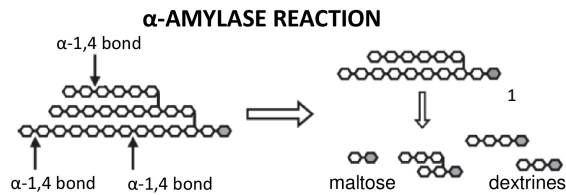


THE USE OF GLYCOSIDE HYDROLASES IN FOOD INDUSTRY

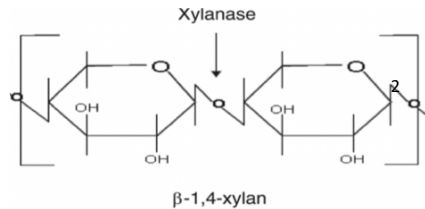
OBJECTIVES

- Know the main characteristics of glycoside hydrolases (its mechanism, structure and which enzymes do they englobe).
- Discover their applications in food industry, concretely in bread making.
- Learn how these enzymes are obtained.

GLYCOSIDE HYDROLASES IN BREAD MAKING



- Generation of simple sugars used for CO₂ production and Maillard reaction
- Effect on conservation (avoids retrogradation of starch)



- Increase of dough viscosity and volume
- Hydration of the gluten network
- Reduction of bread staling

- This enzymes are obtained from microorganisms, specially from bacteria of the genus *Bacillus* and fungi of the genus *Aspergillus*.

Gurung, Neelam, Sumanta Ray, Sutapa Bose i Vivek Rai. 2013. "A Broader View: Microbial Enzymes and Their Relevance in Industries, Medicine, and beyond." *BioMed Research International*

Butt, M.S., M. Tahir-Nadeem, Z. Ahmad i M.T. Sultan. 2008. "Xylanases and Their Application in Baking Industry." *Food Technology and Biotechnology* 46(1): 22–31.

GLYCOSIDE HYDROLASES

Group of enzymes that hydrolyse the glycosidic link. EC 3.2.1.X



They can act in two different mechanisms: inversion or retention. There are three classifications of this enzymes:

- According to the type of catalysed reaction and the type of substrate → IUBMB classification (by EC number)
- Based on the similarities of the amino acid sequences → CAZY classification (by families)
- Classification joining the two previous classifications → Polaina classification (by groups)

Four groups acting on: 1) Disaccharides, 2) Starch 3) Cellulose, 4) Other substrates

There are several possible three-dimensional structures.

Glycosidases are used, for example, in the production of beer, sugar syrups, bread or milk without lactose.

CONCLUSIONS

- Glycoside hydrolases are a very large group, with differences on its mechanism, sequence and structure.
- Their applications in the food industry are numerous. In bread industry, glycoside hydrolases play an important role in the structure and final texture of the bread.
- Microorganisms are the main source of glycoside hydrolases.

1. Modified from: Goesaert, Hans; Louise Slade, Harry Levine; and Jan A. Delcour. 2009. "Amylases and Bread Firming - an Integrated View." *Journal of Cereal Science* 50(3): 345–52
2. Butt, M.S., M. Tahir-Nadeem, Z. Ahmad, and M.T. Sultan. 2008. "Xylanases and Their Application in Baking Industry." *Food Technology and Biotechnology* 46(1): 22–31.
3. Modified from: Arroyo, Miguel, Carmen Acebal, and Isabel De la Mata. 2014. "Biotocatálisis Y Biotecnología." *Arbor* 190(768): a156.

ENZYME PRODUCTION

