

HELPING PATIENTS IDENTIFY SUITABLE PRODUCTS FOR LACTOSE INTOLERANCE



Michèle J Sadler
BSc, PhD, RNutr
Director, Rank
Nutrition Ltd

Lactose is the main type of carbohydrate in milk and is therefore present in other dairy foods such as yoghurt. It is also used in food processing and is often present in instant food mixes, processed meats and baked products such as cakes and biscuits. It may also be used as a carrier in medicines.

LACTOSE DIGESTION

Lactose is a disaccharide, composed of one molecule of glucose and one of galactose. As lactose cannot be absorbed as a disaccharide it is digested by the enzyme lactase from the jejunum into its constituent sugars which are rapidly and completely absorbed within the small intestine.

Babies are born with the ability to digest lactose, unless they suffer from 'congenital lactase deficiency', a condition in which lactase is not produced. However, after weaning, the ability to digest lactose declines, an inherited trait affecting the majority of the world's population. In some milk-drinking populations, lactase production does persist into adulthood allowing larger quantities of lactose to be digested and well-tolerated, although most adults cannot digest lactose completely.

Hence some people suffer from low levels of intestinal lactase production, a condition referred to as primary hypolactasia, lactose malabsorption, or lactose maldigestion. This results in undigested lactose entering the large intestine where it provides a substrate for the colonic microflora. Bacterial fermentation results in the production of short-chain fatty acids and gases such as

CO₂ and H₂. This can lead to intestinal discomfort after eating foods containing lactose in some people with lactose maldigestion.

Symptoms of lactose intolerance, which may develop one to three hours after lactose intolerant or lactase deficient individuals ingest lactose in food, include bloating, diarrhoea, flatulence, cramps and abdominal pain. The extent of discomfort is closely related to the amount of lactose consumed, but there is wide variation among individuals.

Lactose maldigestion is most prevalent in Indian, Asian, Hispanic and African populations. However in Europe about five to 22 percent of the population have primary lactose maldigestion and can only tolerate small amounts of lactose.

DIAGNOSIS

It is important that people with the symptoms of lactose intolerance should get a diagnosis and professional dietary advice before trying to manage the condition themselves by removing foods from their diet. In clinical practice, the standard test to diagnose lactose maldigestion is an abnormal breath hydrogen excretion test. The method relies on measurement of the concentration of hy- ▶

Michèle is Director of Rank Nutrition Ltd, which provides nutrition consultancy services to the food industry. Michèle has a BSc in Nutrition (University of London), a PhD in Biochemistry and Nutritional Toxicology (University of Surrey), and is a Registered Nutritionist.

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drogen released into the breath after ingestion of a certain amount of lactose (usually 18 grams or higher). Avoiding foods and drinks that contain lactose for two weeks and seeing if the symptoms improve is another approach.

DIETARY MANAGEMENT

The key dietary measure to manage lactose intolerance is to consume a diet with reduced lactose content and for individuals to match their lactose intake to their own personal tolerance level. Individuals who show an abnormal breath hydrogen excretion test can generally tolerate up to 12g of lactose (about 250ml of cows' milk), although some individuals develop symptoms after ingesting smaller amounts.

While lactose consumption can be reduced by checking food labels and the ingredients list of pharmaceuticals to identify products with added lactose, dairy foods are a key source of lactose in the diet. However, milk and milk products are also a key contributor to calcium intakes. The latest data from the UK National Diet and Nutrition Survey (Table 1) shows that milk and milk products provide about 40 percent of ingested calcium in UK diets (1). Also, the calcium present in milk and dairy products is well absorbed, as milk contains lactose and protein which promote calcium absorption and milk does not contain any substances that inhibit its absorption.

The NDNS data also shows that milk and milk products are the biggest contributor of iodine intakes in the UK, providing about 50 percent of iodine intake in children, 40 percent in adults and about 35 percent in adults. Regarding vitamins, milk and milk products are also the most important source of B2 and B12 (1).

Hence, permanently cutting out dairy foods to manage lactose intolerance is not advisable and, in many cases, individuals should be encouraged to determine the amount that they can tolerate in order to maintain consumption of this

important food group as part of their daily diet.

Another possibility to help manage the condition while enabling the intake of a dairy-source of calcium is to consume live yoghurt. Studies in humans have shown that consumption of live yoghurt starter cultures enhances lactose digestion in individuals with lactose intolerance (2, 3).

A further possibility to manage the condition is to take a lactase enzyme supplement. These are beta-glucosidases derived from bacteria or yeast, with different lactose splitting activities and optional conditions for use. Milk can be incubated with lactase before consumption which further increases tolerance to lactose.

RELEVANT EU HEALTH CLAIMS

Following the recent assessment of health claims for use in the EU, there are two authorised health claims that are potentially useful for consumers and patients with lactose intolerance. The first relates to lactase enzyme. The authorised claim wording is as follows: 'Lactase enzyme improves lactose digestion in individuals who have difficulty digesting lactose.' To bear the claim, supplements containing lactase must provide 4,500 FCC (Food Chemicals Codex) units and consumers must be advised that lactase should be consumed with each lactose-containing meal. The target population should also be advised that tolerance to lactose is variable and they should seek advice as to the role of lactase in their diet (4, 5).

A second claim relates to improved lactose digestion in lactose maldigesters, after consumption of yoghurt. The authorised claim wording is: 'Live cultures in yoghurt or fermented milk improve lactose digestion of the product in individuals who have difficulty digesting lactose.' Yoghurt or fermented milk can bear the claim, provided it contains at least 108 Colony Forming Units (CFU) of live starter microorganisms per ▶

Table 1: Importance of milk and milk products to intake of key micronutrients in the UK diet

| Population group | Daily calcium intake contributed by milk and milk products (%) | Daily iodine intake contributed by milk and milk products (%) | Daily vitamin B2 intake contributed by milk and milk products (%) | Daily vitamin B12 intake contributed by milk and milk products (%) |
|------------------|--|---|---|--|
| 4-10 years | 45 | 51 | 41 | 49 |
| 11-18 years | 35 | 40 | 29 | 36 |
| 19-64 years | 36 | 33 | 28 | 33 |
| 65+ years | 42 | 37 | 34 | 35 |

NDNS, 2014 (1)

gram, i.e. *Lactobacillus delbrueckii* subsp. *bulgaricus* and *Streptococcus thermophilus* (5, 6).

A further claim has been given a positive opinion by EFSA, but is awaiting authorisation (7). The claim relates to the consumption of foods with reduced amounts of lactose which may help to decrease gastrointestinal discomfort caused by lactose intake in lactose-intolerant individuals. However, because of the wide variation in individual tolerances to lactose in lactose intolerant people, EFSA could not set conditions of use for this claim. Hence the claim is currently on hold and will eventually be regulated under the Food Information for Consumers Regulation (8).

CONCLUSIONS

Lactose intolerance arises from incomplete digestion of lactose in the small intestine. There is a wide variation among individuals in the amount of lactose that can be tolerated. The key ways to manage lactose intolerance are to reduce intake of lactose and to use an external lactase enzyme. Evidence also suggests that yoghurt with live yoghurt cultures may be better tolerated by lactose maldigesters. Authorised European health claims for lactase enzyme and for live yoghurt cultures should assist consumers with lactose maldigestion to identify products that can be used to help manage their diets.

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