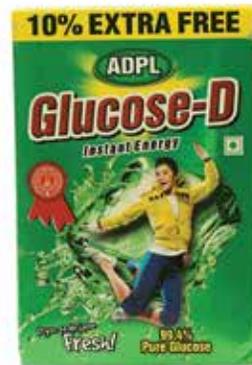
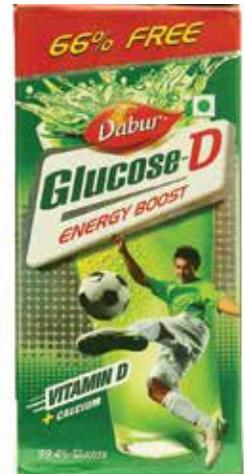
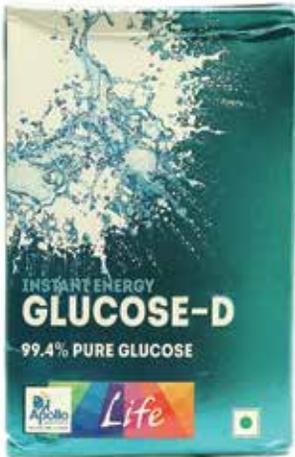


Comparative Test



Glucose Powder

How equal is it to the energy expected?

This white crystalline powder is readily absorbed in the bloodstream and hence it is a good source of energy. It helps to replenish the energy stores, especially during and just after workout. There are several brands of glucose powder in the market and one may note that most of these are proprietary food – this means there no specifications for these in the food regulations. So, what does one look for? It's important to know that a major ingredient in glucose powder is dextrose monohydrate, and in our tests this parameter has been given the highest weightage. We tested eight brands of glucose powder including Patanjali's Glucoshakti, which claims to be herbal. Interestingly, all of these brands, save Patanjali, claim to have 99.4 per cent of glucose. Read on to find out if the test results bore out their claims.

Patanjali claims to be Ayurvedic proprietary medicine, while the other seven brands are proprietary foods. Proprietary food is food that has not been standardised under any regulations and it has no definite formulation. At the same time, there are safety and nutritional requirements that they need to fulfil.

The key parameters for which the product samples were tested included dextrose monohydrate, energy value, vitamin D, calcium and phosphorus. Important health-related parameters were microbiological safety and contamination by heavy metals.

It may be noted that the test results for calcium and phosphorus showed variation from the declared

value of some brands. As consumers, we may want to keep these aspects in mind while choosing a particular brand.

The tests were conducted at an NABL-accredited laboratory and as per product claims and requirements specified for proprietary food in Food Safety and Standards (FSS) Regulations, 2011, and related standard IS: 874:1992, as reaffirmed in 2013 for dextrose monohydrate. Note that there are no specific standards for glucose powder.



The words 'glucose' and 'dextrose' are used interchangeably. The full name is dextrose monohydrate and it is a simple sugar (monosaccharide) generated from starch, most commonly of corn (maize).

Foods naturally high in glucose include honey, agave, molasses, dried fruit, fresh fruits and fruit juices. Foods that typically have a lot of added glucose include sauces, salad dressings, energy bars, cereals, cakes and pies, and sugary drinks. Foods with a lot of added sugar and glucose should be avoided.

If Your Food Is 'Proprietary'

It means that the food has not been standardised as per any regulation and has no definite formulation. The only requirement for these types of supplements is that they mention the ingredients used and the nutritional parameters on their packaging.

Rank	Total Score out of 100 (rounded off)	Brand	Variant	Declaration	Net weight (gm)
Proprietary Food					
1	94	Glucon-D	Regular	Proprietary food	200
2	93	Stenza	Glucose	Proprietary food	250 (200 + 50 gm free)
3	92	Dabur	Glucose D	Proprietary food	125
4	87	Apollo	Glucose D	Proprietary food	500
5	85	Nice	Glucose D	Proprietary food	100 (75 + 25 gm free)
6	84	Multani	Regular	Proprietary food	500
7	70	ADPL		Proprietary food	110 (100 + 10 gm free)
Ayurvedic Proprietary Medicine					
	84	Patanjali	Herbal Glucoshakti	Ayurvedic proprietary medicine	250 (200 + 50 gm free)

