

## ASSESSING THE ANTIMICROBIAL ACTIVITY OF THE PHENOLIC EXTRACT OBTAINED FROM FUJI APPLE POMACE

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The phenolic compounds are the main apple bioactive compounds. These compounds can present antioxidant, anti-inflammatory, antimutagenic and antimicrobial activities. The phenolic profile in the apple pomace depend mainly of the apple cultivar and technology of juice extraction. The aim of this research was to evaluate the phenolic profile and the antimicrobial activity of the apple pomace of Fuji cultivar. The fruits were crushed and the juice was extracted by pressing ( $5.0 \text{ kgf.cm}^{-2}$  for 5 min). The apple pomace (press residue) was dehydrated at  $60 \text{ }^\circ\text{C}$ . The dry apple pomace was homogenized, sieved to 20 mesh, vacuum-packed and stored in a freezer ( $-18 \text{ }^\circ\text{C}$ ). The solid-liquid extraction using 65% acetone (v/v) was performed according to previously optimized parameters, followed by rotavaporation at  $50 \pm 2 \text{ }^\circ\text{C}$  and lyophilization. The samples were resuspended in acetic acid solution and 2.5% methanol (3:1, v / v) and the profile phenolics analyzed by HPLC. The antimicrobial activity was determined by micro dilution in broth to determine the % of microbial inhibition, with modifications. The sample were diluted in different solvents (ultrapure water; 30% ethanol, v/v; 65% acetone, v/v and 20% methanol, v/v). The strains used were *Escherichia coli* (ATCC 25922); *Staphylococcus aureus* (ATCC 25923 and ATCC 6538) and *Salmonella enterica* subsp. *enterica* (ATCC 13076). The phenolic compounds found in the extract, in  $\text{mg L}^{-1}$ , were Procyanidin B1 ( $53.05 \pm 0.68$ ); Procyanidin B2 ( $75.69 \pm 0.32$ ); Catechin ( $38.15 \pm 4.11$ ); Epicatechin ( $231.55 \pm 0.74$ ); Phloridzin ( $95.83 \pm 0.24$ ); Chlorogenic acid ( $105.92 \pm 0.21$ ); Quercetin-3-rutinoside ( $27.41 \pm 0.69$ ); Quercetin-3-D-galactoside ( $31.69 \pm 0.05$ ); Quercetin-3 $\beta$ -D-glucoside ( $23.14 \pm 0.08$ ) and Quercetin-3-O-rhamnoside ( $26.68 \pm 0.24$ ). The results showed a variation in the percentage of inhibition of the microorganisms, with 65% acetone (promoted better dissolution of the extract) reaching moderate antimicrobial activity, with inhibitions of 77, 56 and 34%, of strains ATCC 25923 of *S. aureus*, *S. enterica* and *E. coli*, respectively, at the concentration of  $5000 \text{ } \mu\text{g mL}^{-1}$ ; besides not affecting the bacterial growth in the control samples without extract.  $625 \text{ } \mu\text{g.mL}^{-1}$  of the phenolic extract diluted in 65% acetone inhibited 69% of *S. aureus* (ATCC 25923). Flavan-3-ols (catechin and procyanidins)

and flavonols (quercetins) may justify the antimicrobial action of Fuji apple pomace, and this antibacterial action is directly related to the diluent of the phenolic extract.

**Palavras-chave:** microbial inhibition, phenolic compounds, apple pomace