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Cold atmospheric plasma assisted extraction of bioactive components from cocoa shell

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INTRODUCTION

Cocoa shell, a byproduct in the cocoa industry, due the fact that contains some valuable bioactive components, are discarded on daily basis causing huge economical and ecological problems. Cold Atmospheric Plasma Assisted Extraction (CAPAE) or high voltage electrical discharge is a green extraction technique that gains vast attention in terms of application on different plant materials. The present study focused on the application of CAPAE to recover some bioactive components from cocoa shell.

MATERIALS AND METHODS

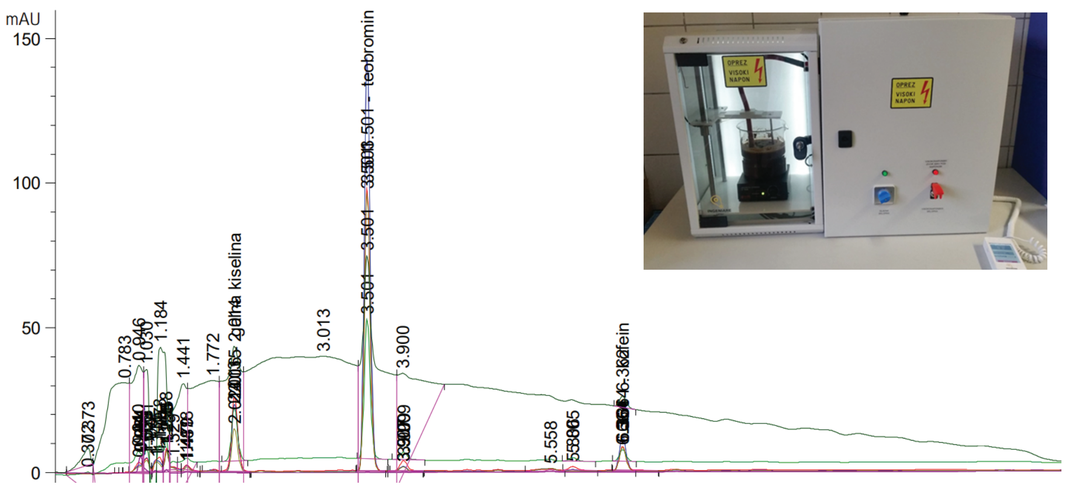
Cocoa shell was obtained from chocolate industry "Kandit" Osijek (Croatia). Different extraction time (30, 60, 90 min), frequency (40, 70, 100 Hz) and solvent-solid ratio (10, 30 and 50 mL/g) of CAPAE were used to obtain cocoa shell extracts. Some bioactive components, namely methylxanthines and phenolic components were measured in obtained extracts by high-pressure liquid chromatography with diode array detector.

CONCLUSION

Results showed that different CAPAE parameters have significant influence on cocoa shell extract composition. Theobromine, caffeine and gallic acid were the most abundant in all cocoa shell extracts. Significant amounts of specific bioactive components from cocoa shell obtained with one of the newest green technologies today, have shown that this by-product can be successfully used in the production of extracts rich in bioactive components.

RESULTS

RUN	mL/g	Hz	min	GALLIC ACID mg/kg	THEOBROMINE mg/kg	CHLOROGENIC ACID mg/kg	CAFFEINE mg/kg	COFFEIC ACID mg/kg
1	30	40	30	943.68	4294.54	-	574.49	-
2	30	70	60	1076.58	4331.82	131.35	583.52	-
3	30	70	60	1100.74	4383.95	392.82	602.80	-
4	30	100	30	1096.00	5246.36	424.14	752.32	711.24
5	30	70	60	1021.65	4343.45	397.64	608.37	-
6	30	70	60	1042.26	5031.44	425.29	716.96	698.01
7	30	70	60	1046.41	4159.31	406.53	542.27	-
8	50	40	60	1559.79	4684.98	-	660.22	-
9	30	100	90	905.54	2865.90	-	402.68	-
10	50	100	60	1735.06	6031.51	-	849.88	-
11	10	40	60	543.95	3478.14	147.83	437.68	359.44
12	10	100	60	535.09	3750.48	129.01	468.32	371.65
13	30	40	90	1079.07	3866.84	-	508.82	-
14	50	70	30	1181.02	4581.06	-	619.83	-
15	50	70	90	1465.10	4102.99	-	558.53	-
16	10	70	90	554.40	3479.19	127.38	431.49	352.76
17	10	70	30	462.84	2530.13	156.11	316.08	308.96



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