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A review on topical preparation of green expertise of herbal drugs used in liposomal delivery of anti-ageing

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Abstract

Design and development of universe healing power of promising technique in herb nutraceuticals for the novel drug delivery system of natural product therapy is the one of the best scientific innovative discovery of cosmeceuticals encapsulated bilayered targeted formulation for the delivery of active ingredients in dermatology which treats sign of both intrinsic and extrinsic ageing actors is the remarkable advantages over conventional formulation to enhancement of pharmacological activity and protect from physical-chemical degradation. Moringa oil has antiseptic and inflammatory properties and has been used to treat and heal minor skin abrasions, minor cuts, rashes, sunburn and skin infection. Chia oil is a great bet for restoring vital moisture and inhibiting the antioxidants that protect the skin from free radicals plus its high concentration of omega-3 and omega-6 fatty acids build collagen, which is key for maintaining a youthful glow. Flaxseed oil helps to repair the skin's cells, showing a marked improvement in elasticity, firmness, tone and prevent the skin from drying out and ageing because of essential omega-3 fatty acids and omega-6 fatty acids. Without a plant, humans and another living organism can't live and nature is always a golden sign to show prominent phenomena of co-existence.

Keywords: Herb-nutraceuticals, conventional, cosmeceuticals, dermatology.

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1. Introduction

Liposomes term was discovered by Paul Ehrlich in 1906 as a targeted delivery. Since first being described by English haematologist Alec Bangham, in 1961[1], first described artificial lipid vesicles also called liposomes and the first liposomal cosmetic product introduced into the commercial market was the capture anti-ageing cream by firm Christian Dior in 1986. Since then the active research in the field of liposomes have been carried out and their applications are now established in various areas, such as drug, cosmetics, and gene delivery etc [2].

Liposomes are sphere-shaped vesicle and mainly consists of phosphor lipid bilayer encircling a polar core[3] where the water-soluble pharmaceutical active ingredients are encapsulated (i.e. central core) hydrophilic heads while the hydrophobic part consisting of two fatty acid chains, can incorporate hydrophobic pharmaceutical ingredients [4,5].

The encapsulation process in the pharmaceutical industry is utilized in fragrances to yield a sustained release, to protect volatile component present in the formulation as well as providing a delayed release in some products [6,7]. It has been estimated that 50% of the US public are aware of anti-ageing therapies [8], and 2000, sales of topical anti-ageing preparations and herbal product is the large proportion of this market [9].

Topical application of anti-ageing formulations has been adopted as an important strategy as they serve as a non-invasive alternative to slow the effects of ageing on the skin and the stratum corneum or horny layer has been identified as the principle barrier for penetration of most drugs and liposome based formulations have been found to extremely promising for topical delivery [10].

1.1 Liposome

Liposomes are spherical colloidal, vesicles in which their central aqueous section is surrounded by one or more of a bilayer membrane (Lamella) that is frequently enclosed by aquatic environments which have uncharged positively, negatively or 2 oppositely charged polar heads and in the formation of membrane natural or synthetic phospholipids in which adding cholesterol will increase their stability and lecithin is an another phospholipids which mostly extracted from natural source such as egg, soya bean[11,12]. They can vary in size from 15 nm to several microns. In the last 30 years, the application of liposome has been expanded from drug delivery to the cosmetic field [13].

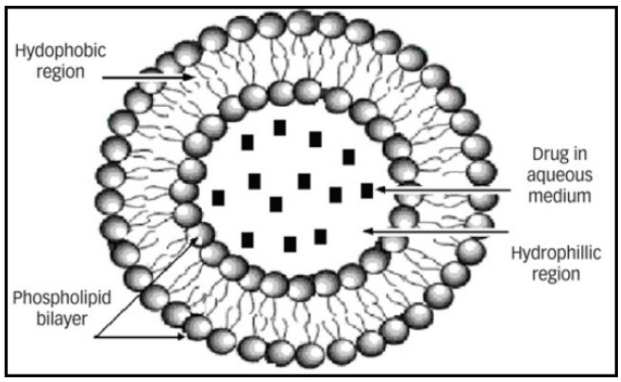


Figure 1: Structure of liposomes

2. Types of Cosmetic Liposomes

Table 1: Discussion of types of liposomes used in cosmetic preparation [14-20]

