RETENTION OF EUGENOL IN PECTIN MODEL SYSTEMS

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1. Introduction

Eugenol is volatile of specific flavour note, which contributes to overall flavour of many fruits and herbs. Thanks to its different health benefits (antioxidant, antimicrobial and anticancerogenic activity) it is the subject of recent studies. Nevertheless, volatility is one of the most important properties considering preparation of appropriate systems for its delivery in food and pharmaceutical industries. The aim of this study was investigation of behaviour of eugenol in model systems based on two different types of pectin, low-methoxy pectin (LMP) and high-methoxy pectin (HMP).

2. Materials and methods

Formation of model systems (H_2O + pectin + eugenol)

Extraction with acidified MeOH and spectrophotometric determination of antioxidant activity

30-DAY STORAGE OF MODEL SYSTEMS

Extraction with acidified MeOH and spectrophotometric determination of antioxidant activity

GC/MS analysis of eugenol content

30-DAY STORAGE OF MODEL SYSTEMS

GC/MS analysis of eugenol content

3. Results

Table 1 Antioxidant acitivity and eugenol content of pectin model systems after preparation

Type of pectin	Pectin content	FRAP (nmol/100 g)	CUPRAC (µmol/100 g)	DPPH (µmol/100 g)	Eugenol content (mg/kg)
LMP	1%	27.45 ± 0.43^{a}	2.44 ± 0.13^{a}	2.02 ± 0.04^{a}	45.52 ± 0.04^{b}
	2%	30.58 ± 0.42^{b}	2.91 ± 0.24^{b}	2.11 ± 0.03^{a}	44.27 ± 0.97^{b}
HMP	1%	29.85 ± 0.18^{b}	2.56 ± 0.03^{a,b}	2.35 ± 0.01^{b}	48.03 ± 0.62^{b}
	2%	33.77 ± 0.30^{c}	2.73 ± 0.04^{a,b}	2.40 ± 0.13^{b}	40.23 ± 0.60^{a}

Table 2 Antioxidant acitivity and eugenol content of pectin model systems after storage

Type of pectin	Pectin content	FRAP (nmol/100 g)	CUPRAC (µmol/100 g)	DPPH (µmol/100g)	Eugenol content (mg/kg)
LMP	1%	27.05 ± 1.45^{a}	1.55 ± 0.03^{b,c}	2.03 ± 0.00^{a}	31.47 ± 0.24^{c}
	2%	28.14 ± 1.50^{a}	1.58 ± 0.07^{c}	2.06 ± 0.02^{b}	29.41 ± 1.22^{b,c}
HMP	1%	25.49 ± 0.45^{a}	1.26 ± 0.01^{a}	2.11 ± 0.00^{c}	22.48 ± 0.42^{a}
	2%	28.93 ± 0.11^{a}	1.35 ± 0.13^{a,b}	2.19 ± 0.01^{d}	26.79 ± 3.07^{b}

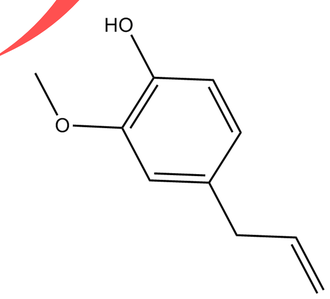
Within the column, means followed by superscript different letters are significantly different at $p \leq 0.05$ (ANOVA, Fisher's LSD).

4. Discussion

After preparation, HMP-1% had higher amount of eugenol (48.03 µg/mL) then HMP-2% (40.23 µg/mL). Compering systems prepared with LMP there were no difference between systems with 1% and 2% of pectin (45 µg/mL). After storage, loss of eugenol was observed. Different trend for model systems with HMP was observed. HMP-1% had lower amount of eugenol (22.48 µg/mL) then HMP-2% (26.79 µg/mL). Model systems with LMP had higher amount of eugenol, than HMP systems, 31.47 µg/mL and 29.41 µg/mL for 1% and 2% of pectin, respectively. Consequently, LMP systems had higher retention of eugenol after storage, 69% and 66% for 1% and 2% of pectin, respectively. Retention of eugenol in HMP systems was 46% and 66% for 1% and 2% of pectin, respectively. Antioxidant activity of model systems was higher when 2% of pectin was used for preparation regardless of pectin type and evaluation method, while after storage there were no difference between systems with 1% and 2%.

5. Conclusion

These results showed importance of pectin type and amount on the retention of eugenol after preparation as well as after storage.



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