

# A SYNOPSIS ON “IMPACTS OF COSMETIC CHEMISTRY ON SKIN HEALTH”

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**Abstract-** Currently, it's generally honored that physical appearance is important, but their goods on molecular and microbial diversity of the skin are unknown. In public health wisdom, the term “cosmetovigilance” began to represent a kind of health surveillance where the end is the safety of the ornamental product for marketable purposes. In recent times, the ornamental assiduity has increased its use of preservatives, surfactants, scents, stains, and other constituents in the creation of ornamental goods. On the one hand similar chemicals ameliorate the quality, parcels, and shelf life of cosmetics; on the other hand, numerous of these substances are toxic to humans, posing health enterprises ranging from a moderate hypersensitivity response to anaphylactic shock or indeed death<sup>[1]</sup>

**Keywords:** cosmetic, toxic, hazardous, chemicals etc.

## 1.Introduction:

Cosmetics is deduced from the Greek word “kosmeticos,” which meaning “to bedeck.” Cosmetics have been around since the morning of time and include particulars used for beauty or improvement of look. Cosmetics and skin care products are now extensively used across the world, adding the mortal body’s exposure to the multitudinous chemical composites that make up their expression. Cosmetics were first used 6.000 times ago, and their use has since expanded each across the world. similar particulars were designed to bedeck and incense the body without altering the structure or function of the skin. The worldwide ornamental business is estimated to be worth roughly \$ 20 billion bones<sup>[2]</sup>.

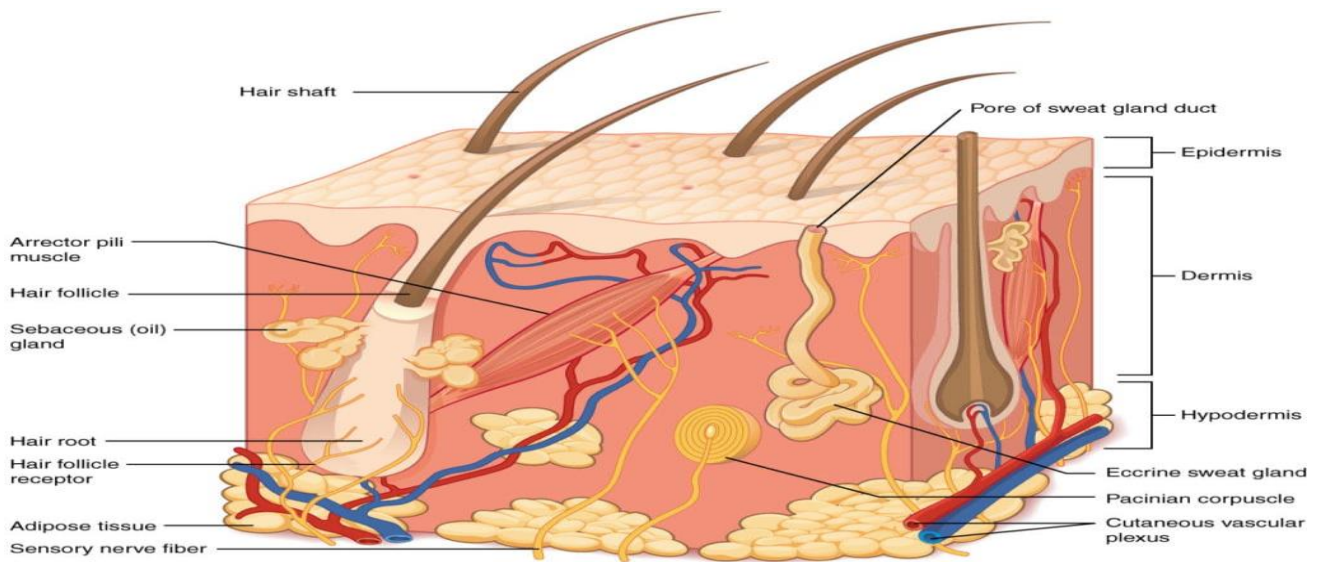
now. We're continuously seduced to use cosmetics and particular care particulars as consumers. However, these goods, which are meant to make us feel good and look good, have a dark side. colorful dangerous substances and dangerous composites frequently used in cosmetics have been set up to be present in amounts that exceed admissible limits. These substances can have significant side goods on the skin, as well as insinuate the skin and other organs, causing cancer. Cosmetics haven't only sneaked the fashion world, but also play a significant part in everyday life. As a result, it's necessary to educate people about the multitudinous negative consequences of cosmetics and the chemicals used in cosmetics<sup>[3]</sup>.