Cosmetics Liposomes	Descriptions
Transferosomes	They are highly deformable, reactive and efficient liposomes applied until now direct transdermal drug delivery and its dimension (300-200nm) so they can easily penetrate the skin and prepared by phospholipids, cholesterol with the addition of some surfactants.
Navasomes	They are non-phospholipid oligolamellar lipid vesicles of 0.1-1.0 microns that are a variety of liposome or modified niosomes and in cosmetic, they used as a sustain released and improve the texture of cosmetic.
Marinosome	These types are made from marine lipid extract that contains a high rate of Eicosapentaenoic acid Docosahexaenoic acid that is omega-3 polyunsaturated fatty acid and they heal the skin's inflammatory problems.
Ultrasome	They are a unique category of liposomes which are formed by entrapment of the endonuclease extracted from micrococcus luteus. They help to detect UV radiation harm to the skin and increase the speed of treatment 4 times.
Photosomes	They act by releasing photolysis enzymes extracted from the marine plant. They are extensively used in sunscreens which prevent light from damageing cell's DNA and reduce the risk of cancer.
Ethosomes	These are multilayered liposomes used in cosmeceuticals delivery to enhance the bioavailability.
Nanosome	They are very small liposomes formed from highly pure phosphatidylcholine in a low nanometer size range. They applied as an anti-ageing serum.
Glycerosome	They are modified liposomes containing glycerol in addition to phospholipids. They used to deliver cosmeceutical active ingredient to the skin with high performance, healing, beautification properties and they contain quercetin and its size 80-110nm shows skin defensive activity
Oleosome	They are natural liposomes and a reservoir of oil, vitamins, and pigments. They are made up of sea buckthorn fruits-flesh demonstrated high stability and antioxidant properties.

3. Mechanism action of liposome

The activity of liposomal formulations in ageing is attributed to its occlusive action, enhanced bioavailability, and protection of active ingredients, reduction of systemic absorption and reduction of side-effects. Liposomes as a carrier itself offer the advantages because lipids are well hydrated and cosmetic containing liposomes rely on this effect can reduce the dryness of the skin which is the primary cause for skin ageing. [21]

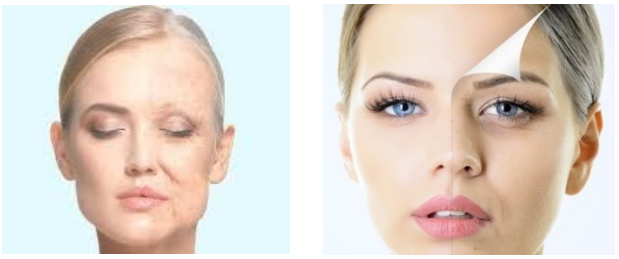
Table 2: Liposomes characterization

Assays	PH, phospholipid concentration and composition, drug concentration, cholesterol concentration
Chemical stability	Phospholipid peroxidation, phospholipid hydrolysis, cholesterol autooxidation, antioxidant degradation
Physical stability	Vesicle size distribution, number of bilayers, encapsulation efficiency, dilution-dependent drug release, electrical surface potential
Biological characterization	Sterility, pyrogenicity, animal toxicity

4. Skin ageing

Ageing is defined as a progressive deterioration of physiological function in the organism, eventually leading to senseless and death. [22]

The sign of ageing includes fine lines and wrinkles, alterations in skin pigmentation, and thinner appearance of the skin due to epidermal and dermal atrophy [23].



(a) **(b)**

Figure 2: Structure of (a) Skin ageing (b) Anti-ageing

4.1 Anti-ageing

Increasing the expectancy of median life as well as improving the quality of life and preventing the consequences of ageing are receiving great attention in research at present[24] Everlasting youth has always interested humankind, now the goal of youth has changed to increase the duration of healthy lifestyle of an individual rather than increasing the life span only.[25] Cosmeceutical formulations, researchers and pharmacists are paying extra attention to the ageing consequences in the skin, trying to find a cost-effective solution to a difficult problem. Estimates show that 2 billion dollars were spent on anti-ageing product in the United States in 2000. [26]

4.2 Types of Skin ageing

Ageing can be divided into two categories: Intrinsic or chronological ageing and extrinsic or premature ageing. [27]

