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Nanomaterials in Nano cosmetics

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ABSTRACT

Nanotechnology emphasizes materials in 1 to 100 nm scales. The rapid advancement of nanotechnology in recent years has fuelled burgeoning interest in the field of nanomaterials. Nanomaterial's referred to an insoluble and intentionally manufactured material. A nanomaterial has one or more external dimension or internal structure on the scale from 1 to 100 nm. In recent years nanomaterials have more extensively been used in the development of cosmetics. The techniques mastered in nanotechnology can play an important role in future of cosmeceuticals industry. Nanotechnology applications in the cosmetics are in the rise. This article covers various nanomaterials used in Nano cosmetic product.

Keywords: nanocosmetics, type of nanomaterial, nanocosmetics uses.

Nanomaterial in Nano cosmetic technology

Founding membrane of US society of cosmetics chemists Raymond Reed coined the term " cosmetics" in the year 1962 cosmetic can be defined as the product which amplify the Appearance of the skin intensity the cleansing and promote the beauty of the use of cosmetic product is growing at a very fast pace as compared to other personal care product.

The nanotechnology is believed to be an innovative solution that can deliver the product wig better efficacy. Several cosmetic companies are investing in the development and marketing of nanotechnology based product in (fig. 1.) for hair (fig. 2.) skin (fig. 3.) tooth, lips (fig. 4.) and nail care (figure 5) their product are development of nanotechnology to deal with problem like aging, hyperpigmentation, acne, dandruff, fungal infection, hair, damage, and tooth decay. Nanotechnologies allow enhance properties in many areas of interest to the cosmetics industry, including UV protection deeper skin penetration and improved hydration, different types of nanomaterials used in cosmetics. Here we will discuss the top nanomaterials.

- Liposomes.
- Nanoemulsion.
- Nano capsules.
- Solid lipid nanoparticles.
- Nanocrystal.
- Nanosilver.
- Nano gold.
- Nanosphere.
- Dendrimers.
- Customers.
- Niosomes.

Liposomes: Liposomes are small artificial vesicles of spherical shapes that can be created cholesterol and natural nontoxic phospholipids. Liposomes can act as dermal carriers due to their being small unilamellar and designed with membrane flexibility (fig. 6.) The use of the liposomes drug delivery system for cosmetics was started in 1987 but nowadays they are frequently used in several hundred commercials in various forms like gel, cream, beauty cream, treatment of hair, and moisture to skin cell.It also creates a barrier over the surface of the skin. In cosmetic product liposomes are widely used in Decorate moisture liposomes face cream, Decort moisture liposomes eye cream.

Nanoemulsion: Nano emulsions areNano sized emulsion which are manufactured for improving the delivery of active pharmaceutical in gradient. There are thermodynamically stable isotropic systems in which two immiscible liquid are mixed to form a single phase. Nano emulsions are transparent or translucent and show properties like viscosity, high kinetic stability, high interfacial area and high solubilization capacity. Nano emulsions are widely used in sun cream, shampoo, lotion nail enamels, conditioners, and hair serums.

Nanocapsules: Nanocapsules sub microscopic tiny bits are polymeric capsules surrounded by a water

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or oily core. Nanocapsules are employed in cosmetics to protect sensitive actives, decrease unwanted odour and remove in compatibility between formulation component. One of the earliest Nano capsules based products in the market was an antiwrinkle lotion with Nano capsules that gradually discharge the active through time. Nano capsules widely used in hydro flash bronzer daily face pack, moisturization, hydro Zen cream, eye tender (antiwrinkle cream), soft touch antiwrinkle sun cream SPF 15 (antiwrinkle suncreems).