Broad field of cosmetics are Broadfield of cosmetics are:

- Skincare creams and lotions
- Powders
- Perfumes
- Lipstick and lip-gloss
- Eye and facial makeup
- Hair colors, hairspray and gels
- Shampoo and other hair products.

## 1.2 Structure and function of skin

The skin is the largest organ of the body. The surface area of the skin of an adult person is about 1.6m. It has three main layers, the epidermis, the dermis and the subcutaneous layer.<sup>[4]</sup>



**Fig1.1structureofskin**

**Hair follicles** are pits in which hairs grow. Hairs also play a role in temperature regulation.

Sebaceous glands – produce sebum

(an oil) to keep hairs free

The epidermis is an elastic layer on the outside that is continually being regenerated. It includes the following:

**Keratinocytes** – the main cells of the epidermis formed by cell division at its base. New cells continually move towards the surface. As they move they gradually die and become flattened.

**Corneocytes** – the flattened dead keratinocytes that together make up the very outer layer of the epidermis called the stratum corneum or horny layer. This protective layer is continually worn away or shed.

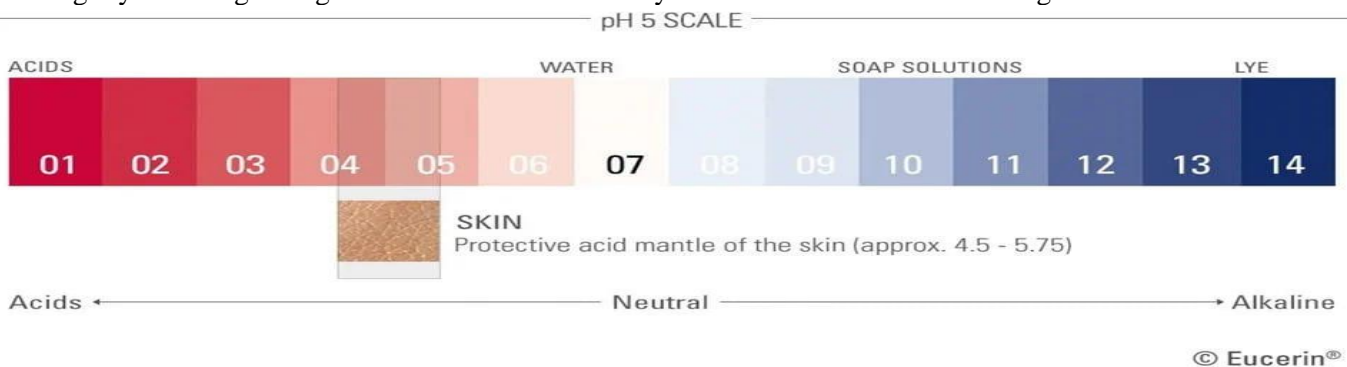
**Melanocytes** – produce the pigment melanin that protects against UV radiation and gives skin its colour.

The dermis is the inner layer that includes the following:

**Sweat glands** – produce sweat that travels via sweat ducts to openings in the epidermis called pores. They play a role in temperature regulation. from dust and bacteria. Sebum and sweat make up the ‘surface film’. The subcutaneous layer under the dermis is made up of connective tissue and fat (a good insulator)

**Skin pH:** The skin’s pH is one of its key protective mechanisms. The pH of our skin is constantly challenged by external aggressors such as pollution, temperature and harsh chemicals.

