

Cosmetics as an Accelerating Factor for Ageing - A Review

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ABSTRACT

Today's generation is more towards the westernised life, excessive use of cosmetic product for the application in skin. They used to clean and cleanse the skin, to increase the glow enhancement and enlighten the skin tone. A large range of cosmetic including skin lotion, body washes, moisturisers, skin cream, nail polish, deodorants, soaps, shampoos and many other products used in daily need now a days. *Ayurveda* described the concept of *Dushi visha* (Cumulative toxicity) which is produced by excess use of chemical and metal in cosmetic products. Skin ageing depend on some intrinsic factors like genetic, cellular metabolism, hormone, metabolic process and extrinsic factors such as chronic light exposure, pollution, ionizing radiation, chemicals, toxins. It includes finely wrinkled, dry and thickened epidermis, loss of lustre, increase dullness, gradual loss of skin elasticity. For the prevention of ageing factors, preference of various method of revitalizing, rejuvenation, augmentation, restoration of each skin layer in the form of Antioxidant therapy. So, it is necessary to stop the degradation of the skin primary structural constituents such as collagen, elastin, suitably they prevent from the wrinkling of skin. The treatment for such condition is the use of rejuvenating (*Rasayana* or *Vrishya*) drugs, milk, meat, soup and some herbal drugs that help to prevent from the free radicles to protect the aging process in the form of *Chaksushya*(drugs help to protects the vision), *Medhya*(Drug which help to protect the mental condition), *Varniya* (Drug help to increases the skin glow). Increased of *ojas* gives the body good growth, nourishment and improvement of strength.

Key Words *Ayurveda*, Cosmetic, Oxidative stress, *Dushi visha*, Cumulative toxicity, Free radicles, *Rasayan*

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INTRODUCTION

Acharyas sushruta mentioned in his text book *Sushruta Samhita kalp sthana*, that a part of *Sthavar* (inanimate), *jangama* (Animate) and *Kritrima* (Artificial) poison, which accumulate and cannot be excreted from body completely, due to its chronic and cumulative nature or become less potent after applying cosmetics, it accumulates in the body for a prolong period and

vitiating body slowly is called as *Dushivisha*. The *veerya* of *dushivisha* being less, it does not show any immediate fatality.

AIMS AND OBJECTIVES:

- A brief Review of *Dushi visha*
- Comparison with cumulative toxicity
- Concept of Free radical and their effect counter with *Rasayan*(Antioxidant) treatment

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Dushivisha^[1] become aggravated often by habitat, season (rainy), food (polluted food) and day sleep and it vitiates the dhatus (tissue). Present use of cosmetic products, food habits, life style and mental attitude are entirely different from past conditions. In past time females used natural cosmetic product which is properly self-made herbal products and each product having no preservatives and they are chemical free. The basic essentials of life i.e. air, food and water are polluted and hazard having a gloomy picture for the coming generation. Many skin diseases are caused by the effect of prolong use of cosmetic such as, Allergic contact dermatitis or Eczema, Acne vulgaris, malignancy etc. A study carried out by new Delhi based on NGO centre for science and environment (CSE), on different fairness creams, it contained large amount of mercury, lead, nickel and chromium are main constituents. In these study 73 fairness creams tested, CSE found presence of mercury in over 40%. The drugs cosmetic act prohibits the use of mercury in cosmetic as it causes skin and kidney ailments. Chromium too may cause cancer. The high level of steroids in these products can cause redness and thinning of skin, acne, skin dryness and in some cases facial hair also seen in women².

In the chronic stage, scaling, lichenification (Thick and leathery skin) and excoriation predominates in face, neck and hands are the most common body parts involved. Forehead and ears are commonly affected by hair dyes and shampoos, ears are susceptible to metals from

earing, eyelids are particularly affected by airborne allergens and cheeks and lips are prone to react to facial cosmetics.^[3]

CONCEPT OF FREE RADICALS IN AGEING PROCESS:

It is a highly unstable oxygen molecule; they give the alteration of biochemical molecules, and destroy the cells. Free radicals are continuously created from the millions of cells that continuously destroyed by the metabolic activities of the body and they are differently essential to the life of a person. They produced when body defence system activated against the killing germs that become infected from the environmental infections but the main problem is increased their number and over production of these radicals.