Solid lipids nanoparticles: Solid nanoparticles are Nano sized colloidal carriers composed of lipids surfactants and drugs in appropriate rations was developed at the beginning of the 1990 s , over the conventional lipoid carriers like emulsion and liposomes 50 to 1000 nm in the size range of solid lipids nanoparticles. SLN have UV resistant properties and act as physical sunscreen on their own so improved proto protection with rediced side effects can be achieved when they are combined with molecules sunscreen shown in (fig. 7). SNP as carrier for 3, 4, 5 trimethoxybenzoylchitin and vitamin E. Sunscreen are developed to enhance UV protection product. SLN are mostly used in Allure body cream, Allure Eau perfume spray, Soosion facial lifting cream.

Nanogold: Nano goldexhibits various sizes ranging from 5 to 400 nm. Inter particles interaction and assembly of gold nanoparticles play an important role in determination their properties. The main properties of nanogold in beauty care consist of asserts namely acceleration of blood, circulation, anti-inflammatory property antiseptic properties improvising firmness and elasticity of skin delaying aging process and vitalizing skin metabolism. Gold nanoparticles are used in various products like cream, lotion, face pack,dedorant, anti-aging cream. Cosmetic companies like L'Oreal and L' care Paris are using gold nanoparticles for manufacturing more effective cream and lotion.

Nanocrystals: Nanocrystals are pure drug particles stabilized by surfactants without any surrounding polymers or linanocrystal. It is fast growing industrially feasible technology and is currently flourishing in the pharma and cosmetic industries for several poorly soluble compounds are processed as nanocrystals by various techniques. Such as increased solubility help to penetrate these activities into various layer of skin. Cosmetic actives like flavonoids (antioxidant) lutein, beta carotene coenzyme Q10 and many others are success fully produced as nanocrystal and exhibit improved of the compound.

Nanosphere: Nanosphere is the spherical particles which exhibit a core shell structure. Nanospheres are colloidal systems that entrap therapeutic agents with in a colloidal matrix. This system has great potential and is being able to convert poorly absorbed, labials biologically active substance and poorly soluble active substance into the proitious deliverable drug. Nanospheres are used in skin care product to delivers active ingredients into deep layer of the skin and deliver their beneficial effect to the affected area of the skin. More precisely and efficiently. In cosmetic product nanosphere are used in hydralane ultra moisturizing day cream, lip tender, course salome competence hydration ultra-moisturizing cream, eye tender, cell act DNA filler intense cream etc.

Dendrimers: The term “dendrimers” arise from two Greek words: namely dendron that mean tree and meros meaning part. Dendrimers are extremely small in size 2 to 20. Dendrimers are new class of macromolecular, architecture and also being used as nanotechnology based cosmeceticals. In cosmetic dendrimers are used in shampoo, sunscreen, hair styling gel and antiacne product.

Niosomes: Niosomes is a nonionic surfactant based vesicle. It is lamellarstructures that are micro scopic in size. Niosomes are one of the promising drug carriers that have a bilayer structure and formed by self-association of nonionic surfactants and cholesterol in aqueous phase. Niosomes are widely used in the formulation of cosmetic products like lips, balms, cream, liprouge, lipstick etc.

Nanosilver: Nanosilver particles generally present at 1 to 100 nm in size decreases as particles size decrease, the surface area to volume ratio of nanoparticles increase dramatically. Nano silver particles are among the most attractive nanomaterials and have been widely used in cosmetics. Nanosilver in cosmetic product can act as active substance, carrier’s consistency improving substances effectiveness enhancing substances and antimicrobial agents. Nanoparticles are added to permanent make up formulation as well as anti-aging cream and toothpastes. Literature demonstrated that silver nanoparticles can protect same skin disease like atopicdermatitis due to antibacterial properties of nanosilver. It can be used as preservatives in cosmetics and in cosmetics and in anti-acne preparation. Nanosilver is used in soap, toothpastes, wet, wipes, deodorants lip product as well as face and beauty foams.

