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A REVIEW ON PHYTOSOMES: AS NOVEL DRUG DELIVERY SYSTEM FOR HERBALPHYTOCHEMICALS ON SKIN AILMENTS

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ABSTRACT

Plant polyphenols as well as other hydrophilic common combinations have been discovered in cutting-edge biochemical and pre-clinical studies to potentially treat skin conditions, various types of malignancy, anti-aging., and a variety of other therapeutic and diagnostic medicine. Because of their low bioavailability through the skin, These substances are a big test due to their hydrophilic character and unique material composition. Phytosomes are most likely a tool that can increase phytoconstituent penetration thru the skin in order to control skin morphology. Present review discusses how phytosomes work on skin disorders, commercial phytosomes and patented technologies for skin disorders.

KEYWORDS: Phytosomes; Flavonoids; Skin Disorders.

INTRODUCTION

The most visible organ is the skin., carries out vital role like regulation of temperature of body as well as the sensations of pressure, temperature, and pain, also is a basic obstacle against pollution and insults to the environment which makes ageing very obvious.[1]

Thinning, sagging, the development of age spots, and skin dryness are all symptoms of ageing. As a result of the increased desire to remain or at least appear young, anti-aging items are in high demand.

The hydrophilic system in herbal products must be in a good state of balance (for absorption through the gastrointestinal tract's liquid phase) and lipophilic to improve biological

availability (to cross lipid biomembrane balance).[2]

In recent decades, there has been a lot of interest in the creation of a novel drug delivery system (NDDS) for herbal products. The novel carriers should preferably meet two criteria. To begin with, it should administer the medication at a pace determined by the body's needs over the course of treatment. Second, it can deliver the herbal drug's active ingredient to the site of action.

Many of the essential nutrients of herbal medicines are simply soluble in water (glycoside, flavonoid); yet, these components can be partially soluble or hydrophobic, which means that the therapeutic effectiveness is lower when applied on a topical basis.[3] Many efforts have been made to increase biological availability by formulating such drugs with the goal of delivering drugs, such as phytosomes and liposomes. This can result in the bio-availability of herbal products compared to conventional herbal extracts by using them in formula development processes.

Indena developed and commercialised Phytosomes, a patent technology that incorporates limited plant extraction or water-soluble nutrients into phospholipids including lecithin extracted from soybeans to create lipid-related structures known as phytosomes. Phytosomes are important for improved skin uptake and the bioavailability of active ingredients (phytoconstituent and phospholipid complexes). PhytoPhospholipid complexes have higher biological activity than equal amounts, orally and topically, of an active ingredient or extract.[4]

COMPARISON OF PHYTOSOME AND LIPOSOME

Many phytosomes have been studied, which show that the phytosomes are bioavailable, absorbed and therapeutically very efficient over liposomes.

Table 1 shows a comparison of phytosomes and liposomes, as well as their arrangement in Fig. 1.

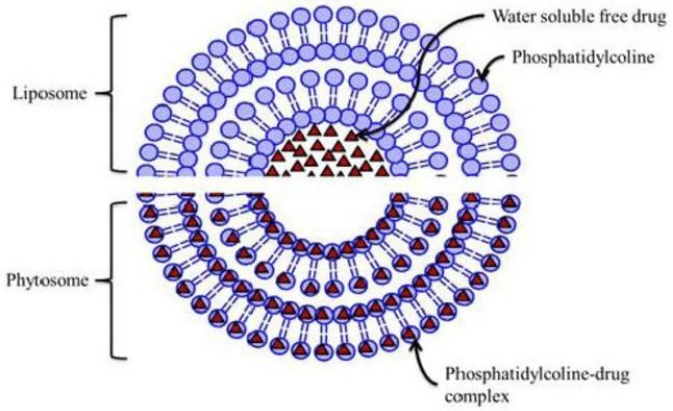

Figure 1: illustrates the distinction between phytosomes and liposomes.

PHYTOSOME COMMERCIAL END-PRODUCTS[8-13]

There are a variety of commercially available Phytosome-based products on the market that have a greater therapeutic function than traditional dosage forms. Table 2 shows a few of them, along with their trademarks, key constituents, origin, dosage, and application.

Table 1: shows the differences between phytosomes and liposomes.

Characteristics	Phytosome	Liposome	Reference
Linkage	Little molecule associated(specially with Phospholipid and polyphenol extract)	Many molecules exist and not all of them are well connected.	[5]
Drug release	Oral distribution is the best.	Oral bioavailability is low.	[6]
Ratio of phospholipids	For its preparation, a 1:1 or 1:2 ratio is desired.	The lipid content is up to ten times that of the active ingredients.	[7]

Table 2: shows Phytosomal products on the market.

