

Allulose

Presentation by
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WHY Allulose?

Allulose is an ideal sweetener for those on ketogenic or reduced carb diets, as it has no impact on blood glucose or insulin levels when consumed in reasonable amounts.

Ketogenic and low carb diets are used for a host of reasons other than weight loss, but for those looking to lose body fat, allulose may be an ideal sweetener since it is nearly calorie-free and has been shown to have a small but notable impact on reducing body fat mass in humans.

What is Allulose ?

Allulose is a monosaccharide epimer of fructose, formally called D-psicose. It's found naturally in jackfruit, figs, raisins, and maple syrup.

Allulose is 70% as sweet as sucrose (sugar) with a very similar taste and texture, and no aftertaste

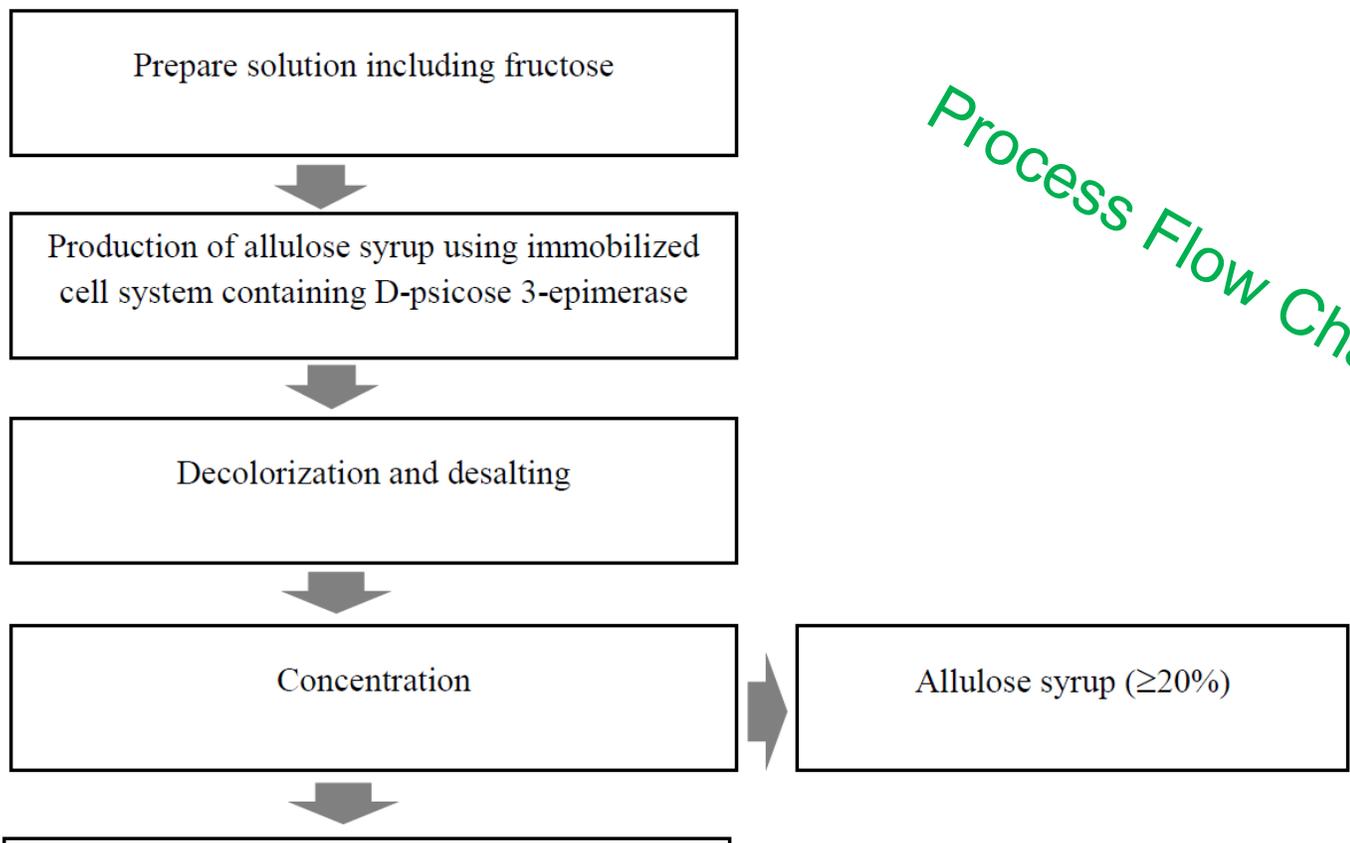
Allulose's low glycemic index is attributed to its ability to not impact blood glucose levels.