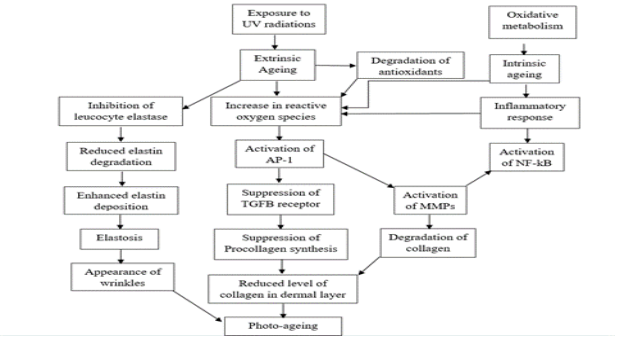


Figure 3: Mechanism of Ageing

4.2.1 Intrinsic Ageing

Intrinsic ageing is a natural occurrence in which numerous simultaneous mechanisms occur. Dead skin cells do not shed as quickly, and the turnover of new skin cells may decrease slightly. The sign of intrinsic ageing are as follows; Fine wrinkles, thin and transparent skin, loss of underlying fat leading to hollowed cheeks and eye sockets, bones shrink, hair loss ridges develop.[28]

4.2.2 Extrinsic Ageing

Extrinsic ageing is caused by exogenous origin, i.e. smoking, poor nutrition, and solar exposure. These factors are responsible for premature ageing of the skin. Loss in tone and elasticity is observed along with increased skin fragility, benign lesions. [29]

(a)

(b)

Figure 4: Clinical appearance of intrinsic (a) and extrinsic (b) ageing of skin

4.3 Antioxidants used in anti-ageing products

Antioxidants play an important role in the prevention of ageing. Many antioxidants are now available in oral and topical preparations. Combination of various antioxidants may have synergistic effects. Various antioxidant actives used in anti-ageing formulations are as follows.[30]

4.3.1 Retinol

Vitamin A has antioxidant activity it is used to treat the skin ageing and it also has a nutritive value which enhanced the skin activity when applied topically and also helpful for eyes. [31]

4.3.2 Alpha Lipoic acid

It is the most potent antioxidant in the market today. It enhanced the skin cell metabolism and helps repairs aged skin and restores the level of glutathione, a protective antioxidant, and detoxification compound, to near normal. [32]

4.3.3 Ascorbic acid

Vitamin C is a highly water-soluble, sugar- like, low molecular weight ketolactone. It is a proven anti-wrinkle treatment that works as both a free radical scavenger and it enhanced the collagen reduction.[33]

4.3.4 Lycopene

It is a bright red carotenoid antioxidant and quenchers for free radicals.[34]

4.3.5 Tocopherol

Vitamin E is a lipid-soluble antioxidant that is present in the skin and found in various food such as

vegetables, seeds, and meat. It makes skin repair itself and epidermis is likely less dry out [35]

Table 4: Green extract used in loaded cream formation [36, 37]

Botanical name	Family	Part used	Nature of extract	Antioxidant	Nature of cream	Oil phase	Emulsifier
Acacia	Mimosaceae	Bark	Ethanol	Phlobatannin	Simple W/O cream	Paraffin oil	ABIL EM 90
Benincasa hispida	Cucurbitaceae	Fruit	Petroleum ether	Caffeic acid	Simple W/O cream	Cetyl alcohol	Polysorbate
Camellia sinensis	Theaceae	Leaves	Ethanol	Epigallocatechin gallate	Simple W/O cream	Paraffin oil	AMBIL EM 90
Punica granatum	Punicaceae	Seeds	Ethanol	Ellagic acid	Simple W/O	Paraffin oil	ABIL EM 90
Crocus sativum	Iridaceae	Flower	Ethanol	Lycopene	Simple W/O	Paraffin oil	ABIL EM 90

Table 4: Commonly used plant parts and its active constituents in anti-ageing formulations [38-40]