The skin optimal pH value of skin on most of our face and body lies between 4.7 and 5.75. It varies slightly according to both gender and where it is on the body. It also fluctuates at different life stages.



**1.3 Functions of the skin**

- Provides a protective barrier against mechanical, thermal and physical injury and hazardous substances.
- Prevents loss of moisture.
- Reduces harmful effects of UV radiation.
- Acts as a sensory organ (touch, detect temperature).
- Helps regulate temperature.
- An immune organ to detect infection etc.
- Production of vitamin D.

### 1.4 Sensitive skin:

Concept of sensitive skin Sensitive skin refers to a state of skin hypersensitivity that occurs under physiological or pathological conditions. It is common in young and middle-aged people and the disease site is mainly the face. Common symptoms of sensitive skin include flushing, erythema, itching, tingling, irritation, dryness and discomfort, desquamation, pale, fine pimples, and exudation. Patients often show heat sensitivity, sometimes even simple skincare products and water cannot tolerate, rash repeatedly and challenging to cure so that many patients show anxiety<sup>[5]</sup>

### 1.5 Causes for sensitive skin

This hypersensitivity of the skin results from a decrease in its tolerance threshold. At present, the cause is not clear, so that it may be a widespread phenomenon caused by various factors such as internal and external causes. Different factors can explain it:

- An inflammatory reaction develops when skin contact with irritating chemicals such as soap, household detergents or pollutants. The altered barrier function of the epidermis. This phenomenon then promotes dehydration of the skin and especially the penetration of potentially irritating agents.
- Psychological factors like stress. Hormonal factors (menstrual cycle, menopause). Physical factors: sun, temperature changes (hot/cold), wind, air conditioning, heating, hard water<sup>[5]</sup>.

## 2. Effect of makeup on our skin's Health:

Research shows that makeup products may impact our skin's health in numerous ways. How makeup affects our skin depends on the type of makeup we use, how often we wear it, how long it stays on our skin, and our skin's sensitivity. Many cosmetic products contain harsh ingredients that can compromise our natural protective barrier, allowing pathogens to enter our skin. And regular makeup wear, especially without proper cleansing, may result in side effects that impact our skin's overall health. Here are the common side effects to look out:

### 2.1.1 Clogged pores

pores are the tiny openings in skin around hair follicle and sweat glands that allow our skin to breathe and help move liquids and fats through the skin's face. When makeup is left on the skin for long ages of time, your skin may reply with flakiness, blackheads, papules, bumps, or other skin issues.

### 2.1.2 oily or dry skin

our skin may come more unctuous or dry, if we use products that aren't made for our skin type. Inordinate oil painting product may contribute to clogged pores and flakiness. Extremely dry skin, or xerosis, may affect in rough, scaled patches that itch or indeed crack and bleed. unseasonable aging When worn for long ages of time, makeup clogs our pores and thus limits collagen and elastin production in our skin, leading to lines and wrinkles. This is on top of exposure to the sun's dangerous rays, which begin to get 90% of visible skin aging.

### 2.1.3 Eye- irritation

Applying eyeliner or highlighters to the inside of our eyelid or "waterline" blocks oil painting glands that cover our cornea and may introduce bacteria or patches from the product into our eyes. Healthy eyes are suitable to clear down contaminants, but the "tightlining" fashion could worsen symptoms for those with sensitive or dry eyes, or get issues if you wear contacts.

### 2.1.4 Health Concerns ;

Cosmetic products that contain toxic or carcinogenic (cancer-causing) ingredients may pose serious health risks. Unlike with medications, the FDA does not require cosmetic manufacturers to test their products for safety. This leaves the manufacturers themselves responsible for the safety of the ingredients and products. When manufacturers do test their products for safety, the focus is typically on short-term side effects to the skin such as allergic reactions or irritation. Long-term toxic or carcinogenic effects are difficult to identify with cosmetic products, and more research is needed to understand if low doses of certain ingredients can build up and eventually cause harm. We advise our patients to use trusted medical-grade skincare brands, which are thoroughly tested for safety and efficacy.

