

TITLE: *IN VITRO* ANTIOXIDANT ACTIVITY OF APPLE PULP FERMENTED BY *Saccharomyces boulardii*: FERMENTATION AND ENZYMATIC HYDROLYSIS

AUTHORS: FARINAZZO, F.S.¹; FERNANDES, M.T.C.¹; ISHII, C.S.¹; GARCIA, S.¹

INSTITUTION: 1. UNIVERSIDADE ESTADUAL DE LONDRINA, PR (RODOVIA CELSO GARCIA CID, PR 445, KM 380, CEP 86.057-970, LONDRINA - PR, BRAZIL).

ABSTRACT:

The Fuji apples pulp (*Malus domestica*) contains natural antioxidants such as quercetin, most of which are covalently linked to the cell wall. These compounds can be released from the structural degradation of plant cell wall by fermentation or enzymatic processes. The objective of the study was to evaluate the antioxidant properties of unfermented and fermented apple pulp by *Saccharomyces boulardii*, which underwent a simultaneous fermentation process with hydrolysis with the pectinase (Novozym[®] 33095) and cellulase (Celluclast[®] 1.5 L) enzymes. The apple pulp was hydrolyzed and fermented up 12 hours in submerged state. The samples of fermented and unfermented apple pulp were extracted with a solution of ethanol: water: formic acid (80: 20: 1, by volume). In both cases, the concentration of total phenolic compounds was quantified by Folin-Ciocalteu method, quercetin rhamnoside by HPLC. The antioxidant properties of the samples were determined by free radicals 2,2-diphenyl-1-picrylhydrazyl [DPPH][•] and 2,2'-azinobis- (3-tylbenzothiazoline-6-sulfonic acid) [ABTS]^{•+}. The pulp fermented by *S. boulardii* presented after 12 h of fermentation a cell concentration of 8.271 ± 0.031 log CFU/ mL and could be considered a probiotic product. The fermented pulp exhibited 1.207 times more phenolic compounds and 12.973 times more quercetin than unfermented pulp. There were no significant differences in radical scavenging activity [DPPH][•] between the fermented apple pulp (169.4 ± 19.167 mg Trolox/ 100 mL of extract) and unfermented ($154.4 \pm 16,576$ mg Trolox/ 100 mL of extract), but the radical scavenging activity [ABTS]^{•+} was significantly higher in fermented apple pulp (102.587 ± 10.909 and 56.116 ± 7.891 mg Trolox/ 100 mL of extract, to fermented and unfermented respectively). As a consequence, simultaneous fermentation and hydrolysis increased the quercetin content which subsequently increased the antioxidant activity of the apple pulp so probiotic *S. boulardii* was able to attribute to the fermented product more functionality when compared to the unfermented pulp.

Keywords: [ABTS]^{•+}, [DPPH][•], quercetin, probiotic

Development Agency: CNPq, Universidade Estadual de Londrina