Source	Common name	Plant part used in anti-ageing	Action	Active constituents
Anethum graveolens	Dill	Seed oil extract	Detoxifying enzyme, boost elasticity, Anti-ageing	Carvone, limonene, cineole, dillapiol
Aloe vera	Aloe	Aloe vera gel	Moisturizing, vitamin E, A and C and production of collagen, Anti-ageing	Beta-carotene, Aloin, chrisophanic acid, aloe amodine
Anana comosus	Pineapple	Pulp extract	Antioxidant, reduce wrinkle, Anti-ageing	Bromelin, Ascorbic acid, Retinol.
Arctosta phylosuva-ursi	Bearberry	Leaf extract	Brightening skin, Anti-ageing	Arbutin, quercitin, hyperin
Arctium lappa	Burdock	Fruit extract	Treat acne, Anti-ageing	Caffeylquinic
Artemisia vulgaris	Mugwort	Leaf extract	Antioxidant and vitamin E, Anti-ageing	Cieole, thujone
Aspalathus linearis	Rooibos tea plant	Leaf extract	Antioxidant, Anti-ageing	Benzoic acid, cinnamic acid
Tamarind indica	Indian date	Seed oil	Antioxidant, anti-ageing	Malic acid, pectin, safrole
Carica papaya	Papaya	Seed extract	Antioxidant, anti-ageing	Papain, ascorbic acid, quimiopapain
Crocus sativum	Saffron	Flower part	Anti-ageing, Anti-ageing	Safranal, crocetin, crocin
Curcurbita pepo	Pumpkin	Seed oil	Vitamin c, Antioxidant, Anti-ageing	Cucurbioside A, Lariciresinol
Citrus limon	Lemon	Fruit extract, seed oil	Antioxidant, anti-ageing	Linalool, geraniol, linalyl acetate
Citrus aurantium	Orange	Orange stem extract	Anti-wrinkle, anti-photo-ageing agent	Carveol, carvone
Cinnamomum camphora	Camphor	Stem extract oil	Anti-ageing, anti-wrinkle	Cineole, butenoic acid, safrole
Rubus fruticosus	Blackberry	Leaf extract	Anti-aging, anti-wrinkle	Gallic acid, quercetin, tocopherol
Olea europaea	Olive	Leaf extract	Anti-ageing	Oleic acid, tyrosol
Juglans regia	Walnut	Fruit oil extract	Anti-ageing, anti-oxidant	Ferulic acid, vanillic acid, coumaric acid
Moringa oleifera	Drumstick	Moringa oil	Anti-ageing, Antioxidant	Niazinin A, niazimicin A, nonanal
Linumus itatissimum	Linseed	Flaxseed oil	Anti-ageing, Antioxidant, Omeg-3 fatty acid	Linamarin, linustatin, lotaustralin
Salvia hispanica	Chia	Chia oil	Anti-ageing	Linoleic acid, stearic acid
Centella asciatica	Gotu kola	Leaf extract	Increase collagen, anti-ageing, antioxidant	Asiatic acid, madecassic acid
Punica Granatum	Pomegranate	Seed oil	Vitamin C, Anti-ageing	Ellagic acid, punicalagins
Thymus Vulgaris	Ajwain	Thymol seed oil	Antioxidants, anti-ageing	p-cymene, linalool, myrcene
Trigonellafoenum Graecum	Fenugreek	Seed oil	Anti-ageing	Cinnamic acid, scopoletin
Piper cubeba	Cubeb	Seed oil	Anti-aging	Cubebene, germacrene
Indian gooseberry	Amla	Fruit extract	Antioxidant, Anti-ageing	Ascorbic acid, chebulinic acid
Cocos nucifera	Coconut	Kernel extract	Anti-wrinkles, Anti-aging	Lauric acid, poleic acid, capric acid
Nigella sativa	Cumin	Seed oil	Anti-wrinkles, Anti-ageing	Myrcene, cumin aldehyde, p-cymene
Rosa rubiginose	Rose	Flower extract	Anti-ageing	Citronellol, geraniol. Linalool
Azadiracta indica	Neem	Seed oil	Antioxidant, Anti-ageing	Nimbin, azadirachin
Mangifer aindica	Mango	Seed oil	Collagen production, Anti-ageing	Palmitic, linoleic acid, behenic
Ocimum tenuiflorum	Tulsi	Leaf extract	Antioxidant, Anti-ageing	Rosmarinic acid, eugenol, oleanolic acid
Cymbopogon	Lemon grass	Leaf extract	Antioxidant, Anti-ageing	Myrcene, geraniol,
Lagenaria	Laukidf	Seed oil	Anti-wrinkle, Anti ageing	