## 3. The cosmetic risk and the public health:

The danger to one's appearance as well as the public's health as the usage of cosmetic goods grows, as does the population's exposure to the chemical components for longer periods of time and more often. To adverse effects of these products become more common. Women and men all the globe use a lot of cosmetic items in the quest for eternal youth, despite the potential health hazards.

Cosmetic compounds are also pollution precursors. Their environmental monitoring is still in its infancy. However, they are

known to enter the environment through a variety of routes, including water, posing Health Hazards to marine and freshwater ecosystems as well as humans. As a result, the word “cosmetovigilance” came to be used in public health research to describe a type of health monitoring whose goal is to ensure the safety of cosmetic products used for commercial reasons<sup>[1]</sup>. This surveillance is critical for controlling potentially dangerous chemicals and, as a result, putting our minds at ease about items on the market. Health monitoring organisations across the world have put limitations on the use of certain cosmetic compounds, which means that any ingredient that isn't on the list is authorised. Since a result, the business is continually employing new substances that are not included on the limitation list, as it is extremely innovative and always trying to enhance its goods. These components might be new allergies. Unlike pharmaceuticals, cosmetics do not have a particular agency to review their safety, no marketing authorisation with specified conditions, no risk-benefit analysis, and no assurance of consistency from batch to batch. The health hazards connected with the use of cosmetic goods have emerged as a public health issue, with around 12% of users in the general population reporting negative effects from one or more cosmetic items in the previous nine years.

#### 4. Possible Health Complications Associated With the Use of Cosmetics:

There have been many numerous controversies associated with cosmetic products and increased cancer risk. It is analyzed that all makeup cosmetics contain potential carcinogenic substances.

##### Potential carcinogen in makeup cosmetics:

**The Classification of Carcinogens:** Carcinogens can be divided into two groups: genotoxic and non-genotoxic. The bracket is grounded on their medium of action. The first group, including genotoxic carcinogens, is represented by formaldehyde, acetaldehyde, and ethylene oxide. The medium of action of genotoxic carcinogens is associated with a direct influence on DNA of the target cells. Most of the chemical carcinogens, directly or after xenobiotic metabolism, are responsible for the induction of DNA damage and act as genotoxic substances. These are considered to represent threat factors at all attention because indeed one or many DNA lesions may beget mutations and significantly increase excrescence threat. Among the alternate group, appertained to as non-genotoxic carcinogens, the following can be enumerated: parabens, heavy essence (e.g., arsenic and beryllium), 1,4-- estradiol, and cyclosporine. The medium of action of non-genotoxic carcinogens is associated with the induction of inflammation, immunosuppression, creation of reactive oxygen species (ROS), and influence on receptors. Heavy essence are responsible for towel-specific toxin and seditious responses. Cyclosporine represents typical immunosuppressant whereas tetrachlorodibenzo-p-dioxin plays the part of receptor intercessors<sup>[6]</sup>

#### **4.1 Allergic reactions to cosmetics:**

Cosmetics-related allergic reactions account for a modest but considerable percentage of the problems connected with cosmetic usage. Allergic contact dermatitis is characterised by genuine delayed-type (type IV) hypersensitivity with eczematous dermatitis, accounting for 10% to 20% of all instances of contact dermatitis. Type IV hypersensitivity is a T-cell-mediated hypersensitivity reaction in which the offending allergen activates circulating or resident sensitised T cells, causing them to produce pro-inflammatory cytokines. Product composition, a concentration of potentially allergenic

components, volume of product used, site application, skin barrier integrity, and frequency and duration of application are all variable that influence sensitization.