Trademark	Key constituents	Origin	Dosage	Application
Centella phytosomes	Triterpene	*Centella asiatica*	-	Cicatrizing, trophoderm
Ginselect phytosomes	Ginsenosides	*Ginkgo biloba*	120mg	Adaptogenic
Greenselect phytosome	Polyphenols	*Camellia sinensis*	-	Free radical scavenging activity
Leucoselect	Polyphenols	*Vitis vinifera*	300mg	Antioxidant
Meriva	Curcuminoids	*Curcuma longa*	200-300mg	Anti-inflammatory

Silymarin.	Silibinin	*Silybum Marianum*	-	Antihepatotoxic
Oleaselect™ phytosome	Olive oil polyphenols	*Olea Europaea*	-	Anti-inflammatory, antioxidant
Visnadin	furanocoumarins	*Ammi visnaga*	-	Circulation improver
Bilberry	Triterpene	*Vaccinium myrtillus*	-	Potent antioxidant
Ruscogenin phytosomes	saponin (steroids)	*Ruscus aculeatus*	-	Anti-inflammatory
Zanthalene phytosomes	Zanthalene	*Zanthoxylum bungeanum*	-	Soothing, anti-itching
Lymphaselect phytosomes	Triterpenes	*Melilotus officinalis*	-	Indicated in insomnia
Sabal Select phytosome	Fatty acid, sterols	*Serenoa repens*	-	Benign prostate hyperplasia
Sericoside phytosome	Sericosides	*Terminalia sericea*	-	Skin improver

PHYTOSOME PREPARED WITH FLAVONOIDS[14]

In the preparation of phytosomes, a variety of herbal key constituents are commonly used. Each active ingredient has its own set of characteristics and therapeutic effects. Table 3 shows some of the most common flavonoids.

Table 3: Common Flavonoids Used In Phytosome Preparation.

S.NO	Flavonoid/chief constituents	Plant name
1.	Genistein	Soy tea
2.	Naringenin	Orange
3.	Isoquercetin	Onion buckwheat hyptis fasciculate
4.	EGCG	Green tea

ADVANTAGE OF PHYTOSOMES[15]

- Phytosome is a superior bioavailable herbal extract that increases bioavailability by forming a phospholipid-based complex that allows for better ingestion in the intestine, resulting in a substantially improved remedial effect.
- The non-lipophilic herbal extract is infused with phytosome, which permits it to be very much retained in the lumen.
- As involved constituents are absorbed, the dosage condition becomes more concentrated, allowing for the achievement of the desired effects.
- Promotes liver targeting by expanding the dissolvability of bile in natural constituents.[16]

- Phosphatidylcholine is a phospholipid that is used to make phytosomes., is both a transporter and an antihepatotoxic, as a consequence, there is a synergistic impact
- Phosphatidylcholine, a part of the cell film that is utilized in phytosome innovation, acts as a messenger and nourishes theepidermis.
- Because of the lipid layer that surrounds phytoconstituents, Phytosomes are capable of penetrating the skin, increasing their effectiveness.
- During the formulation process, there is no risk of drug entrapment.
- Furthermore, since the medication structures vesicles after formation with lipids, the entanglement viability is high and foreordained.
- Phytosomes are relatively easy to make, requiring little in the way of complex methodological investment.[17]

The benefit of phytosomes is depicted diagrammatically in Fig. 2.[18]

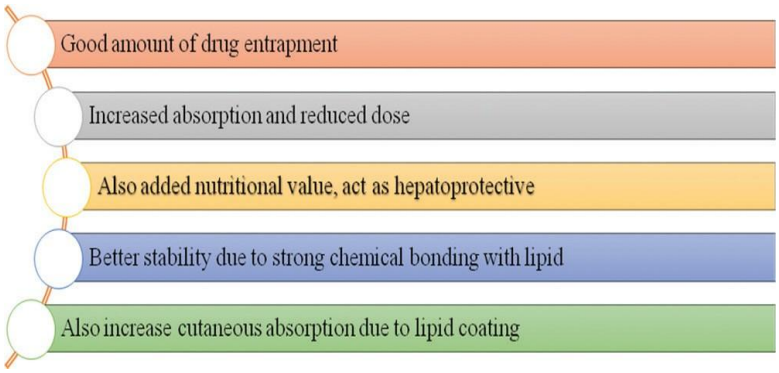

Fig. 2: Advantage of phytosome.

Phytosomes on skin ailments

Phytosomes are fat soluble in nature (Fig.3) and increment effective retention of complex particles, resulting in enhance action in skin capacities like nourishing, collagen construction, and equilibrium of protiens, among others. Absorbency on the skin of life-sustaining phytoconstituents allows localization in the required area. Herbal compounds are amplified by the phytosome process, which improves absorption, bioavailability, and this distribution.[18] The Phytosome Provides significantly increased bioavailability and quicker and improved retention through the skin by consolidating the action of emulsification of the phospholipid with the normalized natural concentrates.[19] As result, utilizing characteristic.