Use of Nano cosmetics

Nanoparticles and other nanostructured materials have unique properties which cannot be achieved when working with the bulk form of the

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material. Applications for these special properties have been suggested in many industries –

The cosmetics industry is one of those most eager to make the most of the opportunities presented by nanotechnology. Nanomaterials have been used to try and improve the performance of a wide range of products, from moisturizer and anti-ageing creams to hair care. Most of the main cosmetics manufacturers have at least some "Nano-enhanced" products in their range. However, there is still some controversy over the safety of these novel materials, and the regulation of nanomaterials in cosmetics is lax or unclear in many parts of the world.

Benefits of Nanomaterials in Nano cosmetics

The two main uses for nanoparticles in cosmetic products are UV filtering and delivery of active ingredients. Titanium dioxide and zinc oxide are both used extensively in sunscreens to prevent UV damage to the skin the Nano formulations of these materials have been shown repeatedly to give much better performance than larger particles, reflecting visible light and absorbing UV with very high efficiency. A wide range of nanostructures have been proposed as delivery mechanisms for cosmetic ingredients in moisturizers, anti-ageing creams, and other skincare products from lipid nanoparticles to dendritic or hyperbranched polymers. Again, these nanostructured materials show much more efficient delivery of the active ingredient to the skin cells. Lipid nanoparticles are particularly effective, as they can merge with the lipid bilayer in cell membranes, facilitating the delivery of compounds which would otherwise not be able to enter the cell.

Lipid nanostructures, and dendritic biopolymers, provide the additional benefit of being totally non-toxic and biocompatible. This is in contrast to the metal and metal oxide nanoparticles - there are still doubts about their safety for dermal use. Nanoparticle-containing sunscreens have come under scrutiny recently. Although research on the topic is still limited, some initial results indicate that the UV-absorbing properties of TiO2 and ZnO2 could also catalyse the production of free radicals, which could potentially lead to increased risk of cell damage and skin cancer. This makes quantifying this effect very difficult, as skin cancer can also be caused by UV damage, which the nanoparticles protect against. Some studies have also shown metal oxide a nanoparticle passing through the skin into the bloodstream - the effects of long-term exposure to nanoparticles in the bloodstream has not yet been conclusively determined. Whether nano-enhanced sunscreens and other cosmetics turn out to pose a significant health risk or not, the negative publicity given to nanotechnology as a result of this issue are likely to affect consumer acceptance of nanomaterials well into the future, even when their effects are better understood - not just in cosmetics, but in many other industries as well.

Conclusion: With the data collected from this study we conclude that nanomaterials are save to use in cosmetics. Cosmetics manufacturers are developing more and more Nano formulated products. Nano emulsions and nanocrystals are becoming more and more popular in skincare products, and they are usually made of organic materials with very few toxicological issues. Whatever the outcome of the current controversies, it seems highly likely that nanomaterials will feature heavily in the future of the cosmetic industry.

Figures

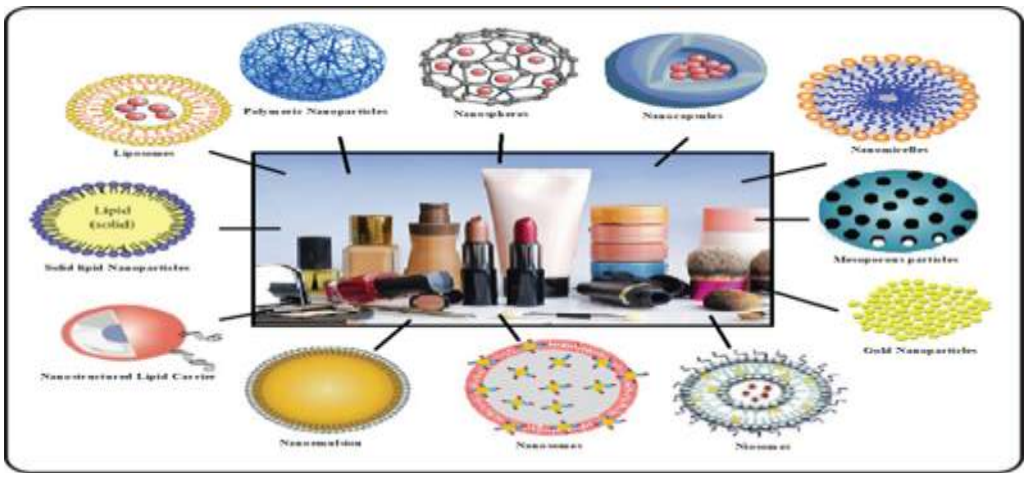

Fig. 1. Different type of nanomaterials used in nanocosmetics.