#### **4.2 Irritant contact dermatitis**

This is the most frequent sort of problem associated with the use of cosmetics, particularly those formulated with methylchloro isothiazolinone/methylisothiazolinone (MCI-MI). Over 57,000 irritants have been identified across the world, ranging from minor irritants to highly corrosive acids and bases. The majority of skin care and cosmetics-related facial issues are irritating

contact dermatitis, which manifests as erythematous, burning, and pruritic skin that may develop microvesiculation and subsequently desquamation. The dermatitis is defined by damage to the stratum corneum that is not accompanied by an immune response. Papules and plaques are the most common symptoms of facial irritating dermatitis, which is caused by cosmetics. A “seborrheic-like dermatitis” with pink scaly plaques on the cheeks and chin is another typical symptom. Patients may develop urticarial or infiltrating plaques less often<sup>[11]</sup>

#### **4.3 Facial stinging:**

A small percentage of individuals experience stinging or burning shortly after applying a cosmetic, which worsens over 5 to 10 minutes and then subsides after 15 minutes. This reaction happens even if the patient does not have allergic or irritating contact dermatitis to the chemical administered. Before employing such components, tests should be performed on the patient's skin. Face stinging is usually caused by chemicals including benzene, phenol, salicylic acid, resorcinol, and phosphoric acid.<sup>[8]</sup>

#### **4.4 Redness:**

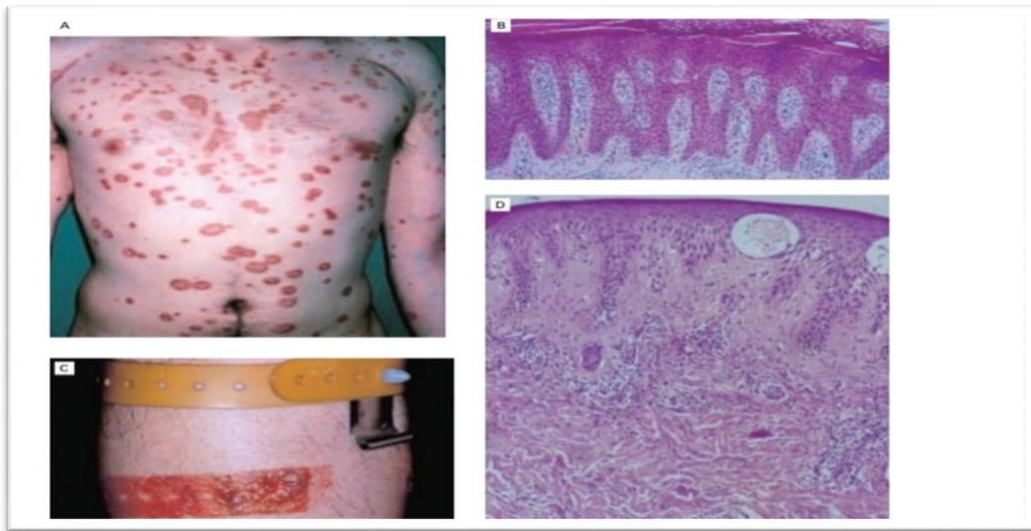
The instability in cutaneous pH is linked to the redness of the skin induced by cosmetic products, particularly soaps. Tallow and nut oil, or the fatty acids produced from these products, are used in modern soap in a 4:1 ratio. Because of



this, the pH of these soaps is frequently alkalized (pH 9-10), causing redness in the skin, which has a pH of 5.2-5.4. Such substances should ideally have a pH of neutral or slightly acidified. Another cause of redness is the use of moisturisers with a higher greasy content, which allows skin to warm up during the day.

