

## Transformations of carbohydrates into prebiotic oligosaccharides using free or immobilized glycosidic enzymes

Francisco J Plou

### Abstract

Carbohydrate-active enzymes have important applications both in the food and the pharmaceutical industries. In particular, the synthesis of prebiotic galactooligosaccharides (GOS), fructo oligosaccharides (FOS) and isomalto oligosaccharides (IMOS) is of growing interest in the functional food area. To mimic the multiple benefits of Human Milk Oligosaccharides (HMOs) over breast-fed infants, GOS and FOS are incorporated into baby foods to favour their microbiota composition in the infant's feces (prebiotic effect) and to reduce allergenic manifestations and infections during the first years of life.  $\beta$ -Galactosidases and  $\beta$ -fructofuranosidases catalyze transglycosylation reactions in which lactose or sucrose are transformed into GOS and FOS, respectively.

A mixture of products with different polymerization degree and type of linkages is usually obtained. IMOS can be synthesized from starch following a multi-enzyme process based on a first hydrolytic step employing  $\alpha$ -amylases and a transglucosylation process catalyzed by  $\alpha$ -glucosidases. We are currently optimizing the preparation of such carbohydrates. Immobilization of the above enzymes allows the separation of the biocatalyst after the reaction and its reuse, thus facilitating the product recovery