

# Experience the excitement around whey: Lactose in the manufacturing of flour confectionery

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**F**or many years, whey has been a source of ingredients for the food industry. Whereas initially the production of food ingredients from whey has been seen as a recovery of valuable components out of the secondary product obtained with cheese production, nowadays whey-based ingredients are highly valued for their functionality and contribution to healthy nutrition. The European Whey Products Association EWPA, the American Dairy Products Institute ADPI and NIZO Food Research are organizing on 7-9 September in Rotterdam the 7th International Whey Conference (IWC-2014), with the motto "Experience the Excitement around Whey". The conference will be an outstanding opportunity for whey processing and application industries to meet scientists, academics and researchers to exchange knowledge and new ideas in a stimulating environment (see [www.iwc2014.com](http://www.iwc2014.com))

In this article we give an overview of the state of the art of lactose applications with the manufacturing of flour Confectionery. We will place this item in the context of the use of whey-based ingredients in food

products that will be discussed extensively at IWC-2014.

## Lactose in the Manufacturing of Flour Confectionery

The practical experience of the use of whey powder is limited to small amounts when considered as an ingredient for flour confectionery, for instance in a scale of approximately up to one or two percent. If whey is present as a major ingredient, then undesired alterations, mainly of

the dough and baking behaviour or the taste of the baked goods, arise both from the nature of the protein and the mineral content of whey. Hence Lactose, when present as a component of whey, cannot exhibit its advantageous potential as baking ingredient. When Lactose is separated from whey, as sole ingredient and used in higher amounts, it demonstrates a totally different influence in the flour confectionery sector.





Furthermore, lactose takes an outstanding position compared to the common sucrose and sugar replacers, emerging from its exceptional functionality in preparing yeasted doughs and cake batters. The functionality is based on important differences of various physico-chemical

and sensory factors: solubility, fermentability and relative sweetness.

From the legal perspective, lactose can be used as bulk ingredient without restriction, except for products intended for persons suffering from lactose

intolerance or diabetes.

The correct application of lactose in yeasted, sweet doughs leads to improved rheological, fermenting and baking results; and to better pastry quality. Whilst the improved rheological properties, raising action and stability of the dough result from the effected gluten-protein in the wheat-flour, there is evidence that improved crumb properties are a consequence of the increased water absorption of the dough, increased pastry volume and reduced starch degradation.

A substantial advantage of lactose in yeasted doughs is the distinct ability to level up inferior wheat-flour quality in a manner that is not attained by any other common ingredient without using additives.

The increased water absorption, followed by an increased cake/pastry yield supports efforts in cutting ingredient cost.

In madeira cake batters and sponge cake batters, lactose exhibits the capability to replace sucrose to a great extent without causing major baking problems. Increased water activity of the cake must be considered (but neglected in the case of refrigerated or frozen cakes). Lactose reduces the extreme sweetness of industrially manufactured cake varieties, maintaining a good overall sensory properties.

With a well balanced combination of lactose and sucrose, it is possible to ensure the maintenance of the normal

**Table 1: Major advantages of lactose over sucrose**

**Performance in sweet yeasted doughs/pastries**

1. increased dough and pastry yield
2. less fermentation time; improved fermentation performance
3. levelling up inferior flour quality
4. increased pastry volume, improved pastry appearance
5. improved crumb softness/freshness
6. improved freshness (keeping quality)
7. fat reduction feasible
8. above mentioned advantages to be benefitted from without need of supporting additives

**Performance in cake batters:**

1. reduced sweetness in very sweet cakes possible
2. fat reduction possible (normally resulting in increased water activity)
3. increased batter yield feasible

sweetness of the cake/pastry while providing a physiologically attractive reduction of the fat content by approximately 50%. This applies both for yeasted pastries and cakes made from batters.

Lactose in non-yeasted doughs regarding biscuits/cookies/shortcrust can only successfully applied in very small quantities in order to improve colour and aroma. Higher quantities lead to dough stiffening/shrinking and biscuit hardening.

### Conclusions

The use of lactose within the manufacturing of flour Confectionery is one of the examples of a longstanding fully developed application of whey-based ingredients in the food industry. Over the years many new products based on the partial or full fractionation of whey have been developed, all with very interesting functional and nutritional properties. With many food products these whey-based ingredients create new added value. At IWC-2014 both the new science behind the whey-based ingredients and the application of these ingredients will be discussed: on 7-9 September Rotterdam will be the place to learn how food companies can create indeed more added value by applying whey-based ingredients. ■

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## IWC-2014

The 7th International Whey Conference to be held in Rotterdam on 7-9 September 2014 has a focus on the newest developments in industry and science with respect to whey.

The conference will be opened with presentations on the developments in the global supply of whey and the markets for various whey-based products. In key-note presentations, aspects such as emerging technologies in whey processing, new applications in food products, regulatory affairs and sustainability will be considered.

Whey proteins and their functionality, processing of whey, lactose and whey oligosaccharides and nutritional and health aspects of whey will be central themes with the scientific considerations.

In the area of whey proteins, whey fortification and high whey protein foods will be especially covered. In the area of processing, the use of membranes to obtain whey-derived products and whey fractions, as well as (cost) efficiency during drying are highlighted.

In the area of lactose and whey derived oligosaccharides, the focus is on FOS and GOS and new oligosaccharides. Micro-particulated whey, the modification of whey products structures and the relation of these structures to perception are at the centre of attention.

In the field of health the dietary need of adults, the needs of ageing people in relation the quality of whey will be discussed. Moreover, the immune response to minor whey proteins as well as oral tolerance and prevention of allergy will be highlighted.

The IWC-2014 Market Place will be the central point at the conference with an exhibition of processing equipment and products, poster presentations and demonstration stations. Here, business and science from all over the world will meet for two days.

**For more information and to register see [www.iwc2014.com](http://www.iwc2014.com)**