Studies show that when it's included in a meal containing carbohydrates, it actually improves glucose tolerance and insulin sensitivity.

Because allulose is technically a sugar (and it bears the suffix “-ose”), the US FDA currently requires it to be listed as sugar in the Nutrition Facts panel on food labels, along with its full amount of carbohydrate and calories, even though allulose does not contribute calories to the diet.

Because we lack the enzymes to digest allulose, it is largely excreted – primarily in the urine – and has very low colonic microbial fermentability; thus, no unpleasant GI effects.

D-allulose is manufactured from fructose in aqueous solution by enzymatic epimerization in the presence of magnesium chloride. The enzyme used is an immobilized D-allulose-3-epimerase, which converts fructose to D-allulose



Process Flow Chart

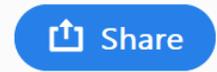


TABLE 1

Products Containing Allulose

PRODUCT	SWEETENER STATEMENT
Allulite Rare Chocolate	All the taste of sugar without all the calories or impact on blood glucose
Fuze Meyer Lemon Black Tea; Fuze Tropical Mango Green Tea	Proprietary sweetener blend (sugar, allulose, stevia leaf extract)
Keystone Pantry Allulose Rare Natural Sweetener	Ultra low-calorie sugar
Keystone Pantry Flavored Syrups	Sweetened with allulose and monk fruit
Know Better Cookie	Near zero glycemic index
Lang's Reduced Calorie Chocolate Truffles	Truffles with indulgent experience, made with allulose
Quest Hero Bar	Sweeteners include allulose, erythritol, and sucralose

— SOURCE: LIST OF PRODUCTS CAME FROM SWEETENER MANUFACTURERS, VARIOUS WEBSITES, AND A FOOD AND BEVERAGE PRODUCT DATABASE. THIS ISN'T AN EXHAUSTIVE LIST; ADDITIONAL PRODUCTS ARE ON THE MARKET.

Market

Global allulose market is segmented on the basis of its various application in various industries such as bakery, confectionary, dairy food and therapeutic food such as diabetic or weight management food. Increasing number of health issues associated with consumption of simple high calorie sugar, growing obesity rate, diabetic patients etc. are major factors causing consumers shift towards low calorie sweeteners.

Literature Survey

In the next few pages.....

The screenshot shows a web browser window with the following content:

- Browser Tabs:** allulose - Yahoo India Image Search, allulose Literature survey - Yahoo
- Address Bar:** https://in.images.search.yahoo.com/search/images;_ylt=AwrwlQZHOzBdqxlA6Bq7HAx;_ylu=X3oDMTB0N2poMXRwBGVn...
- Navigation:** Back, Forward, Refresh, Home, Stop, Print, Full Screen, Close
- Page Content:**
 - LITERATURE SURVEY** (Main Title)
 - What is a Literature Review?** (Text explaining the purpose and types of literature reviews)
 - LITERATURE SURVEY** (Table with columns: S/N, TITLE, ABSTRACT, TECHNIQUES, ADVANTAGES)
 - WHAT IS A LITERATURE SURVEY/REVIEW?** (Text defining a literature survey as a text of a scholarly paper)
 - LITERATURE SURVEY** (Table with columns: Name of the Author, Publication Year, Address, Journal)
 - LITERATURE SURVEY** (Table with columns: Road, Manipulation, Response, Geographical setting, Reference)
- Footer:** ...yahoo.com/.../view;_ylt=AwrwS21N0zBdMT4Ahdm9HAx;_ylu=X3oDMTizYWlmZnQzBHNiYwNzcgRzbGsDaW1nG9pZANKNWE1NGFIZTUxM2YwZWJlMzMyNmNmQzZmZlNzU3N2Y3NwRncG9zAzEwBG...

