TITLE: REUSING SUPERNATANT OF *Arthrospira platensis* CULTURE MEDIUM TO B-GALACTOSIDASE PRODUCTION FROM *Enteroccocus faecium*

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ABSTRACT:

Lactic acid bacteria such as *Enteroccocus faecium* can produce a variety of important enzymes. among them β-galactosidase, that catalyze hydrolysis of b-1,4-D-galactosidic linkages. At the industrial level, b-galactosidases are attractive enzymes due to their hydrolase and transferase activities. Indeed, these enzymes are used for the production of oligo- saccharides related to their transglycosylation activity allowing the transfer of galactose hydroxyl groups to the disaccharide lactose. As a result of their hydrolytic activity, b-galactosidases are mainly used in the food industry to reduce the lactose concentration in milk products, with the aim of overcoming lactose intolerance, a worldwide problem. Lactic acid bacteria generally need complex nutritional, increasing the economic value of culture medium. Renewable material such microalgae supernatant is the key issue for the development of large-scale cultures to minimize the cost water and nutrients consumption. *Arthrospira platensis* has been used for many decades as an important source of specific metabolites such as proteins, carbohydrates, pigments, vitamins and minerals. However, the large-scale production of these organisms generates a volume of extracellular fluid, with organic metabolite, that is discarded in the environment. Thus, the aim of this study was to produce β-galactosidase from *Enteroccocus faecium* using *A. platensis* supernatant. *Enteroccocus faecium* was grown in a rich MRS medium containing different supernatant concentrations of *A. platensis* (25, 50, 75 and 100%) at 37°C under static condition and β-galactosidase activity were observed in 24h intervals during 48h. The cells were harvested by centrifugation at 8000 rpm for 10 min at 4°C. The intracellular β-galactosidase was obtained by sonication and assayed at 30°C after 30 min of incubation of the enzyme samples with o-nitrophenyl-β-D-galactopyranoside (ONPG, Sigma) as chromogenic substrate. The result indicated that high levels of *A.platensis* supernatant added decrease β-galactosidase production. The highest β-galactosidase activity was of 34,44 U/ml with 25% of *A. platensis* supernatant and in the short fermentation time. It shows that *A. platensis* supernatant can be supplemented and less quantity commercial medium can be used to β-galactosidase production by *E. faecium*, demonstrating the potential for industrial applications.

Keywords: Photosynthetic microorganisms; Lactic acid bacteria; Hydrolysis; Enzyme.