Effect of osmotic solutions on apple polyphenols diffusion

Mouhamadou Kebe, Jean Francois Maingonnat, A. N'Guessan, Catherine M.G.C. Renard

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Kebe M.[1,2], Maingonnat J.F.[1], Nguessan A.[2], Renard C.M.G.C.[1]

[1]UMR 408 INRA UAPV, Avignon, France
[2]UFR STA, University Nangui Abrogoua, Abidjan, Côte d'Ivoire

Introduction

Polyphenols are beneficial to human health and their loss during processing is a major problem. The aim of this work is to study the diffusion of apple polyphenols when soaking in solutions at different osmotic pressures. solutions.

Material and methods

1. Determination of turgor pressure in apples (granny smith & golden delicious): volume changes *vs* osmotic pressure of different soaking solutions (1) (Mannitol solutions 0, 0.2, 0.4, 0.6, 0.8 M)
2. Mass transfer of apple Polyphenols in osmotic solutions by leaching process

Results and discussion

1. Turgor pressure

- Same range of values as obtained for other apple varieties (Lin & Pitt,1986).
- Plasmolysis & rupture of cells at high turgor pressure.

Table 1: Water potential, cell turgor pressure for Granny Smith (A) & Golden Delicous in various mannitol solution (B)

Mannitol (M)	Water Potential	Osmotic Pressure	Turgor Pressure
0	0.00	-1.41	1.41
0.1	-0.23	-1.41	1.18
0.2	-0.46	-1.40	0.94
0.4	-0.92	-1.40	0.48
0.6	-1.38	-1.38	0.00
0.8	-1.84	-1.35	-0.50
Fresh Matrix	-1.27	-1.35	0.08

A

Mannitol (M)	Water Potentia l	Osmotic Pressure	Turgor Pressure
0	0.00	-1.47	1.47
0.1	-0.23	-1.47	1.24
0.2	-0.46	-1.45	0.98
0.4	-0.92	-1.42	0.49
0.6	-1.38	-1.38	0.00
0.8	-1.84	-1.34	-0.51
Fresh Matrix	-1.50	-1.34	-0.16

B

2. Polyphenols loss

- 40 to 60% initial Procyanidins lost in distilled water.
- Solute loss decreased in Mannitol solutions (Devic *et al.*, 2010).

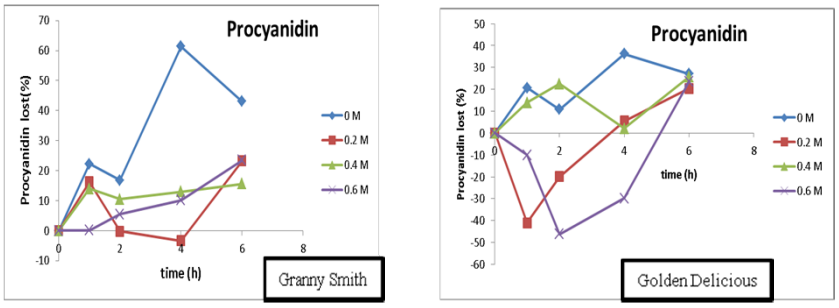

Figure 1: Comparison of osmotic pressure on procyanidin loss

Conclusions

Rupture of apple cells is responsible for loss of polyphenols in liquid-solid diffusion.
Osmotic solvent decrease polyphenols diffusion during leaching process

References :

(1) Lin T. T., Pitt L,R. (1986). Journal of Texture Studies,17, 291-313
(2) Devic E., Guyot S., Daudin J-D, Bonazzi C.(2010). Food Bioprocess Technology,3,867-877.

UMR408 SQPOV
Domaine Saint-Paul
Site Agroparc
CS 40509
84914 Avignon Cedex 9