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Table 5: Equipment used for *in vivo* characterization of botanical cream [41,42]

S. No.	Equipment	Purpose of use
1	Mexameter	Erythema analysis transepidermal
2	Tewameter	Water loss evaluation
3	Evaporimeter	Barrier function test
4	Corneometer	Detection of skin hydration
5	Sebumeter	Assessment of skin surface sebum
6	Visiometer	Wrinkle test
7	Cutometer	Measurement of skin elasticity

Table 6: List of some articles and years and their conclusion

Title	Conclusion	Reference
Liposomal Vitamin D3 as an Anti-ageing agent for the Skin	Excessive exposure to sunlight causes skin photo aging, VD3 was found to have a good protective effect from UV radiation and photo aging. Of course, there are still some remaining issues to be overcome, such as stability and skin uptake of VD3. In 1987, Christian Dior launched the first liposomes cosmetic "Capture". Since then, this class of cosmetic has received positive attention, finally, VD3 liposomes could significantly improve skin appearance and protect from photo aging the skincare field.	[43,44]
Isoflavones-Based Liposome Formulations as Anti-ageing for Skincare	Isoflavones based modified liposomes help to protect skin from ageing and provides antioxidant, prevent from loss of moisture and enhance the glow of the skin	[45-48]
Anti-Inflammatory and Skin Barrier Repair Effects of Topical Application of Some Plant Oils	Plant oil has so many effects on the skin it provides the antioxidants to the body also work as anti-ageing and heal the body and develop dermatological treatments.	[49-52]
Liposomes in Cosmetics	Liposomes play an important in the topical delivery which enhanced the beauty and provide the stability of the cosmetic and release of active principal to the targeted site.	[53,54]
Recent Advances in Liposomal Drug Delivery	Liposomes have been used in many pharmaceutical applications. Now a time by the help of liposomal delivery we promote the natural things and to fulfil the human needs so we need to develop different formulation against ageing.	[55-57]
Promotional of the Stability of Liposomal formulations for Anti-ageing Therapy	Lycopene is an essential antioxidant for the prevention of several pathological conditions so lycopene liposomal formulation is a new technique to improve the stability of formulation.	[58-60]
Liposomal drug delivery system	Drugs encapsulated in liposomes can have a significantly altered pharmacokinetics; the efficacy of the liposomal formulation depends on its ability to deliver the drug molecular to the targeted sites.	[61,62]
Liposomes: As a Topical Drug Delivery System	Liposomes are interesting as a drug carrier and its formulation provide sustained, enhanced level of deeper strata of the skin and enhanced the systemic absorption.	[63,64]
Antioxidants in skin ageing-Future of dermatology	We all can truly "look as young as we feel" by applying topical antioxidants. It may increase the lifelong and enhanced the beauty and free from disease condition.	[65,66]
Local therapy as basic anti-ageing prevention	Skin is the largest organ of the body, is the organ in which changes associated which ageing are most visible. By the application of the natural anti-ageing product, we can feel the relief against ageing.	[67,68]

5. Conclusion

The universal healing power and regaining the health by natural therapy; while using one concept i.e. liposomal based drug delivery system against ageing. It is the new weapon of treatment evolved from recognition of a link between nutrition and pharmaceuticals which are beneficial to overall the health. It is advanced drug delivery technology utilized to present the drug to the desired body site for drug release and absorption and prevent from ageing. Today ageing is a most common disease which causes an abnormality of bodily structure or function due to intrinsic or extrinsic factor and can treat by using food or part of food in a modified therapy which is beneficial to overall the health. Now a new and natural therapy is available in a liposomal form that heals and treats the ageing process and inhibits the ageing and supply antioxidants in the form of known term anti-ageing.

Conflicts of interests

The authors declare no conflict of interest.

References

[1]. Bangham A. Standish, M.M; Watkins, J. Diffusion of univalent ions across the lamellae of swollen phospholipids. *J. Mol. Biol.*1965; 13; 238-252.

