

BENEFITS OF ESSENTIAL OILS AS NATURAL ANTIMICROBIAL AGENTS IN FOOD PROCESSING

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Introduction

Food safety is a global priority, with contaminated food affecting millions of consumers annually. Essential oils (EOs) are increasingly studied as natural alternatives to synthetic additives because they provide antimicrobial and antioxidant activity and respond to the growing demand for Clean Label products.

- Extracted from flowers, seeds, roots or leaves
- Mainly composed of terpenes and phenolic compounds

Material and method

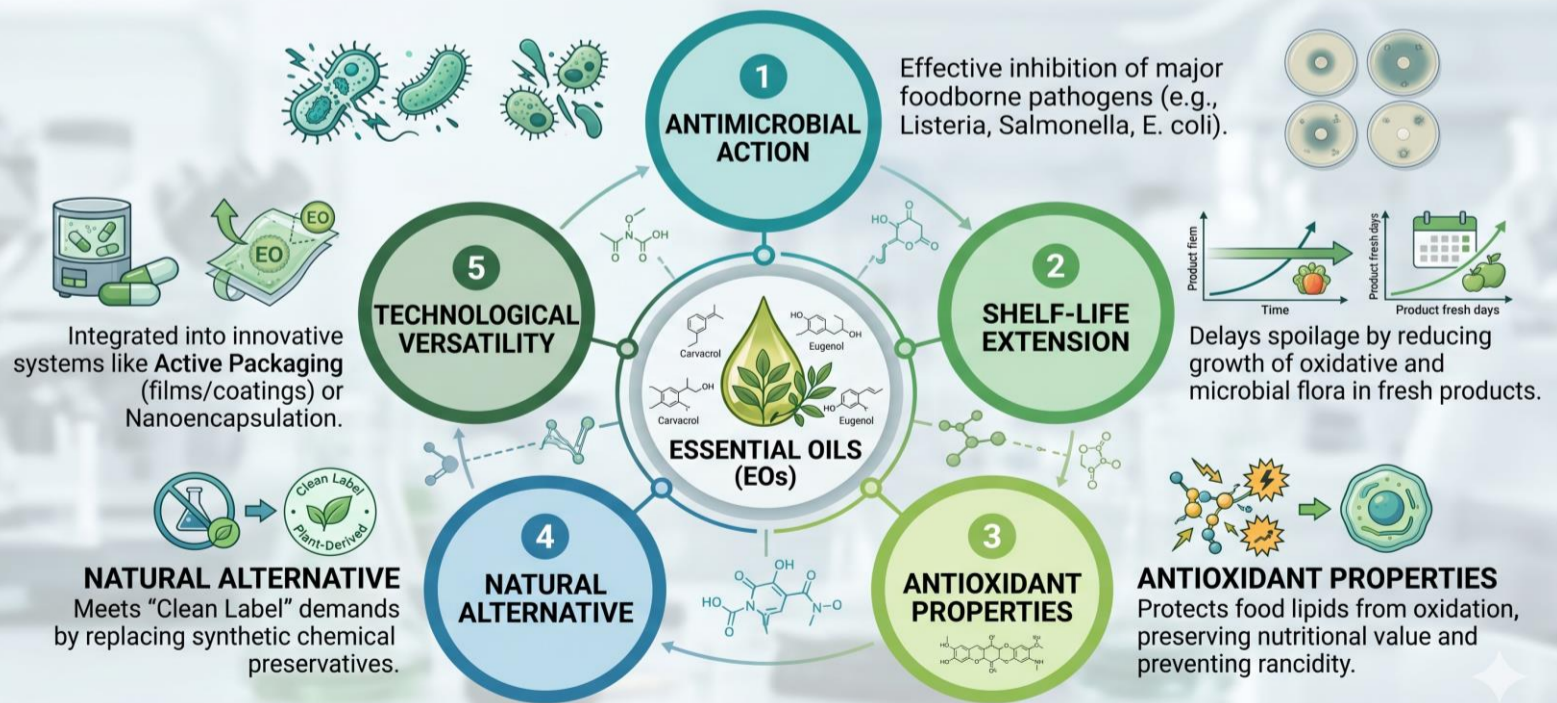
This review synthesizes data on the antimicrobial efficacy of essential oils in food systems, emphasizing bioactive-pathogen interactions, extraction methods and nanoencapsulation techniques.

- Evaluation criteria: shelf-life extension and organoleptic impact
- Food matrices considered: meat, dairy and fresh produce

Results and discussions

- 1 Antimicrobial potency**
Oregano, thyme and cinnamon EOs showed strong inhibition against *L. monocytogenes* and *Salmonella* spp.
- 2 Shelf-life extension**
Synergistic EO combinations and mild heat treatments increased meat/dairy durability by up to 40%.
- 3 Nano-delivery**
Nano-emulsions maintained antimicrobial stability for over 15 days by reducing EO volatility.
- 4 Active packaging**
Chitosan/starch films enabled controlled bioactive release and limited surface spoilage in fresh produce.

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Conclusions

Essential oils represent a sustainable strategy for modern food safety, supporting natural preservation and alignment with Clean Label trends. Although sensory impact remains challenging, nanoencapsulation and active packaging improve microbial stability while preserving food quality.

Acknowledgement

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