

Functional Modification Of Ethylcellulose

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ABSTRACT

Researchers at the University of California, Davis have developed ethyl cellulose-based oleogels enhanced with fatty acid and acid salt complexes which offers a healthier and versatile alternative for structured lipids in food, cosmetic, and industrial applications.

FULL DESCRIPTION

This technology develops modified ethyl cellulose (EC) oleogels through the incorporation of fatty acid and fatty acid salt combinations, including ionically coordinated complexes, to improve oleogel network formation and functional properties. By dispersing EC in vegetable oils along with specific additives like stearic acid and sodium stearate, the process yields semi-solid, thermo-reversible gels with enhanced mechanical strength, stability, and oil-binding capacity at far lower EC concentrations than previously possible. These oleogels can serve as healthier substitutes for traditional solid fats, reducing harmful trans and saturated fat usage while maintaining desirable texture, structure, and sensory qualities. They can also be used in cosmetic formulations, particularly when paired with conventional lipid-based oleogelators.

APPLICATIONS

- ▶ Fat replacers in baked goods, spreads, confectioneries, and dairy products.
- ▶ Health-conscious food formulations targeting cardiovascular risk reduction.
- ▶ Pharmaceuticals requiring semi-solid delivery matrices.
- ▶ Cosmetic products needing stable, semi-solid gels with tailored texture and melting behavior.
- ▶ Industrial uses where organogel materials provide performance benefits.

FEATURES/BENEFITS

- ▶ Replaces trans and saturated fats with a healthier oleogel-based fat alternative.
- ▶ Strengthens gel structure by leveraging ionic and hydrogen-bonding interactions.
- ▶ Improves stability and functionality by forming thermo-reversible networks with high oil-binding capacity.
- ▶ Tunes texture and performance by adjusting EC molecular weight, oil composition, and additive ratios.
- ▶ Extends shelf life by incorporating compatible antioxidants.
- ▶ Delivers solid-fat replacement performance while maintaining texture and stability.
- ▶ Compatible with lipid-based oleogelators, allowing for highly tunable texture and melting behavior.
- ▶ Dramatically reduces the amount of EC needed to form oleogels.
- ▶ Compatible with conventional lipid-soluble cosmetic structurants.

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OTHER INFORMATION

KEYWORDS

antioxidants, edible oils, ethyl cellulose, ionic surfactants, oleogel, oleogelator, solid fat replacement, stearic acid, sodium stearate, thermoreversible gel, cosmetics

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Food
 - ▶ Other
- ▶ **Materials & Chemicals**
 - ▶ Chemicals
 - ▶ Polymers

RELATED CASES

2026-440-0

PATENT STATUS

Patent Pending

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