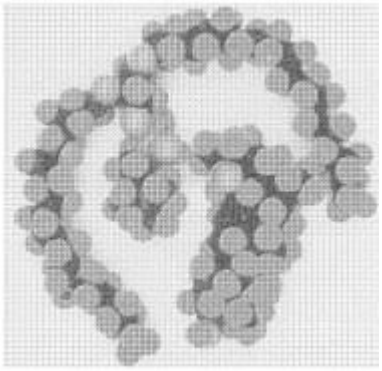

Fig 3: The cellular structure of the phytosome is organised.[20]

pasphytosomes builds retention, supports the skin, and capacities as a corrective. The use of phytosome as a topical medicinal and cosmetic agent with better effectiveness and protection results in proper herbal use for skin ailments.

Age-related changes in skin texture and appearance

The texture of the skin is shown in Figure 4 A person's skin aging is largely the result of vulnerability to ultraviolet radiation. Skin ageing is seperated into two kinds: natural and external. Natural maturing is brought about by the progression of time and addresses a person's hereditary historyIt is unavoidable; in this manner, it is outside deliberate ability to control. external maturing is brought about by outer factors like smoking, exorbitant utilization of liquor, helpless nourishment and sun openness. Since it is unavoidable, this phenomenon is known as premature ageing. The use of antioxidants effectively protects against these forms of ageing.[22]

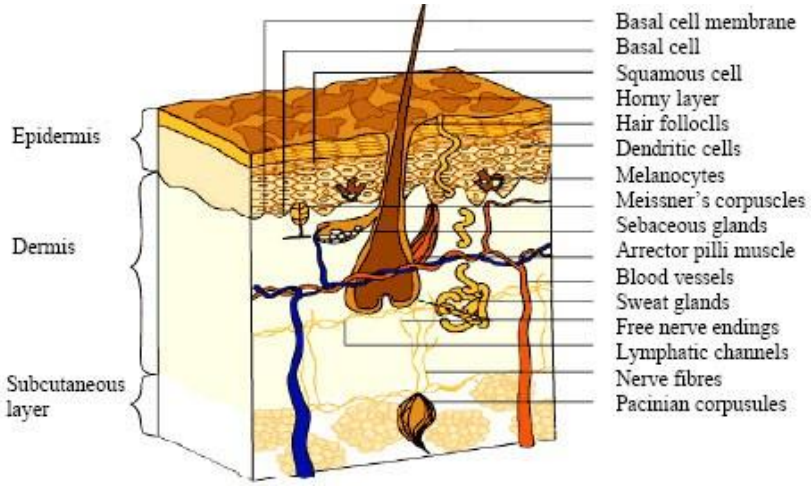

Figure 4: Skin Structure.[21]

Normal ageing symptoms[23]

1. Creases of the skin
2. Dainty and straightforward skin
3. Dry skin that may itch
4. Incapability to sweat effectively enough to keep the skin cool.
5. Bone loss causes bones to recede from the tissue which is the result of flabby skin.

External signs of ageing

1. Creases of the skin
2. Toxicity by products
3. Complexion that is uneven
4. Brown itchy bumps as well as a wrinkled texture.
5. Skin that has progressed over the years..

Some Skin Issues

1. Skin inflammation, otherwise called atopic dermatitis, is a skin problem described by redness, expanding, tingling and scaling.[24]
2. Acne is a skin allergic disease that causes zits or blisters, particularly on the face, and affects the sebum and hair follicles.[25]
3. Freckles are one category of melasma that is caused by skin's oxidation reaction to ultraviolet.

A few Examples of Plants Beneficial For Skin conditions

Herbs have been used medicinally and cosmetically worldwide since ancient times. There is a growing need for naturals or herbal remedies and cosmetics. When applied topically, a few of the herbals mentioned in Table 4 can be used as makeup and antidotes. Herbal constituents can be effectively used as cosmetics for skin disorders using phytosome systems.

Table 4: Plant having cosmetic properties that can help with skin problems.

