

Development of extraction techniques and phytochemical investigations for the production of high profile nutraceutical food supplements

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INTRODUCTION

The interest in the recovery of active compounds from raw materials of plant origin has increased considerably in order to use them in foods, pharmaceuticals and cosmetics. Thus, it has been reported that some bioactive molecules, such as dietary fiber, vitamins and secondary metabolites, can also be found in the residues obtained during the processing of fruits in different products ^{1,2}.

AIM OF THE RESEARCH

In this case, this research focused on the investigation of the chemical composition (phenolic compounds, sugars, metals...) of prune's by-product through colorimetric, volumetric and chromatography method, as well as the application of this by-product into new formulations of nutritional supplements after decreasing the reducing sugar's content.



Isolation of bioactive compounds



Prune's by product

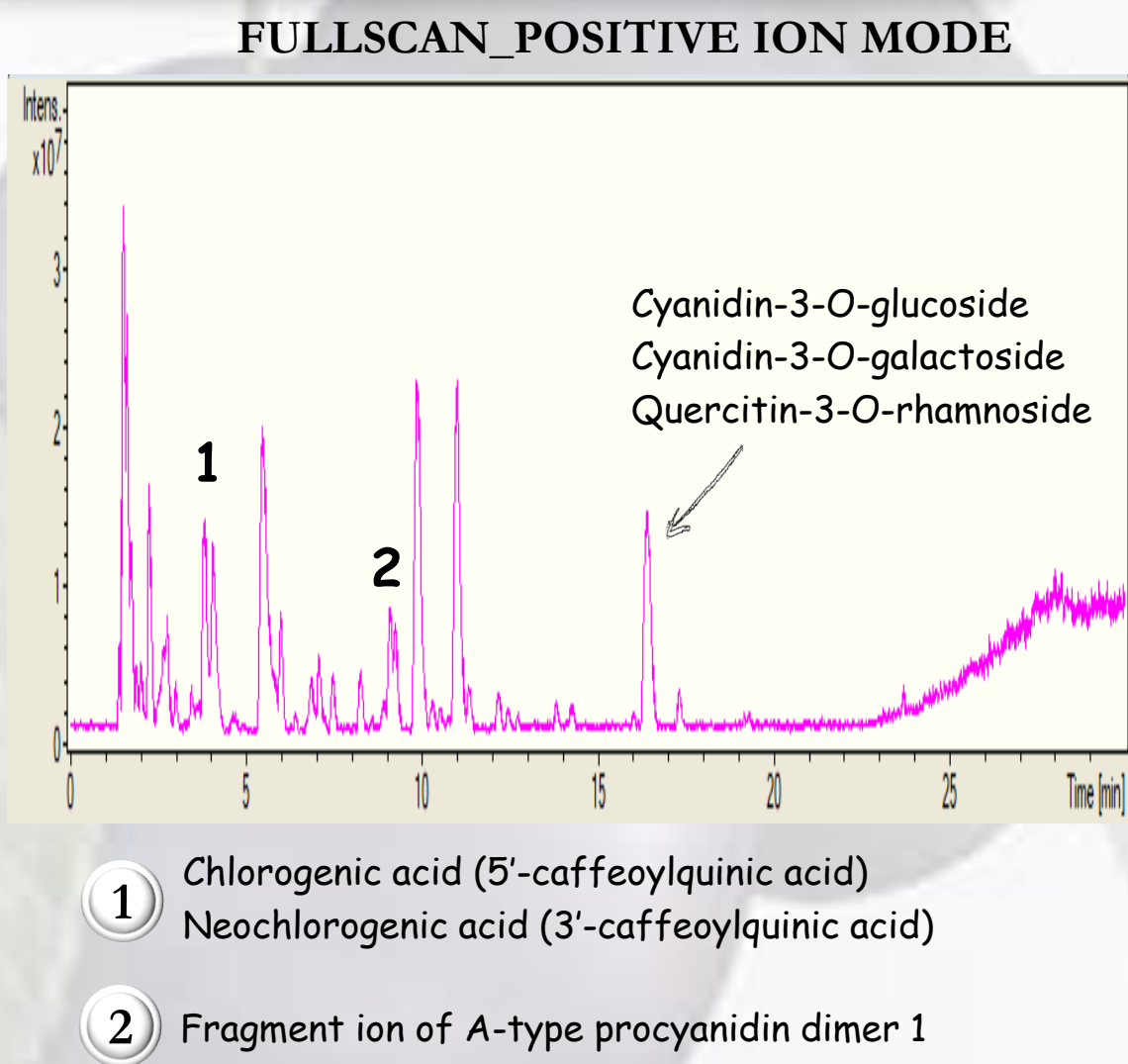
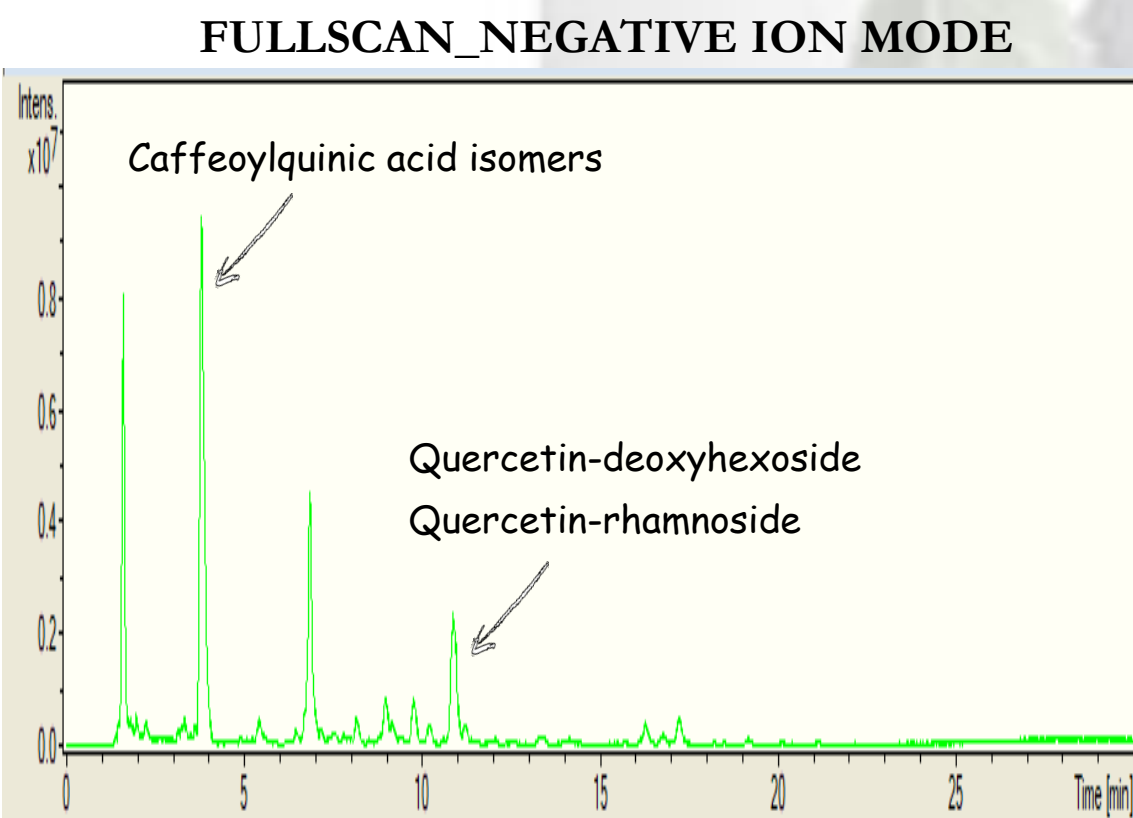
- Agitation / 30 min / room temp. (Ethanol 80%)
- Centrifugation / Filtration
- Evaporation

