**Influence of vacuum impregnation process conditions on bioactive compounds of fresh-cut apples**

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ABSTRACT

Vacuum impregnation technology (VI) allows introducing of different elements in a food matrix with porous tissue, improving several properties such as sensory quality, nutritional value and/or healthy potential. Therefore, the objective was to evaluate the impact of vacuum time (tv) and relaxation time (tr), through a central composite design with: tv= 1.14-14 min and tv= 1.14-14 min, on the bioactive potential of fresh-cut apples subjected to mild vacuum impregnation (67.7mbar), and determine the optimum process conditions to improve bioactive potential. Fresh-cut apples were vacuum impregnated on a 30°Brix honey osmotic solution with the addition of 0,5% of ascorbic acid and 0,5% of citric acid. It was determined the relative percentage variation (∆%i), with respect to fresh-cut fruit without treatment of Vitamin C (VC) antioxidant capacity (AC), total phenolic content (TPC), and individual phenolic compounds concentration (chlorogenic acid= AcC; catechin= Cat; epicatechin= Ep; kaempferol=Ka) on the day of treatment (i=0) and after 7 d of storage at 1.5°C (i=7). Predictive models were obtained for: ∆%VC0, ∆%AC0, ∆%AcC0, and ∆%Cat7. At tr=14min and tv = 7.5 min, VC0, AC0 and Cat7 achieved the maximum increases (501,6%; 252,8% and 103,8% respectively); while the higher increase for AcC0 (109,5%) was obtained with tv= 7,5 min and tr= 7,5 min. Changes in ∆%VC7, ∆%AC7, ∆%TPC0, ∆%TPC7, ∆%AcC7, ∆% Cat0, ∆%Ept0, ∆%Ept7, ∆%Ka0 and ∆%Ka7 were not affected by the process variables. The average increments obtained for these responses were: VC7= 198,5%, AC7= 123,6%, TPC0=97,9%, TPC7= 45,3%, AcC7= 28,3%, Cat0= 296,0%, Ept0=114,42%, Ept7= 37,0% and Ka7=11,2%, however the content of Ka0 decreased (-8,9%). Through multiple response optimization procedure, the appropriate estimated conditions were obtained to improve the bioactive potential of minimally processed apples, maximizing VC, AC and AcC (tv: 5,8 min, and tr: 6,8 min). At those VI times, the optimal relative percentage variation values determined were: VC0=2640%; AC0=210,3% and AcC0=104,3%. Vacuum impregnation of fresh-cut apples with honey osmotic solution allowed for increasing the content of bioactive compounds that were maintained after storage, thus improving the potential health properties of fresh-cut apples.

Key words: vacuum impregnation, vacuum time, relaxation time, bioactive potential