Literature Survey

allulose - Yahoo India Image Search

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The collage contains several images:

- Top Left:** A green banner with the word "ALLULOSE" in white and a cartoon character of a sugar molecule.
- Top Middle-Left:** A spoon with white powder, labeled "ALLULOSE The latest natural low-cal, low-sugar sweetener on the block." and "all natural ideas".
- Top Middle-Right:** A white and blue package of "Allulose Sweetener" by OMK.
- Top Right:** A spoon with powder on a wooden surface, labeled "Allulose ... Keto Sugar?".
- Middle Left:** A blue and orange package of "Allulose" by Health Cardant.
- Middle Middle-Left:** A person holding a clipboard that says "all about ALLULOSE".
- Middle Middle-Right:** A white bowl of powder, labeled "Allulose A new way to think about sugar."
- Middle Right:** Chemical structures for Fructose and Allulose. Fructose is shown as a five-membered furanose ring with hydroxyl groups at C2, C3, and C4. Allulose is shown as a five-membered furanose ring with hydroxyl groups at C2, C3, and C4, but with a different stereochemistry at C2.
- Bottom Left:** A spoon with powder, labeled "ALLULOSE The latest natural low-cal, low-sugar sweetener on the block."
- Bottom Middle-Left:** A purple infographic titled "Allulose - It's a Sugar" with a table comparing it to other sugars.
- Bottom Middle-Right:** A blue infographic titled "Global Allulose Industry Report 2015" with a large "2015" watermark.
- Bottom Right:** A blue infographic titled "Making Sponge Cake Using Allulose as a Sweetener" with a line graph and a product image of "Sensato Allulose".

...yahoo.com/.../view;_ylt=AwrwS215OjBdWgwAEjO9HAX;_ylu=X3oDMTlyc2ZhaWVpBHNIYwNzcgRzbGsDaW1nBG9pZANKYTK0OTZkNzNhNzNjZDQ4NDZjMjNkNDBIZGZIYmRiYwRncG9zAzkEaXQDYmlu...

Literature Survey

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SAFETY DATA SHEET

Santa Cruz Biotechnology, Inc.
Revision date 27-Aug-2018
Version 1.6

Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product Identifier

Product Name	D-Psicose
Product Code	SC-221516
EC No	208-999-7
CAS No	551-68-8
Synonyms	D-Allulose; D-Ribo-2-hexulose
Pure substance/mixture	Substance

1.2. Relevant identified uses of the substance or mixture and uses advised against

For research use only. Not intended for diagnostic or therapeutic use.