[2]. Torchilin, V, Weissig, V Liposomes: A Practical Approach; Oxford University Press: Kettering, UK, 2003: pp.77-101.
[3]. Vemuri S, Rhodes CT: Preparation and characterization of liposomes a therapeutic delivery system: a review, *Pharmaceutica Acta Helvetiae*, 1995; 70(2): 95-111.
[4]. Khan I, Elhissi A, Shah M, Alhnan MA, Waqar A. Liposome based carrier systems and devices used for pulmonary drug delivery. In: DAVIM JP (ed.) Biomaterial and medical tribology research and development, 2013; pp. 395-443.
[5]. Khan I, Yousaf S, Subramanian S, Alhnan M A, Ahmed W, et al, Proliposome Powders for the Generation of Liposomes: the Influence of Carboghydrate Carrier and Separation Conditions on Crystallinity and Entrapment of a Model Antiasthma Steroid. *AAPS Pharm Sci Tech*, 2007; p.1-13.
[6]. Brannon Peppas L Controlled Release in the Food and Cosmetics Industries in Polymeric. *Delivery Systems American Chemical Society*, 1993; p: 42-52.
[7]. Kirby C, Gregoriadis G Dehydration Rehydration Vesicles: A Simple Method for High Yield Drug Entrapment in Leptosomes, 1984; 2: 979-984.
[8]. Herris Interactive Inc. Anti-ageing medicine, vitamins, minerals and food supplements: a public opinion survey conducted for the International Longevity Center. *J Anti Ageing Med*, 2003;6: 83-90.
[9]. Thornefeldt C. Cosmeceuticals containing herb: facts, fiction and future. *Dermatol Surg* 2005; 37: 873-80.
[10]. Morrow PA, McCarron AD. D. I. J. Woolfson and R. F Donnelly Innovative Strategies for Enhancing Topical and *Transdermal Drug Delivery Open Deliv J* p. 2007; 36-59.
[11]. Nastruzzi C, Esposito E, Menegatti E, Walde P. Use ano stability of liposomes in dermatological preparations. *J Appl Cosmetol*, 1993;11:77-91.
[12]. Scholtz JC. Liposomes as drug delivery system. 2010.
[13]. Patravale VB, Mandawgade SD. Novel cosmetic delivery systems: an application update. *Int J Cosmet Sci* 2008; 30(1):19-33. Doi: 10.1111/j.1468-2494.2008.00416.x.
[14]. Kurapati S. The current role of nanomaterials in cosmetics. *J Chem Pharm Res*. 2016;8(5):906-14.
[15]. Reva T, Vaseem AA, Satyaprakash S, Md. Khalid JA. Liposomes: The novel approach in cosmaceuticals. *Word J Pharm Pharm Sci*. 2015;4(6):1616-40.
[16]. Singh A, Malviya R, Sharma PK. Novasome-a breakthrough in pharmaceutical technology a review article. *Adv Biol Res.* 2011; 5:184-9.
[17]. Karimi N, Ghanbarzadeh B, Hamishehkhar H, Keyvani F, Pezeshki A, Gholian MM. Phytosome and liposome: the beneficial encapsulation system in drug delivery and food application. *J Appl Food Biotechnol.* 2015;2(3):17-26.
[18]. Tapas KP, Oli M. Prospect of nanotechnology in cosmetics: benefit and risk assessment. *World J Pharm Res.* 2014;3(2):1909-19
