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Milk Thistle (*Silybum marianum*): A Comprehensive Review of Its Therapeutic Potential and Food Applications

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ABSTRACT

Introduction: Milk Thistle (*Silybum marianum*), commonly known as 'doodhpatra' in Hindi, is a member of the Asteraceae family and has been widely utilised for centuries as a therapeutic herb. The bioactive complex, silymarin, extracted from the seeds of *Silybum marianum*, consists of flavonolignans such as silybin, silydianin, and silychristin. Due to its established antioxidant, lipid-lowering, antihypertensive, antidiabetic, anti-obesity, and hepatoprotective properties, milk thistle holds significant potential for food applications.

Aim: This review aims to comprehensively analyse the bioactive properties and potential food applications of *Silybum marianum*. While the health benefits of milk thistle are well-documented, research focusing on its molecular structure, metabolism, and innovative applications in food remains limited. By investigating its phytochemical profile and extraction methodologies, this study provides insights into the feasibility of incorporating milk thistle into functional food formulations.

Materials and Methods: A comprehensive literature review was conducted using Google Scholar to gather data on *Silybum marianum*. The bioactive compounds were assessed through spectrophotometry, while fatty acid composition was analysed using Gas Chromatography-Mass Spectrometry (GC-MS). Additionally, solid-liquid extraction and Soxhlet extraction methods were explored for obtaining aqueous and fatty fractions using different solvents.

Results: Findings from existing studies highlight the significant therapeutic properties of milk thistle, particularly its hepatoprotective effects and its role in managing metabolic disorders such as diabetes and obesity. The vegetable oil extracted from milk thistle seeds contains high levels of polyunsaturated fatty acids, contributing to its nutritional value and potential incorporation into dietary formulations.

Conclusion: Milk thistle exhibits promising applications in functional foods and nutraceuticals due to its potent bioactive compounds. However, further research is needed to elucidate its molecular mechanisms, optimise extraction techniques, and explore innovative delivery systems for enhanced bioavailability.

Keywords: Bioactive compounds, Hepatoprotective, Spectrophotometry

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