ASSESSMENT OF ANTIOXIDANT ACTIVITY OF HEXANE AND ETHANOLIC TOMATO POMACE EXTRACTS

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ABSTRACT

In this paper antioxidant activity of hexane and ethanolic tomato pomace extracts (obtained from tomato varieties: Bačka and Saint Pierre) was investigated. The contents of phenolic compounds and flavonoids in ethanolic and lycopene and β-carotene in hexane extracts were determined spectrophotometrically. The antioxidant activity of tomato pomace extracts was determined using different tests, including reducing power and 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assays.

1. INTRODUCTION

The processing of fruits and vegetables results in the production of solid wastes which are promising sources of bioactive compounds. Tomato (*Lycopersum esculentum*) is the most important source of lycopene and also, contains a number of flavonoids and phenolic acids. The tomato pomace, by-product generated during juice processing is a potential source of these compounds.

2. MATERIALS AND METHODS

2.1. Extraction procedure

Samples (10 g) of freeze dried pomace obtained from tomato varieties Bačka and Saint Pierre were extracted, sequentially with hexane and 80% ethanol, using an ultrasonic bath, Heidolph DIAX 900. The obtained extracts were evaporated to dryness under reduced pressure. The yields of hexane extracts were 1.21% for Bačka and 4.61% for Saint Pierre and the yields of ethanolic extracts were 36.18% Bačka and 44.35% for Saint Pierre.

2.2. Contents of antioxidant compounds in tomato pomace extracts

The lycopene and β-carotene content in hexane extracts were determined according to the method of Nagata and Yamashita[1]. The amount of total soluble phenolics in ethanolic extract was determined spectrophotometrically according to the Folin-Ciocalteu method[2]. Total flavonoids were measured in ethanolic extract using a assay developed by Zhishen[2].

2.3. Antioxidant activity of tomato pomace extracts

The antioxidant activity of tomato pomace extracts was determined using different tests, including reducing power and 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assays[2].

3. RESULTS AND DISCUSSION

The contents of antioxidant compounds in hexane and ethanolic extracts, expressed as mg per g dry weight of tomato pomace extract, is listed in Table 1. The higher contents of

lycopene (13.10 mg/g) and β-carotene (14.87 mg/g) were detected in the Bačka pomace extract. The amounts of total phenolics (16.23 mg/g) and flavonoids (12.05 mg/g) were higher in the Saint Pierre pomace extract.

Table 1. The contents of antioxidant compounds in tomato pomace extracts

Varieties	Hexane extract		Ethanolic extract	
	Lycopene (mg/g)	β-carotene (mg/g)	Phenolics (mg/g)	Flavonoids (mg/g)
Bačka	13.10	14.87	11.70	7.62
Saint Pierre	4.29	6.22	16.23	12.05

The investigated tomato pomace extracts were able to scavenge stable free DPPH radical (Figure 1) and the higher antioxidant activity expressed as IC_{50}^{DPPH} value was obtained in the case of hexane extracts; IC_{50}^{DPPH} value was 0.06 mg/ml for Bačka pomace extract and 0.16 mg/ml for Saint Pierre pomace extract. Figure 2 shows the reducing powers of the tomato pomace extracts. The reducing power of the extracts increased with increasing concentration.

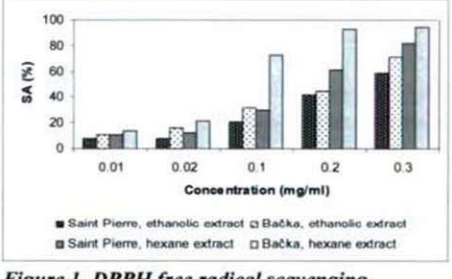

Figure 1. DPPH free radical scavenging activity of tomato pomace extracts

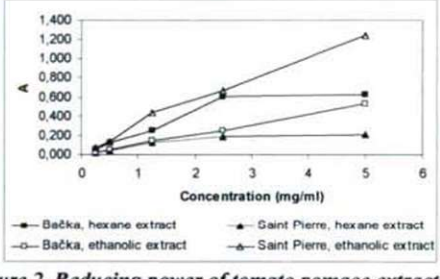

Figure 2. Reducing power of tomato pomace extract

The obtained results show that the tomato pomace should be regarded as a valuable source of carotenoids and phenolic compounds and has potential as a value-added ingredient for functional foods.

ACKNOWLEDGEMENT

These results are part of the project No. 23011, which is financially supported by the Ministry of Science and Technological Development of the Republic of Serbia.

REFERENCES

1. Nagata, M., Yamashita, I., (1992): Simple method for simultaneous determination of chlorophyll and carotenoids in tomato fruit. Journal of the Japanese Society for Food Science and Technology, 39, 925-928 p.
2. Chang, C. H., Lin, H. Y., Chang, C. Y., Liu, Y. C., (2006): Comparisons on the antioxidant properties of fresh, freeze-dried and hot-air-dried tomatoes. Journal of Food Engineering, 77, 478-485 p.