Score Rating: >90: very good*****, 71–90: good****, 51–70: fair***, 31–50: poor**, up to 30: very poor*



**CV RECOMMENDATION |
TOP PERFORMER | VALUE
FOR MONEY**

Glucon-D



Key Findings

- Based on the overall test findings, the top performer is Glucon-D. It is also the value-for-money brand.
- Highest energy value was found in Dabur.
- In the sensory panel tests, Multani scored highest and was followed by Glucon-D.
- Dextrose content in ADPL fell short of their claim – it was found to be 98.8 gm/100 gm, as against their declared value (99.4). Dextrose in Glucoshakti was 98.40% but added herbal ingredients aloe vera 0.20 gm, ashwagandha 0.05 gm and satawari 0.05 gm and claims to be ayurvedic proprietary medicine.
- Except Glucon-D and Patanjali, all other brands were found to have less vitamin D than their declared values. Vitamin D was quite low (below the detection limit of 2.0 µg/100 gm) in ADPL and Nice.
- Calcium content in ADPL and Multani was found to be 121.7 mg/kg and 158.33 mg/kg, against their declared value of 170 mg/kg.
- Phosphorus content in ADPL was a mere 10 mg/100 gm). Its declared value was 100 mg/100 gm.

TESTED

MRP (Rs)	MRP per 100 gm	Best before (months)	Manufactured/Marketed by
Proprietary Food			
36	18.0	24	Heinz India Pvt. Ltd
48	24.0	24	MHS Pharmaceuticals Pvt. Ltd
23	18.4	24	Dabur India Ltd
85	17.0	24	Apollo Pharmacy
26	26.0	24	Nice Pharmaceuticals
85 (Rs.10 off)	17.0	24	Multani Pharmaceuticals Ltd
28	28.0	24	Agarwal Drugs Pvt. Ltd
Ayurvedic Proprietary Medicine			
35	17.5	12	Patanjali Ayurved Ltd

TEST RESULTS FOR PHYSICOCHEMICAL PARAMETERS

Dextrose Equivalent | Energy Value | Vitamin D | Calcium | Phosphorus

◆ Dextrose Equivalent

Dextrose monohydrate is the main ingredient in glucose powder. All tested brands claim to have 99.4 per cent of glucose. Since glucose is a good source of energy, higher is better.

- Glucose was highest in Apollo (99.97 per cent).
- Dextrose was lowest in Patanjali (98.4 per cent) and ADPL (98.8 per cent). Patanjali has not declared dextrose value on their label. Patanjali claims to be an Ayurvedic medicine and contains aloe vera (0.20 gm), ashwagandha (0.05 gm) and satawari (0.05 gm).
- Dextrose content in ADPL was less than its declared value (99.4 per cent).

◆ Energy Value

Glucose powder is a ready source of energy. In our tests, we compared the total energy value (per 100

gm of sample calculated in Kcal) with the declared value. Higher energy value is considered to be good for consumers.

- Highest energy value was found in Dabur (369.56 kcal/100 gm), followed by Glucon-D (366.08 kcal/100 gm).
- Energy value in all the brands was above the declared value.

◆ Vitamin D

Vitamin D helps the body to use calcium from one's diet and is therefore essential for strong bones. No recommended daily allowance (RDA) was fixed for vitamin D in Dietary Guidelines for Indians, 2011, of National Institute of Nutrition.

- Vitamin D was found highest in Stenza (12.4 mcg/100 gm), though it was less than its claimed value (22.5 mcg/100 gm). The second highest amount of vitamin D was in Glucon-D (10.77 mcg/100 gm).
- Except Glucon-D and Patanjali, all other brands were found having less quantity of vitamin D compared to their declared value.
- Vitamin D was quite low (below detection limit of 2.0 µg/100 gm) in ADPL and Nice.

Comparative Test

◆ Calcium

Calcium is a mineral important for strong bones and teeth. As per Dietary Guidelines for Indians, 2011, issued by National Institute of Nutrition, the requirement of calcium for a young man/woman is 600 mg per day. So, a higher amount of calcium in glucose powder is better.

- Highest amount of calcium was found in Stenza (216.84 mg/kg), followed by Glucon-D (202.17 mg/kg).
- Calcium content in ADPL and Multani was 121.7 mg/kg and 158.33 mg/kg – as against their declared value of 170 mg/kg.

