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ANALYTICAL CHALLENGE

Solution to the mutarotation challenge

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The winner of the mutarotation challenge (published in volume 414 issue 9) is:

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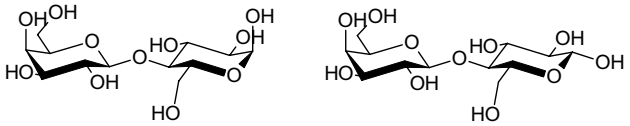
Our Congratulations!

Lactose
Milk sugar
Lactobiose



α- and β-D-Galactopyranosyl-(1→4)-D-glucose

Lactose is a disaccharide composed of galactose and glucose subunits. Lactose makes up around 2% of milk (by weight) from reindeers up to 8% of milk from donkey. The name comes from *lac*, the Latin word for milk, plus the suffix *-ose* used for sugars. Milk sugar was first mentioned by the Italian physician Fabrizio Bartoletti (also Bartoletto, Bartholet, Bartoleto, Bertoletti, Bartholdi, Bartholetus…) in 1615 [1]. In 1700, the Venetian pharmacist Lodovico Testi published a booklet of testimonials to the power of milk sugar and named it saccharum lactis [2]. In 1780, lactose was identified as a sugar by Carl Wilhelm Scheele [3]. The French chemist Jean Baptiste André Dumas named the substance as lactose in 1843 [4]. In 1856, Louis Pasteur caused confusion when he named the galactose as "lactose" [5]. Marcellin Berthelot renamed it "galactose," and transferred the name "lactose" to the milk sugar in 1860 [6]. In 1894, Emil Fischer had established the configurations of the component sugars. In aqueous solution, lactose equilibrate the two anomeric α- and β- glucopyranose subunits by converting the stereocenter on the anomeric carbon. This process is named "mutarotation."

Declarations

Conflict of interest The author declares no competing interests.

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This article is the solution to the Analytical Challenge to be found at https://doi.org/10.1007/s00216-022-03935-6

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