



# Lactose Assay Kit (K-LOLAC)

Our new unique Lactose assay kit (K-LOLAC) for testing low-lactose and lactose-free foods and beverages now joins our existing bestselling Lactose/Galactose kit (K-LACGAR).

Final action status AOAC 2020.08

- World's first sequential (single cuvette) enzymatic assay for lactose.
- Highly selective enzyme allows accurate measurement in low-lactose and lactose-free products.
- Produces a lower and more accurate result than any other enzymatic assay.



## Benefits of K-LOLAC over Common Enzymatic Assays

- OFFICIAL METHOD** K-LOLAC is the first enzymatic method validated by a multi-laboratory evaluation and as of May 2021 is the only method granted Final Action Status: AOAC 2020.08.
- SENSITIVE** Can quantify lactose at **lower limits** than all other available enzymatic assays - essential for low-lactose and lactose-free products.
- EFFICIENT** First **sequential** enzymatic assay for lactose, i.e. reduced analyst hands-on time and increased cost-effectiveness.
- SELECTIVE** Uses an exclusive enzyme which hydrolyses lactose **more selectively** than competing methods leading to reduced overestimation.
- ACCURATE** Method includes 15 min pre-incubation step to remove high background glucose levels, allowing **rapid accurate measurement** in low-lactose and lactose-free products.

## Examples of Applications for K-LOLAC

- Standard and low-lactose/lactose-free dairy products
- Foods containing milk (e.g. dietetic foods, bakery products, chocolates and confectioneries) particularly for markets with prevalent lactose intolerance
- Food additives
- Cosmetics, pharmaceuticals and other materials (including biological cultures)
- Animal feed

**Recently tested** Infant formula (values obtained for 'SMA-LF' and 'Aptamil Lactose Free' are in close agreement with those measured using HPAEC-PAD).

Kit	Megazyme		Competitor
	K-LOLAC	K-LACGAR	Lactose / D-Glucose Kit
Format	Sequential <sup>a</sup>	Non-sequential <sup>b</sup>	Non-sequential
Number of lactose assays (samples)	65	57	32
Suitable for low-lactose and lactose-free	✓	X	110 (75+20+15)
Suitable for "regular" dairy free samples	✓	✓	
Assay time for "lactose-free" in minutes	90	Not Recommended <sup>c</sup>	35 (20+15)
Assay time for "regular" dairy samples in minutes	50	15	X
Supplied with reagents for pre-treatment	✓	X	6 months
Minimum reagent stability	2 years	2 years	X

**a:** requires a single cuvette: both determinations take place in a single cuvette

**b:** requires two cuvettes: one for free glucose/galactose, one for glucose/galactose released from lactose

**c:** Lactose over-estimation is likely to happen due to the presence of GOS and the low selectivity of the β-galactosidase used in the assay.



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A new solution for the dairy industry: the K-LOLAC advantage: Rapid, Selective, Sensitive and Accurate Measurement in Low-Lactose & Lactose Free Products.

Final action status AOAC 2020.08

## Lactose Detection: Challenges for Lactose-Free Products

Low-lactose and lactose-free products are manufactured through the  $\beta$ -galactosidase mediated hydrolysis of the naturally present lactose. Glucose and galactose are the major products formed but transglycosylation reactions also lead to the formation of a range of di- and tri- saccharides.

**Methodologies designed for standard dairy are not readily applicable to lactose-free products.**

Detection methods typically employed for **HPLC** (ELSD and RI) lack the required sensitivity, **ion chromatography** (HPAEC-PAD) is expensive to run and requires technical expertise, and standard **enzymatic methods** lack specificity for lactose in real samples.

**K-LOLAC represents an advance on existing enzymatic assays for lactose-free products by addressing three key challenges in the measurement of residual lactose.**

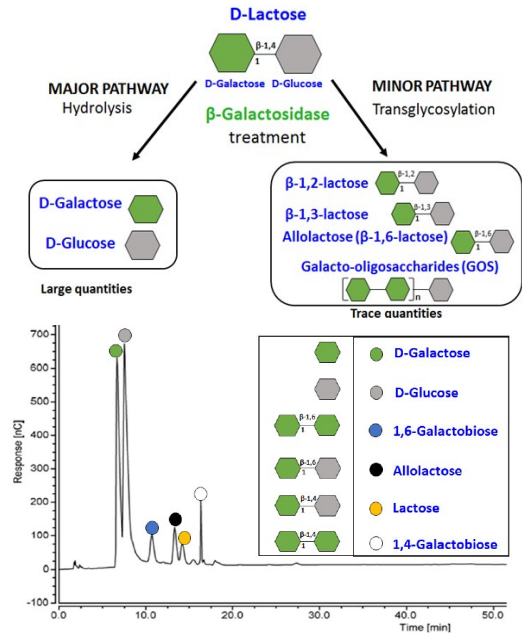


Figure: HPAEC-PAD chromatogram for the analysis of a commercially-available 'lactose-free' milk

## Problems Solved by Megazyme's K-LOLAC

### 1. Background Glucose

Our kit uses highly optimised glucose oxidase and catalase pre-treatment to remove free glucose prior to analysis, offering **improved accuracy** by reducing errors.

### 2. Galactosidase Selectivity

K-LOLAC is unique in using **highly selective** MZ104  $\beta$ -galactosidase. Other commercially-available assays quantitatively hydrolyse various transglycosylation products present, resulting in an overestimation of the lactose content.

**K-LOLAC produces a lower and more accurate result** by significantly reducing the over-reporting that occurs in competing products.



### 3. Detection Assay

The K-LOLAC format allows for sequential measurement of lactose while having the **lowest detection limit** on the market - detecting lactose at 1.62 mg/L versus 8 mg/L for competitors.

## Which Lactose Assay Kit Should I Choose?

	K-LOLAC	K-LACGAR
Sequential Assay Format	✓	X
Uses selective $\beta$ -galactosidase	✓	X
Suitable for Standard Dairy Products	✓	✓
Suitable for Low-Lactose and Lactose-Free	✓	X