◆ Phosphorus

Phosphorus is considered to be an essential nutrient required for proper cell functioning, regulation of calcium, and strong bones and teeth. Deficiency in phosphorus can lead to lowered appetite, anaemia, muscle pain, improper bone formation (rickets), numbness and a weakened immune system.

- Phosphorus was found highest in Stenza (190 mg/100 gm).
- Phosphorus content in ADPL was less (10 mg/100 gm) than its declared value (100 mg/100 gm).

PHYSICOCHEMICAL SCORES

Parameter ↓	Weightage (%)	Proprietary Food							Ayurvedic Proprietary Medicine
		Glucon-D	Stenza	Dabur	Apollo	Nice	Multani	ADPL	Patanjali
Dextrose equivalent	30	28.02	27.90	28.32	30.00	28.44	28.26	24.00	21.60
Energy value	15	13.24	12.88	14.8	11.78	11.29	11.99	11.22	12.41
Vitamin D	8	7.87	8.00	5.60	3.98	2.40	2.99	2.40	7.18
Calcium	8	8.00	8.00	7.22	5.55	6.98	4.67	1.74	7.30
Phosphorus	8	7.52	7.84	7.36	7.52	7.68	6.88	1.60	6.40



Heavy Metals

These should not be present in higher than the limits specified in the national standards. We tested the eight brands for presence of arsenic and lead. For arsenic, the specified limit for glucose powder ('foods not specified' category) is 1.1 ppm (parts per million). Lead in glucose powder ('foods not specified' category) shall not be more than 2.5 ppm.

Both arsenic and lead were not detected in any of the tested brands, the detection limit being 0.1 mg/kg).

Microbiological Activity

We tested the brands for total plate count. The colony count per gram of the product should be on lower side (no limits have been specified in FSS Regulations). Due to improper or poor hygienic conditions during the manufacturing process, microorganisms may occur in the finished product. These are responsible for many food-borne diseases.

Total plate count in all the brands was found to be less than 10 cfu/gm, which means they are safe for consumption.

FOR SENSORY ATTRIBUTES

Panel members judged the samples for these sensory attributes: free-flowing tendency, taste and odour, and absence of colouring and foreign matter. The product shall be white or light cream in colour. It shall be crystalline or granular and odourless powder, readily soluble in water with a characteristic sweet taste that is free from foreign flavour. The panellists rated the samples on a 100-point scale.

- *Multani was rated as the most acceptable brand, followed by Glucon-D.*

Brand	Score out of 10
Multani	8.46
Glucon-D	8.21
Dabur	8.05
Patanjali	8.04
ADPL	7.60
Stenza	7.58
Apollo	7.46
Nice	6.87

FOR GENERAL QUALITIES

◆ Marking/Labelling

The following details shall be clearly and indelibly marked on the label of each container/packet as per Food Safety and Standards (Packaging and Labelling) Regulations and Legal Metrology (Packaged Commodities) Rules:

- Name of product
- Trade name, if any
- Name and address of manufacturer



Comparative Test

- (d) Batch or code number
- (e) Net quantity in grams
- (f) Month and year of manufacture
- (g) The words 'best before' (month and year to be indicated)
- (h) Nutritional information
- (i) FSSAI license number
- (j) Logo indicating 'vegetarian' or 'non-vegetarian' status
- (k) Storage information
- (l) Maximum Retail Price (MRP)
- (m) Customer-care details
- *All the brands had the required information on their labels. Patanjali, which claims to be an Ayurvedic medicine, does not feature the vegetarian dot.*
- *In some brands, the letters on the label were so small that they could be read only with a magnifying glass.*

◆ Packing

Packing plays an important role in maintaining consistent quality of the product, preventing its deterioration, and increasing the shelf life. Packing should be proper and moisture-proof.

Glucose powder shall be processed and packed under good hygienic conditions. It shall be securely packed in clean high-density polyethylene (HDPE), polyethylene, or suitable cardboard. The containers shall be clean and dry.

- *One brand, Multani, was packed in plastic container. All other brands were in cardboard cartons.*

Net Weight

In the tests, net weight of all the brands was found to be above their declaration.



Dear readers: We are open to hearing your suggestions on products and services that you believe should be reviewed/tested by Team Consumer Voice. You may write to editorial@consumer-voice.org