Ethanolic extract

Aqueous extract



ESI-MS / MS² Analysis



Chemical composition

Total phenolic content	Folin-Ciocalteu assay	2.35 - 4.07 (mg GAE/g FW)
Total flavonoid content	Aluminum chlorate assay	0.023 - 0.125 (mg QE/g FW)
Reducing sugars	Fehling's assay	12.74 - 17.23 (mg/g) (as glucose)
Total sugars content	Enzymatic assay (Sucrose, D-Glucose, D-Fructose)	0.93 - 1.45 (g/100g FW)
Sorbitol	HPLC-RI	3.96 (g/100g FW)

GAE : Gallic Acid Equivalent / QE : Quercetin Equivalent / FW : Fresh Weigh



Metals (mg/100g FW)

Na	9.29 - 65.02
Mg	21.42 - 28.58
K	397.86 - 536.86
Ca	35.69 - 72.06
Zn	4.11 - 34.80
Fe	0.74 - 3.24
B	0.39 - 3.95

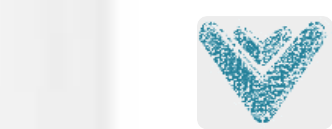
Total antioxidant capacity

TAC (mg AAE/100 g FW)	
Prune byproduct	121.67 - 294.09
Skin	163.62 - 972.74
Plum fruit ³ Pulp	10.38 - 38.17
Fruit	22.17 - 92.65

AAE : Ascorbic Acid Equivalent / FW : Fresh Weigh



DPPH assay



Total Antioxidant Capacity (TAC)

CONCLUSION

This research showed that *Prunus domestica* L. waste product is still rich in phenolic compounds (2.35-4.07 mg GAE/g), flavonoids (0.023-0.125 mg QE/g), sugars (0.93-1.45 g/100g), sorbitol (3.96 g/100g) and some metals (K, Ca, Mg...). Thus, ESI-MS and MS² analysis revealed that ethanolic extract is mainly composed by caffeoylquinic acid isomers, cyanidin and quercetin. These findings are in accordance with that of DPPH assay which reported a significant antioxidant capacity of prune by-product (121.67-294.09 mg AAE/100g) compared to plum fruits (10.38-972.74 mg AAE/100g).

In further analysis, the objective will be the application of *prune* by-product into new formulations in order to obtain beneficial nutraceutical derivatives due to its bioactive content.

MONTERÉ



ACKNOWLEDGEMENTS

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[3] S. Cosmulescu, I. Trandafir, V. Nour and M. Botu. *J. Food Biochem.*, 2015, 39, 64-69.