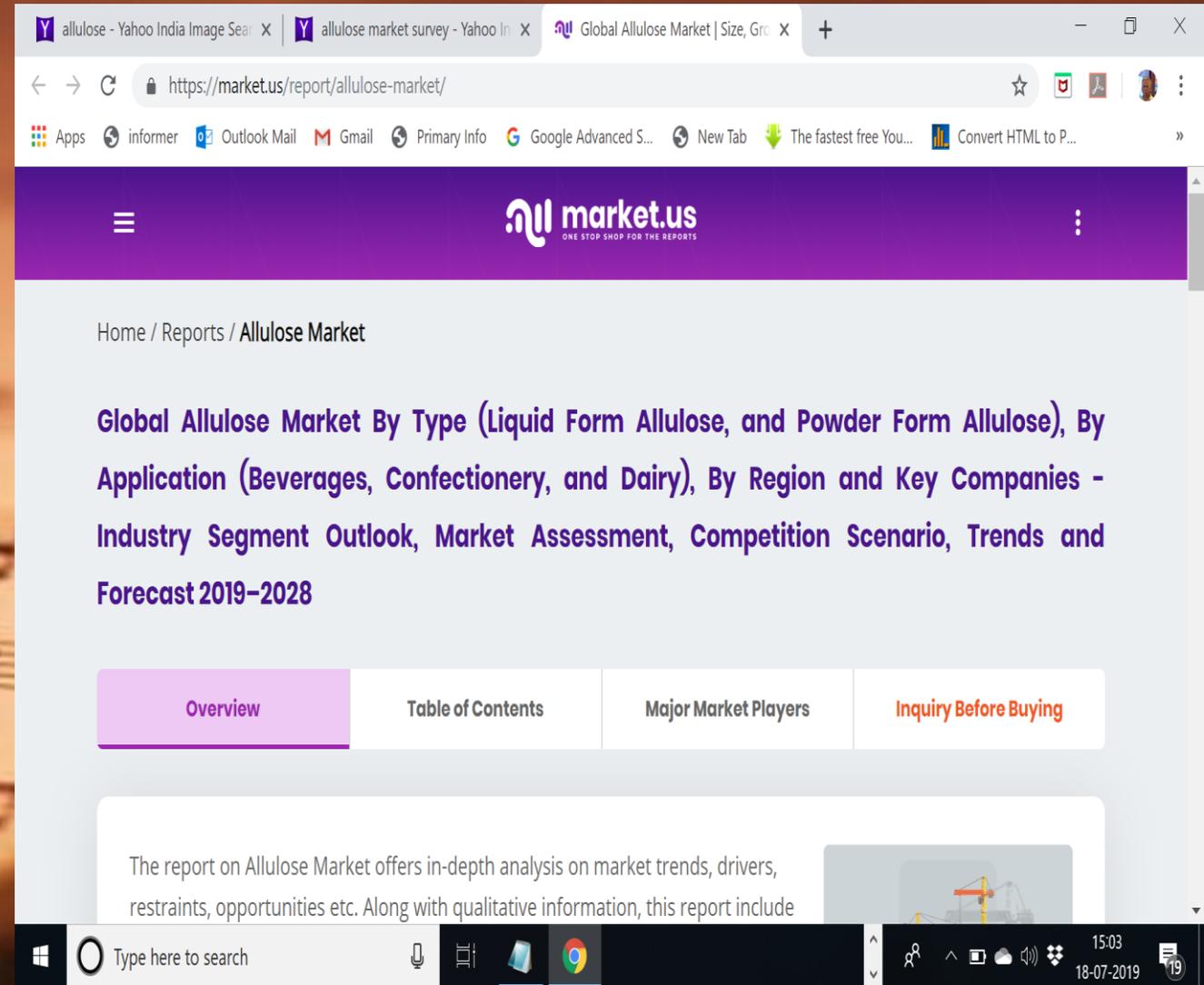
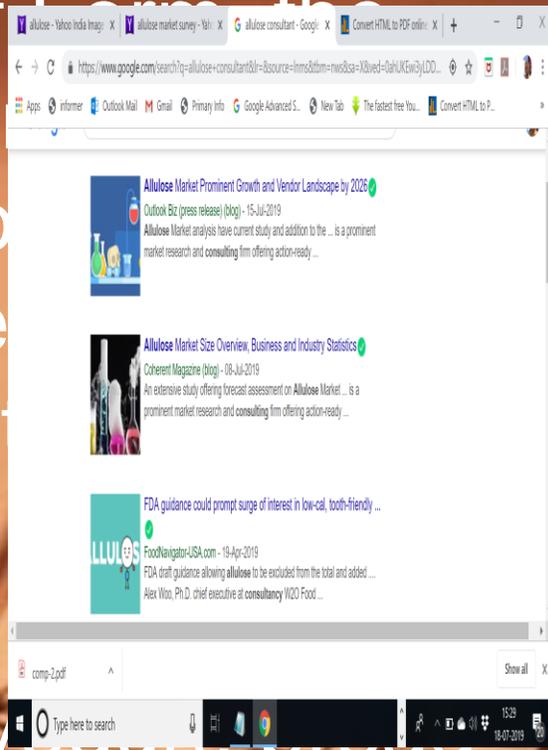
1.3. Details of the supplier of the safety data sheet

