



# Phytosomes: a critical tool for delivery of herbal drugs for cancer

## Phytosomes: Advancing Herbal Medicine Delivery

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Received: 3 April 2023 / Accepted: 23 February 2024  
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**Abstract** Phytosomes represent specialized vesicular structures akin to liposomes, encapsulating active phytoconstituents within a lipid core. Many phytoconstituents, such as glycosides and flavonoids, exhibit hydrophilic properties and encounter challenges traversing lipid-based cellular membranes. Nevertheless, the lipid core of phytosomes enhances their permeability across these barriers, thereby augmenting the bioavailability and efficacy of enclosed plant components. Cancer remains a prominent global cause of mortality, posing significant challenges for existing treatments, which often entail serious side effects associated with conventional approaches like surgery, radiation therapy, and chemotherapy. In exploring alternative strategies, the utilization of herbal active compounds in cancer treatment shows considerable promise in synergizing with conventional methods. While natural plant-derived active components demonstrate robust *in vitro* pharmacological activity, their *in vivo* absorption is often limited. Addressing this constraint, phytosomes emerge as a burgeoning nanotechnology offering a solution by enhancing the adaptability of bioactive

phytoconstituents within lipid-rich barriers. This study delves into a meta-analysis of the physicochemical attributes of phytosomes, elucidating their structural intricacies. Furthermore, the review discusses the advantages and disadvantages of phytosomes as carriers for herbal drugs, shedding light on patented phytosome technologies and associated clinical trials. Additionally, it examines several prominent phytosome-based herbal constituents showcasing notable anticancer properties. Lastly, the review addresses the challenges and potential future directions regarding the use of phytosomes in cancer therapy.

**Keywords** Phytosomes · Herbal medicines · Phospholipid · Nanocarrier · Drug delivery · Liposomes

### Introduction

Cancer arises from the abnormal and uncontrolled activity of transcriptional factors, often driven by genetic mutations. Statistics highlight cancer as a leading cause of death in developed countries. According to a World Health Organization (WHO) report from 2008, there were 13 million new cancer diagnoses and almost 8 million cancer-related deaths globally. Furthermore, projections suggest that by the year 2050, there could be an estimated 27 million new

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