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Fig. 2.Nanocosmtics in hair care.

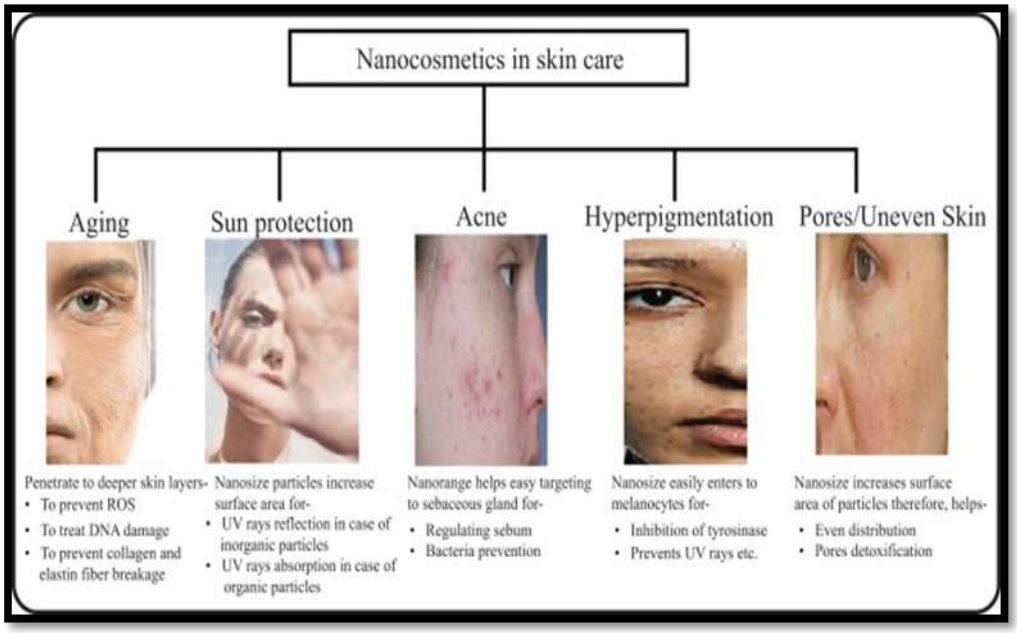

Fig.3. Nano cosmetics in skin care.

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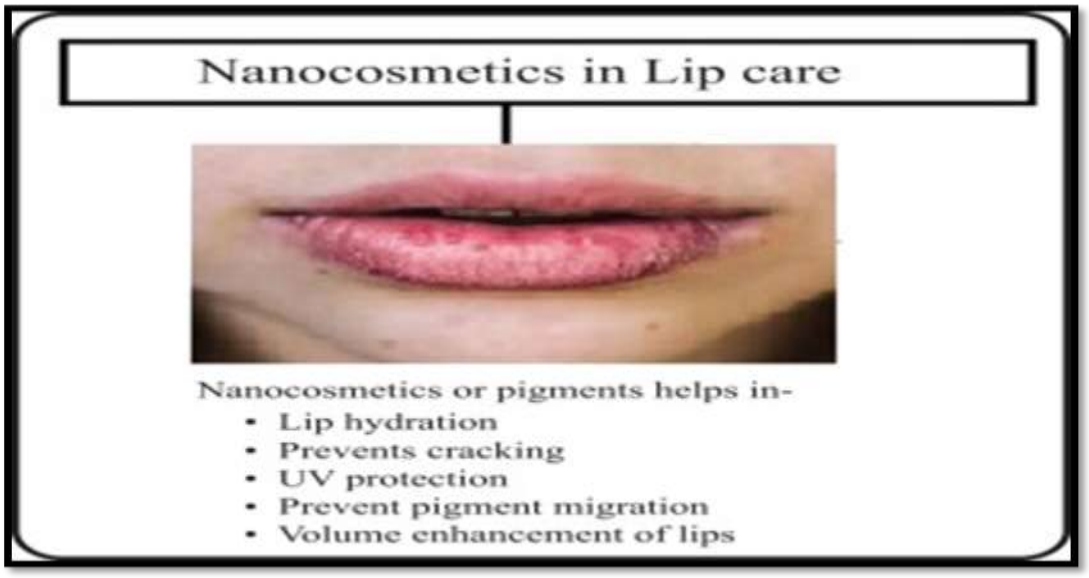