[19]. Ganesan P, Choi DK. Current application of phytocompound-based nanocosmeceuticals for beauty and skin therapy. *Int J Nanomedicine*. 2016;11:1987-2007.doi: 10.2147/IJN.S14701.
[20]. Socaciu C. New Technologies to synthesize. Extract and encapsulate natural food colorants. *Bull Univ Agric Sci Vet Med Cluj-Napoca Animal Sci Biotechnol*. 2009;64(1-2).
[21]. Tripathi K, Evaluation S.G. Chaurasiya, and P. Katare Liposomal Current Recent Advances *Int J Curr Pharm Res*, 2013; vol no 3p:5:4-14.
[22]. Wlaschek M, Tantcheva-Poor I, Naderi L, Ma W, Schneider LA, Razi-Wolf Z, et al. Solar UV irradiation and dermal photoaging. *J Photochem Photobiol* 2001;63:41-51.
[23]. Chui A, Kimball AB. Topical vitamins, minerals, and botanical ingredients as a modulators of environmental and chronological skin damage. *Br J Dermatol* 2003;149:681-91.
[24]. Makrantonaki E, Zouboulis CC The skin mirror of the ageing process in the human organism. State of the art and results of the ageing research in the German National Genome Research Network 2 (NGFN-2), 2007; 42(9): 879-886.
[25]. Ho YS, So KF, Chang RC Anti-ageing herbal medicine. How and why can they be used in aging-associated neurodegenerative diseases. *Ageing Research Reviews,* 2010; 9(3): 354-362.
[26]. Thomas J Regan, Dixon Tatiana K, Bhattacharyya Tapan K, Effects of Topicals on the Ageing Skin Process, 2013; 21(1): 55-60.
[27]. Rabe JH, Mamelak AJ, McElgunn PJ, Morison WL, Sauder DN. Photoaging, mechanisms and repair. *J Am Acad Dermatol* 2006;55:1-19.
[28]. Holtkotter O, Schlotmann K, Hofheinz H, Olbrisch RR, Petersohn D. Unveiling the molecular basis of intrinsic skin ageing. *Int J Cosmet Sci* 2005;27:263-9.
[29]. Sudel KM, Venzke K, Mielke H, Breitenbach U, Mundt C, Japers S, et al. Novel aspects of intrinsic and extrinsic ageinghuman skin: Beneficial effects of soy extract. *J Photochem Photobiol* 2005;18:581-7.
[30]. Lever I, Kumar P, Marks R. Topical retinoic acid for treatment of solar damage. Br J Derma 1990;122:91-8.
[31]. Kligman LH, Duo CH, Kligman AM. Topical retinoic acid enhances the repair of ultraviolet damaged dermal connective tissue. *Connect Tissue Res* 1984;12:139-50.
[32]. Suh J, Wang H, Liu R, Liu J, Hagen T. (R) –alpha-lipoic acid reverses the age-related loss in Glutathione redox status in post-mitotic tissue: Evidence for increased cysteine requirement for Glutathione synthesis. *Arch Biochem Biophys* 2004;423:126-35.
[33]. Colven RM, Pinnell SR. Topical vitamin C in aging. *Clin Derma* 1996;14:227-34.
[34]. Srinivasan M, Sudheer AR, Pillai KR, Kumar PR, Sudhakaran PR, Menon VP. Lycopene as a natural protector against gamma-radiation induced DNA damaged, lipid peroxidation, and *in vitro*. *Biochim Biophys Act* 2007;1770:659-65.

