Conseil des industriels laitiers du Québec inc.
Quebec Dairy Council Inc.

F A C T   S H E E T   # 4

Lactose: a natural milk sugar

As a constituent of milk, lactose is an integral part of a winning nutritional "team." But there is more: lactose has benefits in its own right, starting with many nutritional benefits. Among other things, the chemical and physical properties of lactose mean that it has a number of applications in the food and pharmaceutical industries.

Characteristics of lactose

Lactose is a natural sugar that is found only in the milk of mammals, hence the common name, "milk sugar," that has been given to it. Lactose is a whitish solid that is found in solution in milk. Cow's milk contains 4.7% lactose, whereas human milk contains 6.9%. Lactose is therefore an important constituent of milk.

Composition of Cow's Milk and Human Milk
(Lebeuf Y. et al., 2002) [1]

Nutrient	Milk Types	
	Cow's (/100g)	Human (100g)
Proteins (g)	3,3	1.0
Caseins	2.7 (82%)	0.6 (60%)
Whey	0.6 (18%)	0.4 (40%)
Fats (g)	3.3	4.4
Lactose (g)	**4.7**	**6,9**
Minerals (mg)	0,7	0,2
Calcium (mg)	119	32
Phosphorus (mg)	93	14
Magnesium (mg)	13	3
Potassium (mg)	152	51
Vitamins	*several*	*several*
Riboflavin (mg)	0,16	0,04

Lactose is the dominant sugar in milk and has the same caloric value as table sugar. One of the characteristics that sets lactose apart from table sugar is sweetness, in that the sweetening power of lactose is five times lower than that of table sugar. Sweetening power is the ability of a sugar to produce a sweet taste, which is associated with pleasure. It is the sweetness of certain foods, such as soft drinks and desserts that makes them so attractive, in some cases to the point of causing excess calorie consumption.

Recognized nutritional value

Because it is a sugar, lactose can play a key energy role. Indeed, lactose accounts for 30% of the caloric value of cow's milk. The ingestion of a certain amount of sugars (carbohydrates) is essential to our health, and it is better if this need is met through natural sources of sugar such as fruits, vegetables, grains and dairy products.

A natural ingredient, lactose is easy to digest for the majority of consumers. It is the least likely of all the sugars to cause dental caries. Studies have shown that lactose helps in the absorption of the minerals in milk, particularly calcium and especially in the young. Lactose can also act as a "prebiotic" because it promotes the growth of beneficial lactic acid bacteria in the intestine.

Lactose is added to cow's milk to standardize the composition of milk-based infant formulas. The digestion of lactose is a slow process and provides newborns with energy for long periods.

Lastly, lactose has a relatively low glycemic index, meaning that it has only a small effect on sugar levels in the blood (glycemia). The consumption of low-glycemic-index foods, such as dairy products, can form part of an effective strategy for fighting type 2 diabetes and obesity and preventing cardiovascular disease.

[1] *Milk contains important amounts of some 55 nutrients essential to life. Particular source of proteins, calcium, phosphorus, vitamins, trace elements, milk is a food with strong nutritional density. According to the Canadian food guide, its consumption is highly recommended and this, at all ages.*

A major ally for the food industry

Lactose offers many functional advantages for food processing. Readily available and inexpensive to produce, lactose is soluble and stable, has a low sweetening power, and enhances the colour, flavour and texture of foods.

The use of lactose makes it possible to reduce the intensity of the sweetness of products. Lactose also improves product texture, intensifies and prolongs the perception of flavours, and stabilizes food colours. It acts as an anticaking agent as well, preventing lumps from forming in dry blends (such as soups and sauces). In addition, lactose fermentation extends the shelf life of perishable products such as milk and meats.

Lactose also has applications in the confectionary and baking industries as well as in the processing of various dairy products, including yogurt and chocolate drinks. Lactose plays an instrumental role in cheese making, in part because it promotes curdling. As well, lactose is used in the production of dried vegetables, soups, sauces, seasoning blends, animal foods, and many other food products.

Many applications in the health industry

Lactose is also put to use in pharmacology. For example, certain lactose derivatives are used to produce a laxative effect or prevent enteric infections. Lactose is also used as a sweetener in the preparation of low-calorie products.

The pharmaceutical industry makes use of lactose in many ways, including in the manufacture of tablets and capsules. Because lactose does not cake, it ensures that the active ingredients in pills are homogeneously distributed. Lactose is also used in pill coatingss.

CONCLUSION :
The applications for lactose and lactose derivatives are therefore many and varied, and the range of possibilities will only increase with ongoing technological development. Lactose is thus earning a solid reputation, not only because lactose is a constituent of one of the most nutritionally complete natural foods but also and especially because it provides enormous potential for development.

What about lactose allergies or intolerance ?

Allergies to lactose are rare. Most often, an intolerance is confused with an allergy.

Lactose-intolerant people do not produce enough (or any) lactase, a digestive enzyme that is essential for the proper assimilation of lactose in the small intestine. Lactose therefore moves directly into the intestine without having been assimilated and can cause various gastrointestinal disorders. Lactose intolerance does not pose a serious health threat or cause damage to the intestine, however.

Consumers with lactose intolerance can opt for lactose-free products. As well, the food industry produces milk from which the lactose has been removed or to which lactase has been added, thus enabling lactose-intolerant individuals to continue to safely consume dairy products, with no risk of intestinal problems.