Fig. 5.Nanocosmtics in lip care

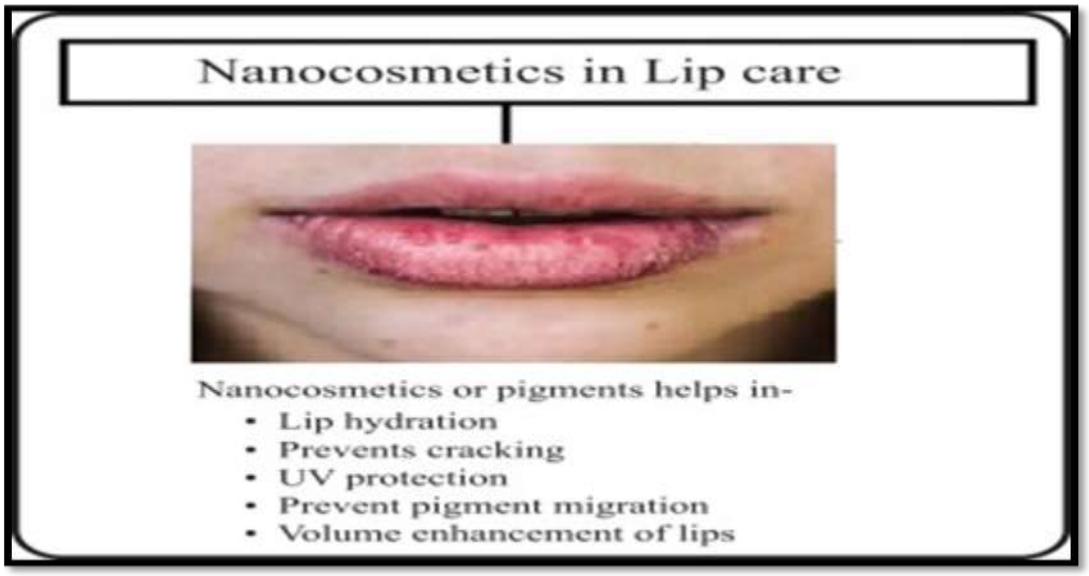

Fig. 4.Nanocosmtics in lip care.