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#### 4.6 Photoallergic-dermatitis:

After coming into touch with cosmetics and then being exposed to light, this sort of allergic response develops. Sunburn is the most common symptom of this response, which might be followed by hyperpigmentation and desquamation. Chemical compounds capable of absorbing radiation, particularly ultraviolet A, generate this reaction, which also lacks a clear immunological mechanism. Erythema, edema, and vesiculation are some of the clinical symptoms. The scents methylcoumarin and musk ambrette, antibacterial agents, and para-aminobenzoic acid esters as sunscreens are the major causes of photoallergic dermatitis. Photoallergy is a rare acquired altered reactivity that is triggered by an immediate antibody or a delayed cell-mediated response.<sup>[11]</sup>

#### 4.7 Vitiligo:

Research found that than 70 percent of chemical-induced vitiligo cases were caused by common household products such as: Hair dye, Deodorant, Perfume, Toothpaste, Detergent and cleansers, Herbal oils, Footwear, Rubber condoms, Cosmetic products.<sup>[12]</sup>

### 5. Harmful chemicals used in cosmetics

Hazardous substances in cosmetics mainly come from chemical raw materials and excessively added banned restricted chemical substances. In fact, some manufacturers did not strictly implement the requirements of the Cosmetics Hygiene Regulations, resulting in some unqualified cosmetics entering the market. After using these unqualified products, the light ones will cause skin irritation, erythema, and edema, which will cause obvious damage to the skin and mucous membranes, and the serious ones will cause teratogenesis and cancer. China's "The Cosmetics Hygiene Regulations" stipulates lead content  $\leq 40$  mg / kg; mercury content  $\leq 1$  mg / kg; arsenic content  $\leq 10$  mg / kg. The fact is that the ingredients in cosmetics are straightforward to get into the reproductive and developmental problems. The following are common chemicals in daily personal care and hygiene products, to understand their toxicity to human health.<sup>[9]</sup>

#### 5.1 sulphates

Sulfates are hearties that are formed when sulphuric acid ( $H_2SO_4$ ) reacts with another chemical. They are also produced from petroleum and plant sources like coconut and win oil painting oil. They act as surfactants and are used for lathering purposes. Sulfates can irritate our eyes and skin. They can unseasonably clear off color from our hair. There is

also an ongoing debate about their use due to implicit risks to the terrain. inferring them from natural sources like palm oil painting oil is causing the destruction of rainforests. When they are washed down, they can be toxic for the submarine.

### 5.2 Paraben

Parabens are the preservatives used to keep your skincare and makeup fresh and origin-free. They're set up in a variety of products, from detergents to poultices and makeup. exploration shows that they beget increased product of the hormone estrogen( womanish coitus hormone) and intrude with reproductive and brain function. Due to the xenoestrogen parcels of parabens, there are reports of their goods on bone cancer conformation. A 2004 study by Darbreetal. set up an increased threat of bone cancer in women using antiperspirants containing 4- hydroxybenzoic acid esters. Parabens have also been detected in mortal mammary glandtumor.it is also set up the presence of parabens in mammary gland towel in womanish subjects. Some of the subjects, still, reported no antiperspirant use.

### 5.3 Phthalates

Pathalates are mariners or plasticizing chemicals used for the spreadability of a product. They're used in nail polishes, scents and poultices to name a many. Also used as mufflers in soaps, they're reproductive and experimental poisons. They're known to be endocrine disruptors and are linked to cancer.

### 5.4 Triclosan:

Triclosan is a common chemical set up in tubes of toothpaste, antibacterial cleansers and deodorants. It's effective against microbes(anti-bacterial in nature), but it's also an endocrine disruptor and a skin vexation. Some studies reported that triclosan can lead to gut inflammation and excrescence growth in mammals.Triclosan breaks down slowly and hence, is considered a implicit trouble to the terrain. Like sulfates, triclosan too is dangerous for submarine life. Recent studies suggest triclosan may increase a childs trouble of awareness.

### 5.5 Hydroquinone:

Hydroquinone is used in skincare for skin lightening. It's used to treat saturation related to acne scars, dots, melasma, age spots andpost-inflammatory hyperpigmentation. Hydroquinone functions by reducing the melanincolor-producingcells(melanocytes).