Name of plant	Active constituents	Pharmaceutical use	Cosmetic use	Reference
Areca catechu	Catechin	Anti cancer	Antioxidant	Evans (2001)
Crocus sativus	Crocetin	Antiinflammatory	Protective	Eiji *et al.* (2006)
Curcuma longa	Curcumin	Hepatoprotective	Antibacterial	Chandra and Gupta (1972)
Glycyrrhiza glabra	Glycyrrhizin	Antiinflammatory	Skin whitener	Blanchi *et al.* (1989)
Green tea	Chammomile	Antiinflammatory	Photoprotective	Franco and Bombardilli (1988)
Crataevea nurula	Lupeol	Antiinflammatory	Antiaging	Geetha and Mahalaxmi (1999)
Rosemarinus ufficinalis	Rosemarry	Antiinflamatory	Antiaging	Geetha and Mahalaxmi (1999)
Buckwheat seeds	Rutin	Antiinflamatory	Antiwrinkle	Bunney (1984)
Embellica officinale	Ascorbic acid, Tannins	Free radical scavenger	Protective	Buchman (1987)
Ginkgo biloba	Ginkgo	Antioxidant	Skin tonic	Loggia *et al.* (1996)
Centella asiatica	Centella	Antioxidant	Skin firming/ conditioning	Dweck (1996)
Psorolia corlifolia	Psorolin	Leprosy and vitiligo	Skin staining and pigmenting agent	Ashawat *et al.* (2007a)
Citrus lemonus	Hesperitin	Antibacterial	Fungal infection of skin	Hutchens (1973)
Aloe vera	Aloin	In burn treatment and protective	Antidermatitis	Ashawat *et al.* (2007b)
Aricaria recutita	Chamomile	Anti-inflammatory	Antipholigistic	Safayhi (1994)
Thea viridis	Gallic acid, catechin, rutin	Astringent	Anti-oxidant	Safayhi (1994)
Vitis vinifera	Carotene	Intestinal haemorrhage,	Eczema	Schauenberg and Paris (1990)
Daucus carota	β-Carotene	Cheratoplastic	UV protection	Merck (1991)
Lycopersicon esculentum	Tamotine and tamotidine	Potent bacteriostatic	Potent bacteriostatic	Merck (1991)
Allium sativum	Alliin and allicin	Anticancer and in Cardiac diseases	Antioxidant	Dewick (1999)
Hamamelis virginiana	Gallic acid	Haemostatic	Cooling agent	Swoboda and Meurer (1992)

Commercial Phytosome which can be used for skin disorders

- Ginkgo Biloba Terpenes Phytosome was demonstrated to be successful on calming singular contact responses to different substances contained in effective plans.[26]
- In experimental models, the well-known relaxing effect of Silymarin was found to be expanded by in excess of multiple times in Silymarin Phytosome. The improvement in the activity of the phytosome structure differs from free dynamic requirements due to the complex's preference for skin phospholipids.[27]
- The complex's phospholipids have liposomial-like properties, which contribute to water retention of the corneous top surface. The transdermic behavior of Ginselect Phytosome can be attributed to the ginseng saponins found in the phosphatidylcholine complex.[28]

Some patented phytosome related innovations for skin issues

Table 5 lists several patents for phytosomes, as well as their uses and inventions.

Table 5: Some patented phytosome-related technologies for skin problems.

License title	New ideas	Reference
Sorbitol furfural fatty acid monoesters and formulations for topical & dermatological application	Unsaturated fat monoesters of sorbityl furfural chose from two diff arrangement of mixtures in which side chain is a straight or spread C3 - C19 alkyl revolutionary alternatively containing at any rate one ethylenic unsaturation	29
For prevention of ageing or sun - damaged skin, a cosmetic and dermatological formulation	Formulation for the diagnosis of sun - damaged or ageing skin.Organization for skin treatment of the skin includes a substance that animates collagen blend and a substance that improves the cooperation between extracellular grid and fibroblasts. For oral administration, a cosmetic or dermatological formulation is used.	30
Thymosin β4 is used to treat skin and heal wounds.	Formulations and strategies for using thymosin β4 to treat skin.	31
Saponin-phospholipid complexes, as well as cosmetics and pharmaceutical formulations involving them	Saponin-phospholipid complexes have a strong lipophilic and enhanced bioavailability, making them ideal to be used as an active component in medicinal, dermatologic, & aesthetic formulations.	32

CONCLUSION

Because of typical drug constituents characteristics like weak lipid, watery liquidity, inadequate sub-atomic scale, and low in vivo action, many plant extracts and bioactive components have incredible natural activity in vitro but low in vivo action., disintegration of components throughout the gut, and so on. As a result of these issues, phyto-constituent absorption is reduced. Complexes containing phospholipids can be used to improve low absorption problems. As a result, phytosomal preparation improves the bioavailability of

active constituents by making them more permeable and easier to cross biological membranes. In both normal and stressed environmental conditions, To shield the skin from intrinsic and extrinsic risks, phytosomal specifics may be used as cosmetics. Many new commercially significant plant extracts will later on, it would most certainly be differentiated in order to evaluate skin issues.

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