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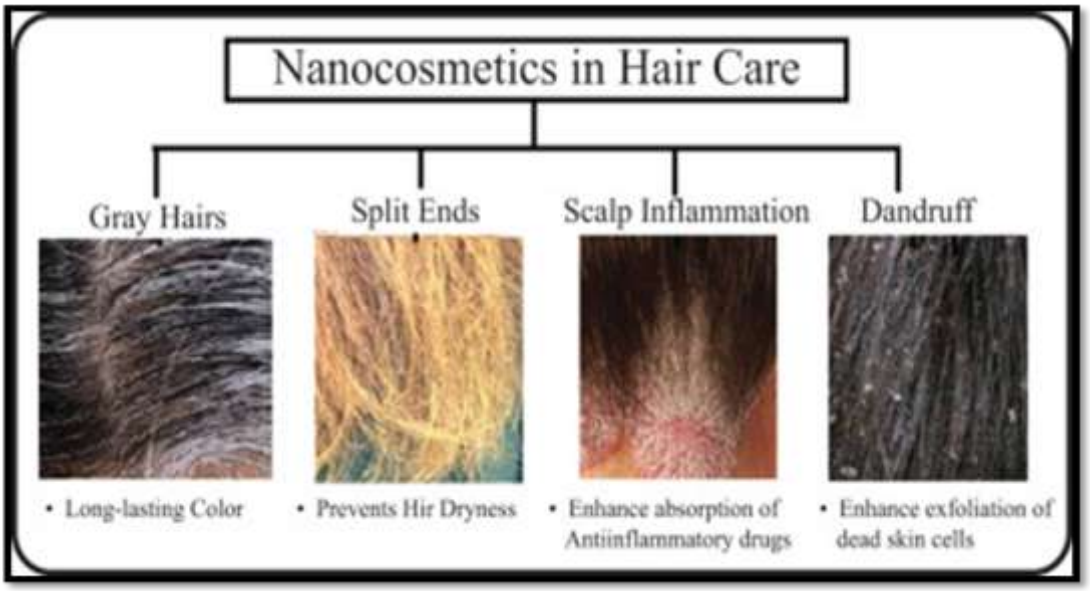

Fig. 6.Nanocosmtics in hair care.

Fig. 5. Nano cosmetics in nail care.

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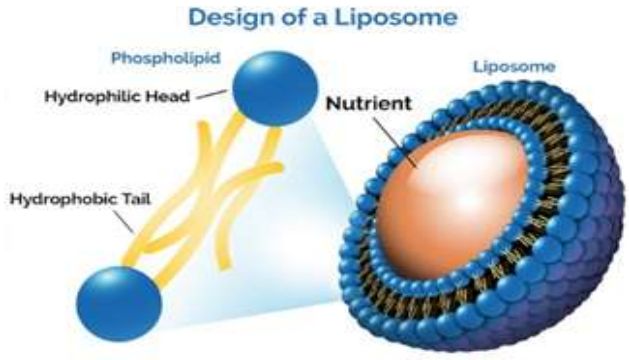

Fig. 6.Structure of liposome.

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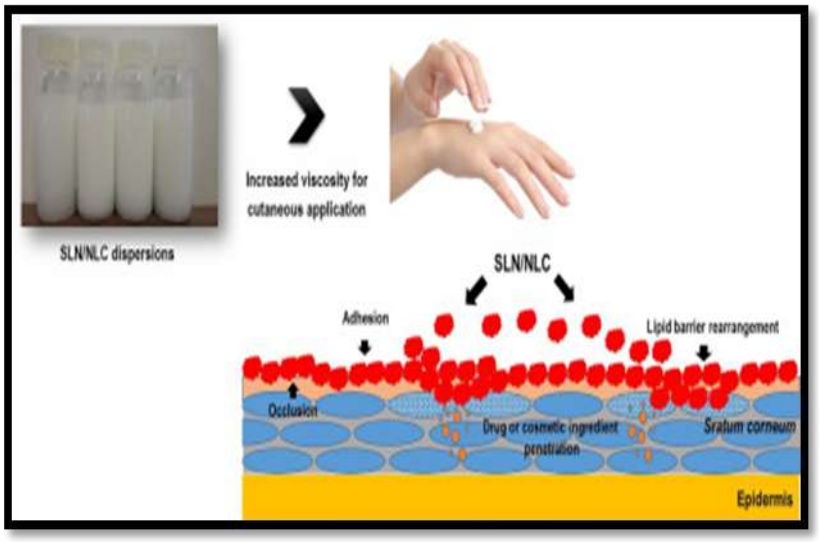

Fig.7. Solid lipids nanoparticles in skin care.

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