G-268-1 ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS FROM PLANTS OVER SOME FOOD-BORNE PATHOGENS AS POTENTIAL PRESERVATIVES

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ABSTRACT

Essential oils (EO's) are promising natural antimicrobials additives to control foodborne pathogens in food industry. MIC and MLC values for selected EO's were obtained against *Escherichia coli, Salmonella tiphymurium, Staphylococcus aureus* and *Candida albicans*. MIC and MLC values for laurel, cumin, oregano, and rosemary showed a higher effect over *S. aureus* and *C. albicans*. The antimicrobial activity of EO's expanded the possibilities for application as natural antimicrobials.

INTRODUCTION

- EO's are obtained from plant material
- Chemically are a complex mixture of constituents that belong to terpenes-terpenoides and aromatic-aliphatic compounds.
- Possess antibacterial, antifungal, antiviral, insecticidal, larvicidal, antioxidant, analgesic, anti-inflammatory and antitumor activity.
- Control of microbial growth in foods by natural preservatives is a worldwide tendency that may have a positive effect on human health.

OBJECTIVE

Evaluate the antimicrobial potential of commercial EO's and chemical preservatives against some food-borne pathogenic microorganisms

METHODS

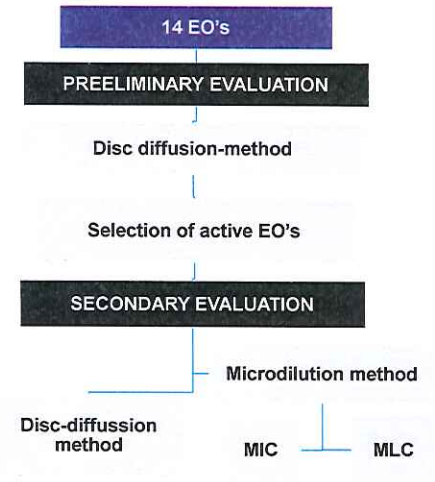

Figure 1 Strategy to select the most active Essential Oils

RESULTS AND DISCUSSION

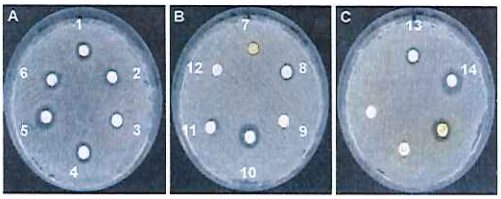

Fig. 2 Antimicrobial activity of EO's on *S. aureus*. *1.* laurel; 2. onion; 3. mexican lemon 1; 4. mexican lemon 2; 5. cumin; 6. black pepper; 7. orange SVC; 8. ginger; 9. sweet orange; 10. oregano; 11. garlic; 12. grapefruit; 13. lemon; 14. rosemary.

Preeliminary Evaluation

Results showed different degrees of inhibition of EO's over microbial growth (Fig. 2); *C. albicans* was sensitive to thirteen EO´s, followed by *S. aureus* (11 oils), *E. coli* (6 oils) and *S. tiphymurium* (5 oils).

Laurel, cumin, oregano and rosemary were the most active EO's against the four pathogens

Secondary Evaluation

Selected EO's prepared in DMSO at concentrations ranging 30 to 70% were tested (Table 1 and Fig. 3) Oregano exerted the highest inhibitory effect with a diameter of inhibition superior to 16 mm on *E. coli*, *S tiphymurium* and *C. albicans*.

Table 1. Effect of different concentrations of selected EO´s on the growth of *E. coli*

% EO (v/v)	Laurel	Cumin	Oregano	Rosemary
	E. coli			
30	9.0 ± 0.3[a]	9.1 ± 0.4[a]	12.4 ± 1.1[a]	10.3 ± 0.6[a]
50	9.7 ± 0.4[b]	10.7 ± 0.3[b]	17.2 ± 1.8[b]	13.0 ± 0.7[b]
70	10.7 ± 0.5[b]	11.9 ± 0.9[b]	20.9 ± 3.6[b]	14.1 ± 0.5[c]
100	12.6 ± 0.9[c]	13.4 ± 1.1[c]	19.7 ± 1.2[b]	16.1 ± 0.8[d]

Figure 3 Antimicrobial activity of Rosemary oil on: A, *E. coli*; B, *S. tiphymurium* and C, S. aureus.

Oregano was the most efficient oil with the lowest MIC and MLC for the microorganisms tested (0.078 % (v/v) followed by cumin and rosemary

Table 2. MIC/MLC values for selected EO´s

	MIC/MLC[a]			
	E. Coli	S. tiphymurium	S. aureus	C. albicans
Laurel	0.625/0.625	0.625/0.625	0.625/0.625	0.625/1.25
Cumin	0.313/0.313	0.313/1.25	0.313/0.313	0.313/0.625
Oregano	0.078/0.078	0.078/0.156	0.078/0.078	0.078/0.313
Rosemary	0.625/0.625	0.313/0.313	0.625/0.625	0.313/0.625

CONCLUSION

- Oregano, cumin, laurel and rosemary commercial essential oils showed strong antimicrobial activity against *E. coli, S. tiphymurium, S. aureus* and *C. albicans*.
- These essential oils can be pursued as food preservatives.

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Antimicrobial Activity of Essential Oils From Plants Over Some Food-Borne Pathogens as potential preservatives.

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Essential oils (EOs) are promising natural antimicrobials additives to control food-borne pathogens in food industry. At current study the antimicrobial activity of commercial essential oils against *Escherichia coli*, *Salmonella tiphymurium*, *Staphylococcus aureus* and *Candida albicans* were examined. Antimicrobial effects of fourth-teen essential oils were evaluated by the disc-diffusion assay, and minimal inhibitory concentration (MIC) and minimal lethal concentration (MLC) were calculated by the methods of disc-dilution and micro-well dilution. Results showed that *E. coli* and *S. tiphymurium* were less susceptible to EOs (6/14 and 5/14, respectively). Contrary, *S. aureus* and *C. albicans* were affected by a higher number of EOs (11/14 and 13/14, respectively). MIC and MLC values were obtained for laurel, cumin, oregano, and rosemary EO's within a range from 0.078 % to 1.25 % (v/v). Also, the inhibitory and lethal values for some chemical preservatives were exposed. Results obtained for EO's expanded the possibilities for application as natural antimicrobials that could be used in conjunction with other approved food preservatives.

(Key words: essential oils, antibacterial activity, antifungal activity).

MY PREFERENCE: POSTER