There have been set up reports of ochronosis and implicit mutagenicity. Ochronosis is an uncommon adverse effect of HQ, with features like progressive darkening of the area to which the cream containing high attention of HQ is applied for numerous times. Hydroquinone is a hydroxyphenolic emulsion that inhibits the conflation of melanin by inhibiting tyrosinase enzyme t may also serve by snooping with the conformation or declination of melanosomes and by inhibiting the conflation of DNA and RNA within melanocytes. Hydroquinone is a most generally used depigmenting agent at present, but it's set up to be largely cytotoxic to melanocytes and potentially mutagenic to mammaliancells.It causes vexation greenishness and burning, also causing exogenous ochronosis. Ochronosis may affect in loss of pliantness of the skin and disabled crack mending which has redounded in a ban on itsover-the- counter use in America and numerous other countries<sup>[11]</sup>.

### 5.6 Toluene:

Toluene is a petrochemical detergent set up in utmost hair colorings and nail polish. They can be dangerous for your vulnerable system and may carry the threat of birth blights and blood cancer. Refrain from using hair colorings and nail polish if you're an expectant mama as it can beget damage to the developingfetus.Toluene can affect the mortal central nervous system and can lea lead to fatigue, headache,etc.

### 5.7 Talc:

Talc is the softest mineral being naturally. Talc is used to absorb humidity and is majorly set up in baby maquillages, eye murk, color, deodorants and somesoaps.However, talc is directly associated with ovarian cancer. It first came a matter of concern when a woman who was using talc made by Johnson & Johnson for 35 timesfailedofovariancancer..

### 5.8 Alcohol:

Alcohol is a common detergent in skincare products. It's helpful in absorbing the products better and hence, a great fit for certain creams and poultices. But alcohol is a poisonous skincare component. Alcohol( drying alcohol) in skincare can leave the skin dry and short. It disrupts the skin renewal process. still, not all alcohols are bad for your skin. Adipose alcohols are deduced from natural fats and canvases and are great moisturizing agents.

### 5.9.Polyethylene\_Glycol (PEG):

PEG is used as a thickening agent in skincare products like poultices, sunscreen and soaps. It can beget cancer and respiratory diseases. It can also strip off the natural canvases ( sebum) from your skin and spark the sebaceous glands( oil painting- producing glands) to make further sebum that can make the skingreasy.During the product processes, points may get defiled with sensible quantities of 1, 4- dioxane. This 1, 4- dioxane is set up to be causing cancer. It doesn't fluently degrade and can remain in the terrain long after it's irrigated down the shower drain.( 18) points also show some substantiation of genotoxicity and can Beget vexation and systemic toxin if used on broken skin.

### 5.10 Petrolatum:

Petrolatum has a softening effect and is recommended for dry skin. Lip redolences and moisturizers contain petrolatum. While it creates a hedge to help water from escaping, it also prevents immersion of humidity from the air. Your skin

drys out ultimately and this is the reason why you're tempted to reapply your lip attar . Also, if not meliorated well, dangerous chemicals like polycyclic sweet hydrocarbons( PAHs) can be retained in it.

#### **5.11. Formaldehyde:**

Formaldehyde is frequently used as a preservative in skincare. It's a tintless gas and is used to help the growth of bacteria. Formaldehyde can be set up in nail polishes, hair straightening treatments, hair gels, nail hardeners, soaps, deodorants, poultices and makeup. It's associated with experimental poisons, hair loss, crown becks , asthma and neurotoxicity. When gobbled, formaldehyde can beget dizziness and suffocation.

#### **5.12. Lead**

Lead can be found as impurity in Lipsticks via the use of contaminated raw materials or through the use of contaminated material or though the use of pigment that may contain lead. [42]. Skin contact with Lead occurs daily, and some amount has been found to be absorbed through the skin. These use of leaded eye powders (e.g., Surma, Kohl) has been associated with increased blood-lead levels in children and women. Pregnant women and young children are at higher risk because it can cross the placenta with ease and enter the brain of the fetus. It can also be transferred to infants through milk of lactating mothers stored in bones Lead exposure has been found to cause miscarriage, hormonal changes, reduced fertility in men and women, menstrual irregularities, delays in puberty onset in girls. Lead and inorganic Lead compounds have been classified as a suspected carcinogenic to humans<sup>[10]</sup>.