Santa Cruz Biotechnology, Inc. Santa Cruz Biotechnology, Inc.

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https://www.foodnavigator-usa.com/Article/2016/08/01/Allulose-the-hottest-rare-sugar-on-the-block-g...
Allulose - the hottest rare sugar on the block gaining interest in the US
By Stephen Daniells
31-Jul-2016 - Last updated on 01-Aug-2016 at 14:08 GMT
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18-07-2019

On the basis of Formulation of global Allulose segmented into liquid, and other Allulose is additionally broadly utilized in different items, yogurt, frozen yogurt, bread, kitchen items, and other low calorie nourishments.

Allulose is broadly utilized as a settling and thickening specialist for different pastry shop items, for example,



Literature Survey

Functionalized polyhydroxyalkanoa...
sciencedirect.com

Ingredient	D-allulose syrup	HiSweet 55	LYCASIN 80-55	POLYSORB 75/67	63DE #HiSweet 42 (50:50)
Pea protein	18.2	18.2	18.2	18.2	18.2
PowerProtein 515 WPC	18.2				
NUTRIOSE FM 06	7.3	7.3	7.3	7.3	
Syrup	54.5	54.5	54.5	54.5	54.5
Canola oil	1.8	1.8	1.8	1.8	1.8
Total	100.0	100	100	100	100.0

Protein food product comprising d ...
google.com

Ketose	Relative activity (%)
D-Allulose	100.0 ± 1.82
D-Fructose	41.1 ± 1.71
D-Tagatose	2.6 ± 0.07
D-Sorbose	6.9 ± 0.04
D-Xylulose	8.3 ± 0.16
D-Ribulose	10.5 ± 1.45

Data expressed as the mean of three separate experiments ± standard deviation.

doi:10.1371/journal.pone.0160044.t002

D-Allulose Production from D-Fructose ...
journals.plos.org

Protein food product comprisin...
google.com

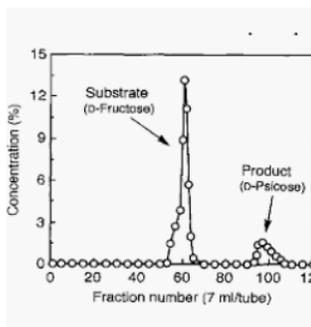
WO2016156117A1 - Chewing gum ...
google.ch



Mass Production of D-...
researchgate.net

D-Psicose Is a Rare S...
researchgate.net

Composition	Hardening rate	
	(g-force/h)	(N/h)
1B	305.33	2.99
1B-1	327.70	3.21
1C	90.65	0.89
2A	5.73	0.06
2B	216.47	2.12



D-psicose from D-fruct...
semanticscholar.org



nutrients

Article

A Preliminary Study for Evaluating the Dose-Dependent Effect of D-Allulose for Fat Mass Reduction in Adult Humans: A Randomized, Double-Blind, Placebo-Controlled Trial

