

Multi-Enzymatic Responsive Hydrogel Lactose Biosensor

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According to the Government of Canada, the average Canadian consume upwards of 74 and 10 liters of fluid milk and cream on an annual basis, respectively (CDIC). While dairy products in Canada remain a hot commodity, countries in eastern Asia and around the equatorial region consume far less dairy products leading to an increased development of intolerances. Although lactose intolerance cases are increased in countries that consume less dairy products (instead consume soy, etc.), it remains a global problem that affects more than 70% of the population to some extent.

With rising awareness of the intolerance, many companies have inserted much effort into developing lactose-free products, e.g. soy and almond milk, lactose-free cheeses and lactose-free ice creams. Most companies generally use methods, such as high performance liquid chromatography with refractive index detector, to verify that their products are lactose-free. The major concern is that these are often expensive and extremely time consuming detection methods.

A desired alternative is the use of biosensors, a rapidly evolving area of research driven by the fact that biosensors are very small, portable, sensitive, selective, cheap and easy to use. My presentation will demonstrate our research on the development of a lactose biosensor with integrated optical and amperometric transduction capabilities. Our integrated lactose biosensor employs β -galactosidase and glucose oxidase enzymes immobilized on the high surface area cellulose nanocrystals.

References:

CDIC. www.dairyinfo.gc.ca