



COST-EFFECTIVE APPROACH IN GREEN VERSUS CLASSIC *CAPSICUM SPP.* EXTRACTION METHODS

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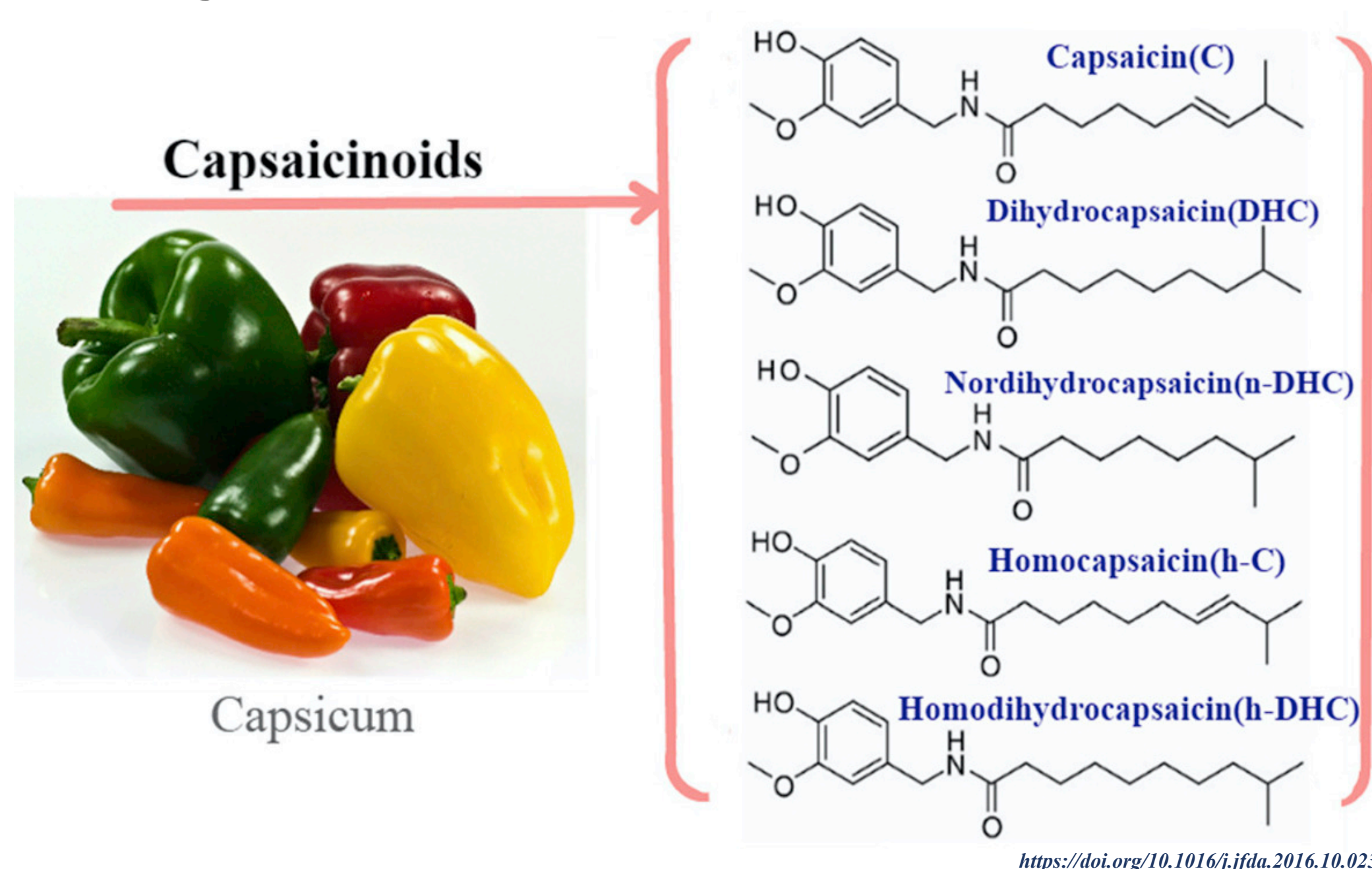
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Abstract: The objective of this research was to evaluate the costs associated with each method of *Capsicum* extraction to identify cost-effective methods. To achieve the research objective, we conducted a methodological review based on research paper articles, in which we assessed the costs associated with each extraction method to identify the most cost-effective methods. Proper extraction of compounds from *Capsicum* is essential to obtain high quality extracts with potential benefit in food, pharmaceutical, cosmetic and scientific research. A correct extraction ensures the preservation of the bioactive properties of these compounds and maximizes their use in various applications.

• Introduction

The **extraction methods of compounds from *Capsicum*** allow for the isolation and concentration of specific compounds found in *Capsicum*, such as capsaicinoids (responsible for the spiciness of peppers) and carotenoids (responsible for their color). *Capsicum* is a valuable source of **bioactive compounds** with potential health benefits, such as the antioxidant and anti-inflammatory properties of capsaicinoids. Capsaicinoids can be used in medications for pain management, such as creams and ointments used to treat joint and muscle pain. **Extraction methods enable the production of these pharmaceutical products.** Some cosmetic products, such as skin-warming creams and lotions, use capsaicinoids from *Capsicum* to create sensations of warmth or improve blood circulation in the skin. Therefore, extraction is essential for obtaining these cosmetic ingredients.



• Material and method

To achieve the research objective, we conducted a methodological review based on research paper articles, where we assessed the costs associated with each extraction method to identify cost-effective methods.

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THE AIM OF THE STUDY

The objective of this research is to evaluate the costs associated with each extraction method of *Capsicum spp.* to identify cost-effective methods

• Results and discussions

Organic solvent methods can range in cost from moderate to high, while hot water extraction is relatively inexpensive, but can vary in efficiency depending on specific conditions. Supercritical and liquid CO₂ extraction requires special equipment and strict control of conditions, which can lead to high costs, but offers advantages such as selectivity and extraction of thermolabile compounds without degradation. Microwave-assisted extraction (MAE) and ultrasound-assisted extraction (UAE) are more affordable, efficient and rapid methods that can reduce operating costs and energy consumption. The choice of extraction method depends on the specific needs and available financial resources. Enzymatic extraction is generally expensive due to the variable price of enzymes and special equipment required, but offers advantages such as selectivity and high quality of extracts.

• Conclusions

Extraction methods for bioactive compounds from *Capsicum spp.* **vary in cost and efficiency.** Hot water, organic solvent, ultrasound-assisted, microwave, solid-liquid, and hydrostatic pressure extractions are budget-friendly methods, each with unique benefits and constraints. In contrast, liquid CO₂ and enzymatic extractions, while costlier, offer advantages such as selectivity and safer processing conditions, making them suitable for pharmaceuticals, food, and cosmetics. Supercritical CO₂ extraction, despite high expenses, is favored for its selectivity and ability to preserve sensitive compounds.