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Abstract: D-allulose is a rare sugar with zero energy that can be consumed by obese/overweight individuals. Many studies have suggested that zero-calorie D-allulose has beneficial effects on obesity-related metabolism in mouse models, but only a few studies have been performed on human subjects. Therefore, we performed a preliminary study with 121 Korean subjects (aged 20–40 years, body mass index ≥ 25 kg/m²). A randomized controlled trial involving placebo control (sucralose, 0.02 g × 2 times/day), low D-allulose (D-allulose, 4 g × 2 times/day), and high D-allulose (D-allulose, 7 g × 2 times/day) groups was designed. Parameters for body composition, nutrient intake, computed tomography (CT) scan, and plasma lipid profiles were assessed. Body fat percentage and body fat mass were significantly decreased following D-allulose supplementation. The high D-allulose group revealed a significant decrease in not only body mass index (BMI), but also total abdominal and subcutaneous fat areas measured by CT scans compared to the placebo group. There were no significant differences in nutrient intake, plasma lipid profiles, markers of liver and kidney function, and major inflammation markers among groups. These results provide useful information on the dose-dependent effect of D-allulose for overweight/obese adult humans. Based on these results, the efficacy of D-allulose for body fat reduction needs to be validated using dual energy X-ray absorption.

Keywords: D-allulose; sugar substitutes; obesity; randomized-controlled trial

1. Introduction

Obesity, a hallmark of the metabolic syndrome, has increased to epidemic proportions worldwide and become a leading cause of morbidity [1–3]. Obesity changes the general metabolism of the body as well as its appearance [4]. It includes metabolic disorders such as type 2 diabetes, dyslipidemia, and cardiovascular diseases with inflammation [5]. According to the Korea National Health and Nutrition Examination Survey [6], the incidence of obesity (body mass index (BMI) ≥ 25 kg/m²) among adults over 19 years of age in Korea was 26% in 1998. Since then, it has been constantly increasing and reached 30.9% in 2014 (males, 37.7%; females, 23.3%). Further, the risk of developing

Nutrients 2018, 10, 190; doi:10.3390/nut10020190 www.mdpi.com/journal/nutrients

Patents

Literature Survey

<input type="checkbox"/> 1	US20180049458	ALLULOSE SYRUPS The present invention relates to allulose syrups, use of allulose syrups in the manufacture of food or beverage products, and food and beverage products made using the allulose syrups.	999	
<input type="checkbox"/> 2	US20180279643	CHEWING GUMS CONTAINING ALLULOSE Chewing gums containing allulose and methods of making such gums are disclosed. In one embodiment, the gum comprises about 5% to about 95% gum base, about 0.1% to about 10% flavoring agent and...	804	
<input type="checkbox"/> 3	US20180271112	CONFECTIONS CONTAINING ALLULOSE A low calorie, low laxation confection such as chewy candy, hard candy, tableted candy, or gelled candy having acceptable texture, stability, clarity, and flavor delivery that contains a bulk...	771	
<input type="checkbox"/> 4	US20180271113	CHEWING GUM COMPOSITION COMPRISING CRYSTALLINE ALLULOSE PARTICLES The present invention pertains to a chewing gum composition comprising crystalline allulose particles and optionally an aqueous allulose syrup, and to the use of allulose for increasing the...	742	
<input type="checkbox"/> 5	US20180077958	METHOD FOR MANUFACTURING ALLULOSE-CONTAINING SWEETENER COMPOSITION The purpose of the present invention is to provide a technology whereby, in a method for manufacturing a sweetener composition containing glucose, fructose and allulose, said method comprising...	699	



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15:12



Literature Survey



US 20180077958A1

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SHIMADA et al. (43) **Pub. Date: Mar. 22, 2018**

(54) **METHOD FOR MANUFACTURING ALLULOSE-CONTAINING SWEETENER COMPOSITION**

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(21) Appl. No.: **15/561,539**

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CPC *A23L 27/33* (2016.08); *A23V 2002/00* (2013.01); *C12Y 501/03* (2013.01); *C12Y 503/01005* (2013.01)

(57) **ABSTRACT**

The purpose of the present invention is to provide a technology whereby, in a method for manufacturing a sweetener composition containing glucose, fructose and allulose, said method comprising treating glucose with glucose isomerase

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