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Research Article

Phytosome Drug Delivery of Natural Products: A Promising Technique for Enhancing Bioavailability

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ABSTRACT

The phytosome technology was developed by Indena markedly enhancing the bioavailability of selected phytomedicines, by incorporating phospholipids into standardized plant extract, which improve their absorption and utilization. Phytosome are advanced form of herbal extract that shows better absorption profile than conventional herbal extract. The present review focus on the preparation and characterization techniques of phytosomes, merits and various landmarks in the field of phytosomes.

Keywords: Bioavailability, Natural Products, Phospholipids, Phytosome, Quercetin

INTRODUCTION

Since the dawn of history traditional medicines have proved their effectiveness for health management[1]. Most of the bioactive plant constituent such as terpenoids, flavonoids, phenolic glycosides and anthocyanins are of highly polar nature (water soluble) i.e hydrophilic in nature. This nature poses great hindrance in absorption of drug as GI membrane (Highly lipophilic) does not permit the passage of highly water soluble substance across it and finally result in poor bioavailability[2]. Bioavailability is the extent and rate at which the active constituent i.e drug or metabolite reaches in the blood and proves clinical efficacy and also minimizes the dose. For a drug to be bioavailable, it should have proper hydrophilicity as well as lipophilicity[3]. In addition, other factors like like poor lipid solubility, improper molecular size, destruction in gut, highly distributed throughout the body, have low plasma half life, poor stability and inefficient to reach the target tissue limit their bioactivity. To overcome all these limitations a number of novel drug delivery systems have been emerged for plant extracts. It includes novel herbal formulations like nanoparticles, nanocapsules, phytosomes, niosomes, transferosomes, ethosomes, pronasomes having remarkable advantage over traditional plant extracts including solubility enhancement, bioavailability improvement, targeted delivery, sustained effect etc[4]. Herbal drug delivery uses various formulation technology to improve drug absorption and provide better efficacy than conventional plant extract[5,6].

Herbosome is a synonym of Phytosome. 'Herbo' or 'Phyto' stands for herbal or plant based and 'some' means cell like. It is a patented technology in which standardized plant extract or polyphenolic compounds (like flavonoid, terpenoids and tannin etc) made to react with phospholipids to form a lipid compatible complex[6]. Phytosomes is a molecular association in which a hybrid bond formation occurs between phosphatidylcholine (PC) and polyphenol, creating a highly lipid-miscible hybrid complex having reduced polarity and ability to cross the biological membrane. Hence improving the bioavailability of polyphenol[7]. Phospholipids are the main building blocks of life and are one of the major components of biological membranes. Phospholipids are regarded as natural digestive aid, having nutritional properties like phos-phatidylserine which acts as a brain cell nutrient, phosphatidylcholine which is helpful in liver cell regeneration, lipid reducing effect and also act as carriers for both polar and non-polar active substances[8]. Various Phospholipids from different sources can be used such as soy lecithin, phosphatidylserine, and 1,2-dioleoyl-Sn-glycero-3- phosphatidylcholine. Phospholipids derived from soybean oil having higher content of phosphatidylcholine offers compatibility and similarity with the biological membrane. Phytosomes are obtained by reacting 2-3 moles or 1 mole of phospholipid such as phosphatidylcholine, phosphatidyl- ethanolamine or phosphatidyl-serine with 1 mole of bioactive component (flavonoids or terpenoids) in an aprotic solvent (dioxane, acetone, methylene chloride, ethyl acetate). The solvent evaporated under vacuum or precipitation with non solvent (aliphatic hydrocarbons), lyophilization (freeze-drying) or spray drying, therefore the complex is isolated[9]. Advantages of phytosomes are better drug entrapment, enhanced absorption of polar Phytoconstituents leading to improved bioavailability, Reduced dose requirement, Better stability profile due to chemical bond formation, improved percutaneous absorption, so act as functional cosmetic. Several companies are involved in production and marketing of

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