[35]. Mayer P, Pittermann W, Wallat S. The effects of vitamin E on the skin. Cosmet Toil 1993;108:99-109.
[36]. A. Ali, Akhtar .N, and H. M. S. Khan, "Enhancement of human cheek skin texture by *Acacia nilotica* bark extract cream." *Tropical Journal of Pharmaceutical, Research*, 2013; 12(3): 323-327.
[37]. Sabale V, Kunjwani H, and Sabale P., "Formulation and in vitro evaluation of topical antiageing preparation of the fruit of *Benincasa hispida*", *Journal of Ayurveda and Integrative Medicine*, 2011; 2 (3): 124-128.
[38]. Mukul K, And N, Asian J. S. Surabhi, Atul. Cosmeceuticals for the Skin: An Overview. Of Pharmaceutical and Clinical Research, 2011: vol no 2 p;4:2-7.
[39]. Draelos, Z.D. The cosmeceutical realm. *Clin. Dermatol*. 2008, 26, 627-632.
[40]. Kaur, G.; Jabbar, Z.; Athar, M.; Alam, M.S. Punicagranatum flower extract possesses potent antioxidant activity and abrogates Fe-NTA induced hepatotoxicity in mice. *Food Chem. Toxicol.* 2006, 44, 984-993.
[41]. Sahu A. N., Jha S. , and Dubey S. D., "Formulation and evaluation of curcuminioid based herbal face cream," *Indo Global Journal of Pharmaceutical Science*, 2011; 1(1): 77-84.
[42]. Anwar F. , Latif S. , Ashraf M. , and Gilani A. H. , "*Moringa oleifera*: a food plant with multiple medicinal uses," *Phytotherapy Reseach*, 2007; 21 (1): 17-25.
[43]. Guo, F.; Lin, M.; Gu, Y.; Zhao, X,; Hu, G. Preparation of PEG-modified proanthocyanidin liposome and its application in cosmetics. *Eur. Food Res. Technol*. 2015, 240, 1013-1021.
[44]. Gui-Ling, H,; Lei, Y,; Ming, S,; Shao-Kang, W,; Hong, Y,; Jia-Sheng, W,; Gui-Ju, S. Vitamin D3 and beta-carotene deficiency is associated with risk of easophageal squamous cell carcinoma-Results of a case-control study in China. *Asian Pac. J. Cancer Prev.* 2014, 15, 819-823.
[45]. Patil, Jadhav Novel methods for liposome preparation. *Chemestry and Physics of Lipids*, 2014; 177: 8-18.
[46]. Steventon K, Factors of Skin Aging. *Global Cosmetic Industry*, 2013; 181(6): 60-63.
[47]. Khan I Yousaf S, Subramanian S, Koral O, Alhnan MA, et al. Proliposomes powders prepared using slurry method for the generation of beclomethasone dipropionate liposomes. *International Journal of Pharmaceutics*, 2015; 502(1-2): 18-27.
[48]. Barel AO, Marc Paye, Howard I Maibach Handbook of cosmetic science and technology. *Boca Raton, Boca Raton: Taylor & amp; Francis*. 2014; pp. 725.
[49]. Solanki, K,Matnani, M,; Kale, M,; Joshi, K,; Bavedekar, A,; Bhave, S,; Pandit, A. Transcutaneous absorption of topically massaged oil in neonates. *Indian Pedatr*. 2005, 42, 998-1005.
[50]. Lopez-Lazaro, M. Distribution and biological activities of the flavonoid Luteolin. *Mini Rev. Med. Chem.* 2009, 9, 31-59.
[51]. Nishigori, C. Cellular aspects of photocarcinogenesis. *Photochem. Photobiol. Sci*. 2006; 5; 208-214.
[52]. Youngs, V.L. Oat Lipids. *Cereal Chem*. 1978, 55, 591-597.
[53]. Rieger M, Rhein LD. Surfactants in cosmetics. 68. CRC Press;1997
[54]. Wu X, Guy RH. Applications of nanoparticles in topical drug delivery and in cosmetics. *J Drug Delivery Sci Technol*. 2009;19(6):371-84. Doi10.1016/s1773-2247(09)50080-9.
[55]. Lasic DD, Papahadjopoulos D. Medical applications of Liposomes: Elsevier; 1998.
[56]. Lasic DD. Liposomes in gene delivery: CRC press; 1997
[57]. Hwang KJ. Liposome pharmacokinetics. In: Liposomes: From biophysics to therapeutics, Dekker, New York, 1987; pp. 247-62.
[58]. Ward PA Oxidative stress: acute and progressive lung injury. Animals of the New York Academy of Science, 2010; 1203: 53-59
[59]. Samad A, Sultana Y, and Aquil M, Liposomal drug delivery system update review. *Current Drug Delivery*. 2007; 4: 297-305.
[60]. Lautenschlager H, Barel AO, Paye M, Maibach HI Liposomes, Handbook of Cosmetic Science and Technology. CRC Press Taylor & Francis Group, Boca Rston: 2006; 155-163.
[61]. Kikuchi, H., Yanauchi, H., Hirota, S. A polyl dilution method for mass production of liposomes. *J Liposome Res*. 1994; 4: 71-91.
[62]. Ostro, M.J. In: Liposomes: from Biophysics to therapeutics. Marcel Dekker, New York, 1987; pp, 383.
[63]. Batzi S and Kom ED. Single bilayer liposomes prepared without sonication. *Biochint Biophysics Acta*. 1973;298:1015-1019.
[64]. Pavelic Z, Natas S, Basnet K and Schubert R. Liposomal Gels for Vaginal Drug Delivery. Methods in Enzymology. 387:287-299.
[65]. Keck C, Muller RH. Drug nanocrystals of poorly soluble drugs produced by high pressure homogenization. *Eur J Pharm Biopharm* 2006;62:3-16.
[66]. Garg G, Saraf S, Saraf S. Cubosomes: An overview. *Biol Pharm Bull* 2007;30:350-3.
[67]. Gendler E. Treatment of the ageing face. *Dermatol Clin Fali godina*; 5: 561-7.
[68]. Kligman D. Cosmeceuticals. *Dermatol Clin* 2009; 18:609-15.