

Organic menthol crystals: on overview of innovation based on relevant patents

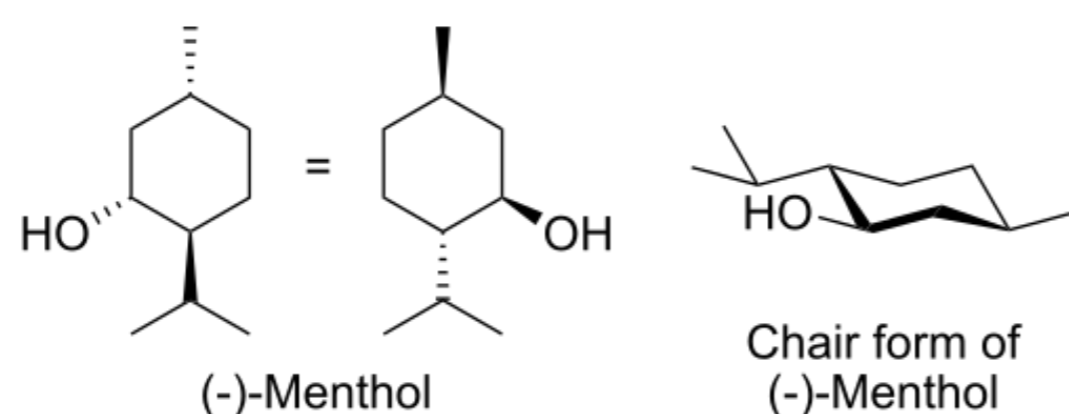
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INTRODUCTION

- Organic menthol crystals, derived from mint essential oils, are natural, waxy, clear, or white crystalline substances that are solid at room temperature, melting slightly above.
- Menthol, a cyclic monoterpene alcohol, is synthesized from natural or synthetic precursors and has a significant demand globally, with various protocols available for its synthesis.



- It is commonly used in perfumery, cosmetics, and medicinal products for its cooling effect and minty scent.
- Menthol's safety profile and anticancer properties have been extensively studied, showing promising results in inhibiting different cancer cells through multiple pathways like apoptosis induction, cell cycle arrest, and the disruption of tubulin polymerization.
- Additionally, menthol's impact on respiratory health and digestive issues, and its potential to exacerbate allergic rhinitis have been explored, highlighting both its beneficial and potentially harmful effects on human health.

AIM

- In this study, we provide an in-depth overview of innovation based on relevant patents related to menthol crystals and its derivatives and their applications.
- By analyzing these patents, we aim to present the current state of the art and identify emerging trends in the field of plant-derived menthol.

METHOD

- The databases used in this study were The Lens and Google Patents.
- The search related to the menthol was based on "title", "abstract", and "claims".
- The found patent documents include different types, provided an in-depth overview of innovation based on relevant patents related to menthol crystals and its derivatives and their applications.

CONCLUSION

- The data provides a comprehensive snapshot of global innovation in menthol applications, with clear leaders across different industries.
- This information will help map the landscape for future developments in plant-derived menthol and its derivatives.

REFERENCES

- El Boukhari *et al.* The Story of a Plant-Derived Molecule Through the Patents. CRC Press: Boca Raton, Florida, USA, 2024.
- Tomar *et al.* An Overview: Synthesis of Menthol using Heterogeneous Catalysis. *Letters in Organic Chemistry* 2024, 21, 16-28.
- Zhao *et al.* Menthol: An underestimated anticancer agent. *Frontiers in pharmacology* 2023, 14.

RESULTS & DISCUSSION

- Patent Classification Codes: Technical Areas of Menthol Application

- 3773 patents
- This class covers organic active ingredients, with menthol being a prominent example, especially in pharmaceutical preparations.

A61K31/045

- 2608 patents
- Menthol is extensively used in cosmetic or similar toilet preparations, particularly for its cooling and soothing effects in products like lotions and balms.

A61K8/34

- 2500 patents
- Menthol plays a role in medicinal preparations, particularly those involving controlled-release formulations and topical products.

A61K9/00

- 2131 patents
- Focuses on oral hygiene compositions, where menthol is a common flavoring and sensory agent in toothpaste and mouthwash.

A61Q11/00

- 1794 patents
- Menthol is used in chemical preparations involving specific additives, indicating its role in enhancing formulations.

A61K47/10

- 1701 patents
- Highlights the therapeutic use of menthol, particularly in treating pain and inflammation through topical applications.

A61P29/00

- 1389 patents
- Focuses on controlled drug delivery systems, where menthol may be employed for its permeation-enhancing properties.

A61K9/70

- 1361 patents
- Related to skin care preparations, reflecting menthol's cooling effect in creams and lotions.

A61Q19/00

- 1254 patents
- Highlights the use of menthol in skin and hair preparations, particularly in cleansing and refreshing products.

A61K8/49

- 1217 patents
- Involves solid forms of medicinal preparations, such as tablets or powders, where menthol can be used as a flavoring or active ingredient.

A61K9/06

- Emerging Trends in Menthol Innovation

- Menthol's therapeutic properties for pain relief and topical applications.

Pharmaceuticals

- Its cooling, refreshing, and soothing effects in cosmetic formulations.

Personal Care

- Flavor enhancement remains significant, particularly in jurisdictions with more lenient regulations.

Tobacco