#### **5.13. Diethanolamine**

DEA( diethanolamine) related constituents are used to make Cosmetics delicate or foamy, or as a pH adjuster to reduce the Acidity of other constituents. They're set up in soaps, detergents Andcleansers. DEA reacts with nitrites in cosmetics to form Nitrosamines. Nitrites are sometimes added to products as anti-Corrosive agents or can be present as pollutants.( 27) The declination of some chemicals used as preservatives in cosmetics Can release nitrites when the product is exposed to air. During trials conducted in laboratory, exposure to high boluses of DEA- related constituents has been shown to beget liver cancers and Precancerous changes in skin and thyroid. These chemicals may Also beget mild to moderate skin and eye vexation. Cocamide DEA is set up to be dangerous to the terrain because of its Acute toxin to submarine organisms and can beget bioaccumulation. Cocamide- DEA was listed under carcinogenic toxic in June 2012. The substance is generally used as a raging agent in detergents, Soaps, hair color, cosmetics and ménage cleaning formulas. Cocamide DEA works as a surfactant, which means it helps detergents And soaps to lather and foam. However, leaving your skin dried out, If a surfactant is too strong it can strip down your body's natural canvases . If This natural protection against microbes and other environmental Factors isn't there your skin might get short and itchy. Your skin Also becomes further prone to infection

#### **5.1.4 siloxane**

Siloxanes are silicone- grounded composites used in colorful ornamental Products to make them soft and smooth. They make hair products Sot briskly and enhance the spreadability of deodorant creams. They Are most frequently used in moisturizers and facial treatments. The Generally used Siloxane which are poisonous are cyclotetrasiloxane And cyclopentasiloxane. They've the eventuality of bio-Accumulating in submarine organisms. Cyclotetrasiloxane is a type of Endocrine disruptor, as it interferes with mortal hormone function, And as possible reproductive toxic, may also vitiate mortal.

#### **5.15 Nickel**

Nickel is set up in cornucopia in nature, everyone is exposed to Small quantities, substantially through food, air, movable water, soil, Household dust, and skin contact with products containing it, Including cosmetics. High situations of exposure can lead to serious Health goods depending on route and the kind of nickel exposed To. While certain types of Nickel are considered to be " poisonous " Because of their carcinogenic effect, metallic Nickel and blends Have been classified as conceivably carcinogenic to humans. Nickel Can also be set up antipathetic is also and it can beget severe contact Dermatitis. The first case of Nickel mislike caused by eye Shadow has been reported; indeed as 1 ppm of it may spark apre-existing mislike.

### **6. Conclusion**

According to scientific substantiation, inordinate situations of chemical preservatives, spices, and emulsifiers used In the product of ornamental goods enhance side goods and health hazards via chemical and physical Mechanisms. The health pitfalls connected with ornamental operation might range from a moderate acuity response to anaphylactic shock or indeed death from intoxication it's concluded that the Quality control process in the manufacture of ornamental products is ineffective in precluding health pitfalls Associated with the use of ornamental products<sup>[12]</sup>.

From the study, there's no mistrustfulness that education and Enlightenments at all situations on proper skincare operation Would be an effective way in controlling skin diseases Originating from cosmetics operation. An important culture That should be incorporated among skincare products Manufacturers ethics is the need to always include Warning and side goods of their products on their labels. It's also judicious to have detailed side goods Enumerated in simple terms so that it can be appreciated By druggies. Since the subjects generally have advanced Educational

background, it was discovered that this trait didn't confer great advantage as it was Firstly believed that they should be suitable to seek and gain knowledge of the chemical composition of the Cream they use as this has great health reclamation. The suggestion may presumably be that utmost uninstructed Subjects use original products which they reference and have Total knowledge about unlike the educated subjects in the Community<sup>[8]</sup>

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