

Encapsulation of flavor compounds on plant protein matrices



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13th International Scientific and Professional Conference WITH FOOD TO HEALTH 16th and 17th September 2021



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Introduction

Method

Flavor compounds possess antifungal, antibacterial, antioxidant and anti-inflammatory activity. Being unstable, different matrices are utilized for their protection. As the use of plant-based proteins is an increasing trend, we used different amounts of almond and pumpkin protein matrices and constant amount of eugenol, cinnamaldehyde or α -ionone to produce complexes. The concentration of the flavor compounds was evaluated using gas chromatography-mass spectrometry after preparation and 3 months of storage at room temperature.





GC-MS analysis

Results

Table 1 Concentration (mg(kg) of eugenol, α -ionone and cinnamaldehyde on almond and pumpkin protein matrices after preparation and 3 months of storage



Figure 1 Chemical structure of eugenol

Sample	Eugenol		α-ionone		Cinnamaldehyde	
	After preparation	After storage	After preparation	After storage	After preparation	After storage



AP (5%)	16.57 ± 1.33 ^b	10.11 ± 0.35 ^b	69.05 ± 0.70 ^c	45.51 ± 2.40 ^c	7.07 ± 0.44 ^c	3.92 ± 0.20^b
AP (10%)	13.98 ± 0.83 ^{a,b}	8.61 ± 0.27 ^b	51.78 ± 3.64 ^b	35.70 ± 0.20 ^b	4.99 ± 0.23 ^b	3.05 ± 0.02 ^a
AP (20%)	9.99 ± 0.27 ^a	6.76 ± 0.43 ^a	39.44 ± 1.36 ^a	27.46 ± 0.17 ª	3.20 ± 0.26 ^a	3.05 ± 0.02 ^a
PUP (5%)	20.28 ± 0.49 ^c	11.35 ± 0.53°	55.10 ± 0.13 ^b	40.65 ± 3.61 ^b	8.28 ± 0.14 ^b	6.33 ± 0.27 ^b
PUP (10%)	12.35 ± 0.45 ^b	9.76 ± 0.24 ^b	53.43 ± 0.48 ^b	39.44 ± 0.95 ^b	8.11 ± 0.25 ^{a,b}	4.79 ± 0.00 ^a
PUP (20%)	9.65 ± 0.45^{a}	7.42 ± 0.05 ^a	34.43 ± 0.19 ^a	33.25 ± 2.55 ^a	7.39 ± 0.05 ^a	4.25 ± 0.13 ^a

Figure 2 Chemical structure of α-ionone



Figure 3 Chemical structure of cinnamaldehyde

AP- almond protein, PUP- pumpkin protein; 5-20% amount of protein used during preparation of complexes; Values marked with different letters in columns for each protein matrices were statistically different.

Conclusion

Type of protein and their amount had impact on the concentration of flavor compounds. Increased protein amount resulted in decreased concentration of volatile compounds after preparation and storage. It was observed that the concentration of a-ionone on both almond and pumpkin protein complexes was the highest, followed by eugenol and cinnamaldehyde. Pumpkin protein complexes had higher concentration of cinnamaldehyde and eugenol compared to almond protein complexes. Concentration of a-ionone was higher on almond protein complexes compared to pumpkin protein complexes. Proper formulation is important to achieve efficient delivery of flavors using plant proteins.



