
Calcium 81mg	7%
Iron 2mg	11%
Potassium 160mg	3%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

With Allulose

Inclusion Rate: Allulose 25%

Nutrition Facts	
Serving size	1 bar (43g)
Amount Per Serving Calories	180
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 8g	40%
Trans Fat 0g	
Cholesterol 10mg	3%
Sodium 35mg	2%
Total Carbohydrate 25g	8%
Dietary Fiber 1g	4%
Total Sugars 13g	
Includes 13g Added Sugars	26%
Protein 3g	
Vitamin D 0mcg	0%
Calcium 81mg	7%
Iron 2mg	11%
Potassium 160mg	3%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

–18% reduced calories

–45% reduced sugars

References

1. World Health Organization. Obesity and Overweight Fact Sheet. June 2016.
2. Institute of Medicine, Food and Nutrition Board. Dietary Reference Intakes: Energy, Carbohydrates, Fibre, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington, DC: National Academies Press; 2002/2005.
3. Dietary Guidelines Advisory Committee. Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2015.
4. International Food Information Council Foundation, 2018 Food & Health Survey, 2018
5. FDA: U.S Food and Drug Administration GRAS Notices. GRN No. 400 , 498, 693 http://www.accessdata.fda.gov/scripts/fdcc/index.
6. Han et al. Gastrointestinal Tolerance of D-Allulose in Healthy and Young Adults. A Non-Randomized Controlled Trial. Nutrients 2018; 10, 2010.
7. Iida et al. Estimation of Maximum No-effect Level of D-Psicose in Causing Diarrhea in Human Subjects. Journal of the Japanese Council for Advanced Food Ingredients Research 2007; 10(1):15-19.
8. Hasturk H. A clinical study on the effect of allulose, a low-calorie sugar, on in vivo dental plaque pH. Forsyth Institute. Boston, MA, USA. 2018.
9. Atiee GJ et al. An open-label, single-dose, nonrandomized microtracer study to determine the mass balance of orally administered, 14C-labeled sweetener product with 15 g sweetener in healthy adult subjects. 2015.
10. Iida et al 2010. Failure of D-psicose absorbed in the small intestine to metabolize into energy and its low large intestinal fermentability in humans. Metabolism 2010; 59(2):206-14.
11. Kendall C, Wolever T, Vuksan V, et al. Comparison of glycemic responses elicited by 25g glucose, 25g allulose. Glycemia Consulting Inc. Toronto, ON, Canada. 2014.
12. Wolever T, Jenkins AJ. A Randomized, Controlled, Crossover Study to Assess the Effects of a Sweetener on Postprandial Glucose and Insulin Excursions in Healthy Subjects. Glycemic Index Labs. Toronto, ON, Canada. 2015.
13. Noronha et al. Effect of Small Doses of Fructose and Allulose on Postprandial Glucose Metabolism in Type 2 Diabetes: A Double-blind, Randomized, Controlled, Acute Feeding Equivalence Trial. Diabetes, Obesity, and Metabolism 2018; 1-10.
14. Hayashi et al. Study on the postprandial blood glucose suppression effect of D-psicose in borderline diabetes and the safety of long-term ingestion by normal human subjects. Biosci Biotechnol Biochem 2010; 74(3):510-9.
15. Iida et al. Acute D-psicose administration decreases the glycemic responses to an oral maltodextrin tolerance test in normal adults. J Nutr Sci Vitaminol (Tokyo) 2008; 54(6):511-4.
16. FDA food labeling guidance, accessed 6/18/19 http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm385663.htm#images Compliance by 1/1/2020.

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