Formulation Comprising Spice Oil Based Nano-Scaled System for Medicinal Applications

IITM Technology Available for Licensing

Problem Statement

- Active polyphenolic ingredients in spices, like Indian cumin seed oil, **lack solubility in water**, **hampering** their use in **pharma formulations**.
- The **hydrophobic and aromatic properties** of spice oils pose challenges in administration, **constraining the available delivery methods**.
- Spice oils often have **low stability due to volatility**, impacting shelf-life and effectiveness in formulations. Despite abundance of spices in India, affordable and easily accessible pharma formulations are scarce, limits medicinal potential.
- Hence, this invention is needed to overcome given **limitations of medicinal compounds** derived from spices, appealing the **development of effective pharmaceutical formulations.**

Technology Category/ Market

Categories: Drugs & Pharmaceutical Engineering

Industry: Healthcare & Pharmaceutical Industry

Application: Food, Pharma, Cancer Treatment, Medical and Surgical, Robotics, Nanotechnology

Market: The global **drug formulation** market size is estimated at **USD 1.64 Trillion in 2022** and is expected to touch **USD 2.95 Trillion by 2032**, growing at **CAGR of 6.05%** during the forecasted period of **2023 to 2032**.

Technology

The instant invention discloses a method for preparing a **nano-scale anti-cancer compound formulation using seed oil** from Cuminum spp (a type of cumin) and a non-ionic surfactant.

- **Cuminum spp**: Specifically mentions **Cuminum cyminum as a species of Cuminum.**
- The **Non-Ionic Surfactant** used can be tween 20, tween 80, or a combination of both.
- The **seed oil composition of Cuminum spp** used in the disclosed method is **specified to be in the range of 4-6% v/v**.
- Different ratios of seed oil of **Cuminum spp and non-ionic surfactant** are mixed to prepare the **organic phase.** The formulation chosen is one that is transparent instantly after preparation.

Research Lab

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Method Overview: The method involves preparing an organic phase using seed oil from **Cuminum spp and a non-ionic surfactant**, then adding this **organic phase drop-wise to water while stirring** to obtain a nano-scaled emulsion spontaneously, which exhibits anti-cancer activity.

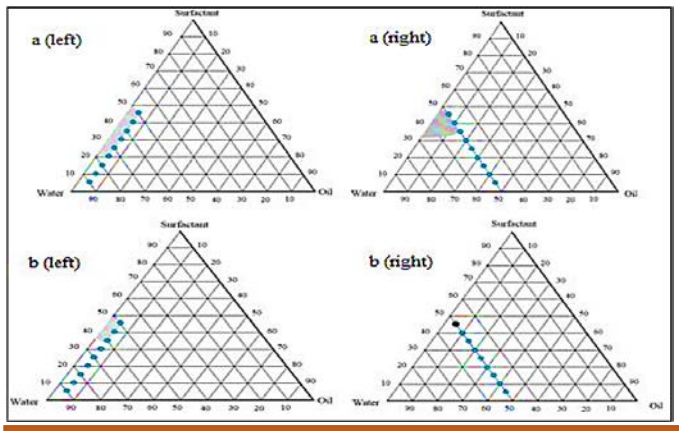
Optimal Formulation: The optimal formulation ratios are mentioned to be **1:4, 1:5, 1:6, 1:7, 1:8, 1:9, 2:8, and 3:7** (**surfactant:oil**). Additionally, this formulation is stable at Tepm range of **2-50°C**.

Biological Activity: Formulation induced apoptosis (programmed cell death) in cancer cell lines and bacterial cells, indicating its **potential anti-cancer and antibacterial properties.**

Key Features / Value Proposition

- **Enhanced Solubility** in spice oils, improving their usability in pharmaceuticals.
- Facilitates easier delivery of medicinal compounds, expanding treatment options.
- **Ensures longer shelf-life** and effectiveness of pharma formulations. **Uses affordable, easily accessible ingredients** like Indian cumin seed oil.
- **Utilizes natural ingredients** and **sustainable practices**. Demonstrates effectiveness against cancer and bacteria. **Simplifies formulation processes for pharmaceutical production.**

FIG 1 Ternary phase diagram constructed using cumin oil, **A.** tween 20 and **B.** tween 80.



Intellectual Property

IITM IDF No.: **1580** | IP No.: **493335 (Granted)**

TRL (Technology Readiness Level)

TRL- 4: Validated in Laboratory.

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