INTRODUCTION:
The past century has made a tremendous growth in evaluation of herbal drugs, supplemented by research expansion in the area of pharmaceutical sciences. The ever expanding growth in the area of herbal drugs has established the exact composition of plant extracts and has also tried to explore the potential of their biological activities. The plant constituents when isolated may lead to unpredictable outcome of their biological activities. The plant constituents when isolated may lead to unpredictable outcome of their biological activities and also there are chances of loss of potential pharmacological outcomes. Although standardization is a technique to solve this problem even then decreased bioavailability may limit their clinical utility. This is result of the solubility issues as most of bioactive constituents of phytomedicines are water soluble (e.g. phenolics, glycosides, flavonoids) which lead to poor oral/topical absorption. There are several factors which contribute to poor bioavailability of natural molecules; these include presence multiple rings in phytocnstitents which limit their absorption from gastrointestinal tract into the blood by easy diffusion. Further, some phytomolecules are poorly compatible with oils and lipids thus fail to meet up with the absorption physiology of small intestine. To overcome these drawbacks, several approaches have been developed to boost the oral bioavailability that includes inclusion of solubility and bioavailability enhancer, structural modification and entrapment with lipophilic carriers. These methods have disadvantages of ineffective or inefficient delivery of active constituents of systemic circulation as these methods do not enhance lipophilicity hence further stagnate rate of absorption from small intestine. The new approach to overcome the existing drawback may be the use of phospholipids as a complex with the target drug molecule. These phospholipids complexed drug molecules are called phytosome. The new drug delivery system is well versed with various advantages and has been termed as “phytosome based new drug delivery system”. The system has the advantage of increasing potency of drug, has better stability profiles (due to formation of chemical bond between phosphotidylcholine and herbal extract), and has better skin penetration and an excellent tool for systemic targeting. The phytosome based approach may be used to enhance bioavailability of various potential phytocnstitents including flavonoids.

Flavonoids, has ubiquitous presence in majority of plants and serves various physiological functions crucial for survival. Flavonoids as a plant secondary metabolites are known to have antioxidant, anti-inflammatory, anti-microbial and anti-cancer activity, hepaoto and nephrotoxicity protective activity. These flavonoids are the major bioactive constituents of phytomedicines (e.g. anthocyanidins from bilberry, catechins from green tea, silymarin from milk thistle, amentoflavone from biophytum etc.) yet poor absorption of theirs limit their pharmacological and clinical utility. To solve poor absorption of bioactive
flavonoids earlier researchers used to prepare such dynamic molecules using liposomes; which are formed by mixing a water-soluble substance with phosphatidylcholine. No chemical bond is formed and the phosphatidylcholine molecules surround the water soluble substance. In Phytosome, phospholipid-substrate interaction is due to the formation of hydrogen bonds between the polar head of phospholipids and the polar functional groups of the substrate. This has opened tremendous opportunities to select commonly used traditional medicinal plants, abundantly available in India, to proceed for their standardized plant extract/flavonoid isolation and phytosome preparation for the treatment of severe diseases. Several flavonoids containing drug has been developed in the market and is to be used with improved bioavailability in the form of phytosome. Some of the listed flavonoids are as follow e.g. epigallocatechin-3-gallate, genistein, quercetin, isoquercetin, silibinin, curcumin, rutin, hesperidin&naringenin etc. A lot of herbal drug left from this list containing flavonoids but have very limited use because of poor absorption into the body. Phytosome is to be act as a tool of bioavailability enhancement of poor bioavailable drugs. It is evident from my research studies that phytosome have an improved absorption and bioavailability when compare to conventional means. Most of research studies are focused on silybummarianum (milk thistle), the fruit of which contains a water–soluble phytoconstitents (flavonoids) which are known to have a hepatoprotective effect. But these flavonoids are poorly absorbed. The chief and most potent constituent of milk thistle is silybin. A brief summary of some of the research studies is given as; when single dose of silybin directly bound to phosphotidylcholine (silybinphytosome) are fed, its absorption was approximately seven times more than the absorption from regular milk thistle extract containing 70-80% silymarin content. In another research silymarinphytosome was prepared and has shown its pharmacokinetics in rats. The phytosome was administered to rat orally. The results showed that the bioavailability and biological effects were increase remarkably. Some of the studies have reported the better results produced by consuming ginkgo phytosome than the conventional ginkgo extract. A bioavailability study was conducted oh healthy human volunteers in which it was found that the levels of the flavonoids and terpenes (GBE constituents) peaked after 3 hours and persisted longer last for 5 hours. One study shows that some patients suffering from Reynaud’s disease and intermittent circulation were fed with ginkgo phytosome which was shown to produce a 30-60% greater improvement compared to regular standardized GBE (Ginkgo biloba extract). Acacia catechu is the drug having rich of their flavonoids content but have limited use due to poor bioavailability. Keeping this consideration I have designed present study which will include the use of phytosome as a modern technology increasing for drug bioavailability as well as efficiency of drug delivery system. Phytosome – A newer drug delivery system for A. CatechuAs mentioned, most of the bioactive
constituents of A. Catechu are flavonoids (e.g. kaempferol, dihydrokaempferol, isorhamnetin, quercetin, afzelchin, (-)-epicatechin, of (+) – catechin & procyanidin) which show poor bioavailability. This poor bioavailability of flavonoid is mainly attributed due to two reasons, firstly, they are multiple ring molecules or having a large structure that make it difficult to be absorbed by easy diffusion. Secondly, they demonstrate poor miscibility with oils and alternative lipid, which restrict their absorption. Moreover there is extensive 1st pass metabolism which drastically reduce their bioavailability. To enhance absorption & bioavailability of A. Catechu flavonoids, phytosome technology may prove beneficial. By this method, water soluble flavonoids molecules can be changed into phospholipids drug complexes, called “phytosome”. As for as the potential of phytosome technology concerned, it has a great future for use in formulation technology and applications of hydrophilic plant compounds. Phytosome are higher ready to transition from hydrophilic setting into the phospholipids drug complexes, friendly setting of the intestine cell membrane and from there into the cell, finally reaching the blood. Phospholipids substance generally employed to form drug-phospholipids complexes which are phospholipids from soya, mainly phosphatidylcholine (PC). It is capable water as well as oil/lipid setting and is well absorbed once taken orally. Precise qualitative analysis indicates that phytosome is usually a flavanoids molecules joined with at least one phosphatidylcholine molecule. There is a formation of hybrid molecules due to the interaction between phospholipids and drug. These hybrid molecules are best suited to merge into lipophilic part of the outer semipermeable membrane of enterocytes (intestinal absorptive cell). Phosphatidylcholine do not just act only as a passive “carrier” for the flavonoids in phytosome, itself is a bioactive nutrient with documented clinical efficaciousness for disease, such as liver disorders, and infectious disease. After formation of successful phytosome of A. Catechu, it may enhance the pharmacological activity of A. catechu phytosome such as anti-oxidant activity, antiulcer, antipyretic, antimicrobial activity and anticancer activity and thereby may find a reasonable clinical application.