

GLYCOSIDASE INHIBITORS - A FUNCTIONAL FOOD ADDITIVE

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Abstract

Glycosidase inhibitors attract scientific and practical interest being glycomodifiers during carbohydrate digestion. It is very important developing antidiabetic preparations that will suppress activities of enzymes involved in carbohydrate metabolism. The goal of this research is to determine regularities of amylase inhibitor production by actinomycetes during the starch bioconversion and to develop food additives with the separated inhibitor to be used in diabetic products.

Hydrolyzed corn starch was used as a raw material. The following devices were applied: shaking incubator Multitron; baromembrane unit Sartorius, cartridge filters with molecular weight cut-off of 100 and 15 kDa for inhibitor separation, extraction and purification. The inhibitor content was evaluated by UK-spectral analysis. The separated inhibitor action was tested on rats. A sugar level in blood under the forced carbohydrate feeding without the inhibitor and with it was determined. The producers screening helped to select actinomycetes *Streptomyces* capable to synthesize direct-pancreatic α -amylase inhibitors.

The producers *Streptomyces lucensis* and *Streptomyces violaceus* showed the highest activity among the selected strains in respect of this enzyme. These strains produce inhibitors with different effect on glycosidase depending on the chemical nature of the carbohydrate substrate. It was established that a glucoamylase inhibitor is synthesised in the simple sugar's medium (glucose or sucrose). During the complex carbohydrate fermentation (hydrolysed starch, dextrans) α -amylase is synthesised. Nutrient solution formulations for different amylase inhibitor efficient biosynthesis were developed (pancreatic, bacterial, human amylases). Method to separate a target product was created, a stable α -amylase inhibitor formulation with the pancreatic amylase's activity of (700000 ± 1000) IU/g was derived. The inhibitor oral intake by test animals after forced carbohydrate feeding lowers their blood glucose level by 40-60% without their behaviour and overall health modifications. Food additives with the separated glycosidase inhibitor were developed.

The experiment results can serve as a scientific foundation that will help to develop a carbohydrate-based food additives technology for dietetic foods and will permit to expand the preventive medicine range for "glyco-modulation".

Key words: *Glycosidase inhibitor, Diabetes, Functional products.*