Effect of Clove essential oil coating in pork meat conservation and texture

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Introduction

Essential oils are complex mixtures of secondary plant metabolites from aromatic plants. There are recognized for having countless biological activities (including antibacterial, antiviral and fungicidal) and being suitable to replace chemical additives for food preservation[1]. Clove essential oil is considered safe for food use and contains a high phenolic content that provides many biological activities.

Methodology

Clove essential oil

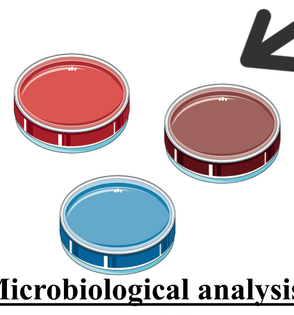
50 ppm

500 ppm

There were made 2 different concentration clove edible coatings.

The coatings were sprayed in the meat that then was vacuum sealed and stored for 6 and 12 months.

After storing, there were performed microbiological analysis, texture analysis and sensory analysis with a trained panel.



Microbiological analysis:
Mesophiles
Psychrotropics
Moulds
Yeasts
Enterobacterea

Texture analysis:
Warner Bratzler[3]

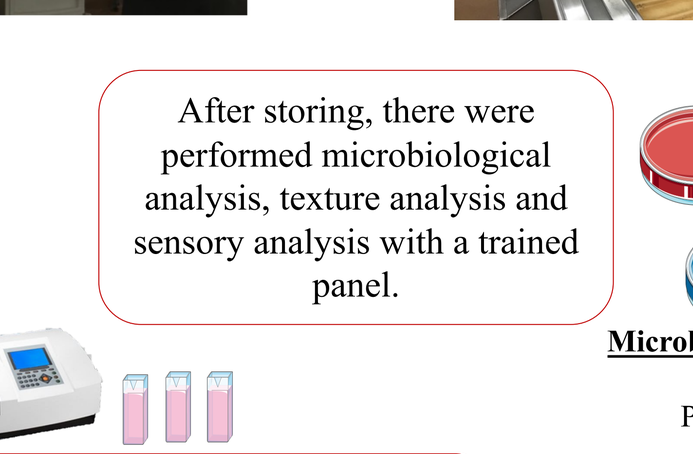
Sensory analysis:
Trained panel

The antioxidant capacity was measured very 2 months during 1 year using the DPPH radical scavanging method[2].

Results

Antioxidant activity of clove edible coatings

The antioxidant capacity of the edible coatings studied increased during the first 6 months of conservation, although there weren't found statistical significative differences in the antioxidant capacity of the different clove formulations.



Texture analysis

		Raw	Cooked
		Mean±SD	Mean±SD
0	Control	53,113±14,555	31,034±8,289
6	Control	30,706±8,233	16,032±7,38
	50 ppm	33,607±7,733	25,482±3,332
	500 ppm	32,254±12,574	19,716±2,831
12	Control	60,609±20,468	35,933±12,882
	50 ppm	39,579±17,007	34,447±14,817
	500 ppm	47,573±16,306	35,114±20,687

The application of the clove essential oil didn't seem to affect sheer force in different modalities

Microbiology analysis

When it comes to microbiological analysis, mesophilic aerobic bacteria seem to decrease during conservation, although with no statistical significative differences between different modalities. Enterobacteria, mold and yeast content didn't seem to be affected by the clove oil coating application, since there weren't found statistical significative differences between them.

	Parameter	Mesophiles	Psychrotrophics	Moulds	Yeasts	Enterobacteriaceae
0	Control	7,359±0,966	7,319±0,986	2,18±1,819	4,744±1,491	6,165±0,868
6	Control	6,056±0,939	6,025±0,906	2,745±0,811	3,165±1,531	4,338±1,117
	Clover 50 ppm	5,941±0,669	5,903±0,696	3,327±0,863	3,32±0,735	4,334±0,564
	Clover 500 ppm	6,187±0,872	6,198±0,933	3,161±1,049	3,854±0,659	4,397±0,975
12	Control	4,896±0,192	4,839±0,243	2,903±0,444	1,654±0,991	3,485±0,297
	Clover 50 ppm	5,054±0,453	4,927±0,769	2,89±0,381	1,738±1,422	3,694±0,528
	Clover 500 ppm	4,764±0,578	5,046±0,807	2,726±0,263	1,657±0,597	3,654±0,319

Sensory analysis

		Color Intensity	Off Colors	Tenderness	Fibrosity	Succulence	Flavor Intensity	Negative flavors	Overall perception
0	Control	56,805±13,119	0,943±3,903	49,971±2,634	9,265±5,539	66,176±12,399	64,576±12,399	3,0481±0,735	64,765±11,249
6	Control	54,198±20,453	1,224±3,977	50,429±11,243	24,759±24,161	65,341±16,105	67,211±16,467	23,156±9,376	67,501±14,363
	50 ppm	67,778±13,892	0±0	49,5±15,118	23,743±28,765	64,543±20,676	69,472±18,511	10,0066±4,857	63,257±18,524
	500 ppm	61,524±12,496	0±0	45,667±13,028	19,863±15,381	68,143±11,508	67,286±11,942	0±0	68,048±10,689
12	Control	59,722±16,502	0±0	50±4,7268	20,75±20,211	68,917±14,727	67,527±14,936	0,833±0,138	68,3611±13,732
	50 ppm	62,349±13,589	0±0	48,135±10,184	15,396±13,942	73,333±13,349	71,556±14,205	0,142±0,027	72,517±13,957
	500 ppm	64±16,659	0±0	52,472±16,765	28,948±27,389	53,171±25,959	58,972±24,972	10,791±4,166	57,486±20,713

Regarding sensory analysis, the panel couldn't find differences between the different meat modalities, namely in flavours, which means that the tested clove edible coating concentration doesn't have a negative impact on this parameter in meat.

Conclusion

Clove essential oil edible coating seems to be a good alternative to food other chemical food preservatives to use in pork meat conservation for the period of one year, since it keeps a high antioxidant capacity during this period, doesn't affect sensory properties and keeps the microbial count low.

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