Excess production of the free radical can be defended by antioxidant nutrients, enzymes that damage the cell membranes and DNA cells which can results in carcinoma, ageing effect, wrinkling, greying of hair, hair loss, cancer, Lymphoma and leukaemia etc.

Synthetic Antioxidant such as butylated hydroxytoluene and butylated hydroxy-anisole has recently been reported to be dangerous for human health. Formation of free radicals that delayed or alter the lipids, protein and DNA that triggered to increase the number of diseases^[4] (V.Lobo, A.patill et.al)

FACTORS RESPONSIBLE FOR FREE RADICAL FORMATION⁵

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Body has the continuous and increased production of free radical in body. The basic cause's are-

- 1) **Immune system-** Immune system of the cells intentionally create the oxy-radical and ROS (reactive oxygen species) such as weapons.
- 2) **Energy production-** During the cell production, they generate continuous and high amount of oxy- radical and free radicals as a toxic waste in our body. They also increased the production of different free radicals. Though, even a single cell should be producing the different type of free radicals.
- 3) **General factors-** Ageing, Metabolism, Stress, Environment.
- 4) **External factors-** Cosmetics products, Perfumes, Pesticides, Insecticides that will increase the number of free radicals.
- 5) **Toxins-** Carbon-dioxides, Carbon-tetra-chloride, Paraquat, Benzo-pyridine

CUMULATIVE TOXICITY IN CURRENT ERA:

BIOACCUMULATION OR CUMMULATIVE TOXICITY:

Bioaccumulation occurs when an organism absorbs a toxic substance are used for a prolong time. Thus, the longer biological half-life of the substance and greater the risk of chronic poisoning, even if environmental levels of the toxin are not very high.

USE OF COSMETICS- A large range of cosmetic including skin lotion, body washes, moisturisers, skin cream, nail polish, deodorants, soaps, shampoos and many other products used in daily needs now a days. They collectively produce the cumulative effects on body in the form of premature ageing due to excess release of free radicles. It may associate with premature greying of hair, wrinkling of skin, excess hair loss, development of skin allergies, acne, contact dermatitis, carcinomas etc. There are some cosmetic name having toxic chemical and their adverse effects are shown in table no.-1, which is given below-

Table 1 Common Cosmetic, their Chemicals and Adverse Effects on Body

COSMETIC NAME	NAME OF TOXIC CHEMICALS	ADVERSE EFFECTS ON BODY
Skin lightening agent	Hydroquinone (HQ)	<ul style="list-style-type: none"> • Ochronosis (Progressive darkening of the area in which the cream containing high amount of HQ. • Mutagenicity
Black henna	Combination of red henna with p-phenylene-diamine (PPD)	<ul style="list-style-type: none"> • Blister formation, • Surface oozing, • Swelling and erythematous rashes on skin.
Sunscreen products	Benzo-phenone, dibenzoyl methane, para-amino benzoic acid (PABA) and cinnamates	<ul style="list-style-type: none"> • Photo-allergic dermatitis, •Headache, • Dizziness, • Fatigue, • Irritation on eyes, nose and throat.
Shampoos or hair bleaching agent	Hydrogen peroxide solution, Ammonium persulfate	<ul style="list-style-type: none"> • Allergic contact reactions, • Dryness of hair, • Making hair liable to damage.
Moisturizers, lipsticks (As preservatives)	BHA (butylated hydroxyl anisole), BHT (butylated hydroxyl toluene)	<ul style="list-style-type: none"> • Carcinogenic effects, • Endocrine disruptors • Interfere with hormonal functions.
Shampoos, Soaps,	DEA (Diethanolamine)	<ul style="list-style-type: none"> • Skin dryness,

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cleansers, hair dyes, cosmetics	Use to Form creamy texture of cream and react with pH adjuster form nitrites	<ul style="list-style-type: none"> • Liver cancer, • Mild to moderate skin and thyroid irritation, • Carcinogenic action
Cosmetic for nails, nail polishes	Di-butyl phthalate (DBP)	<ul style="list-style-type: none"> • Developmental defects • Changes in the prostrate and testes and reduce sperm count • Endocrine disrupter • Infertility, • Kidney failure.
Cosmetics and some foods such as strawberries, barley etc.	Parabens (as preservatives)	<ul style="list-style-type: none"> • Endocrine disruption • Skin ageing • DNA damage
Perfumes	Aromatic compounds, essential oil	<ul style="list-style-type: none"> • Allergies • Severe headache • Asthma
Moisturizing creams	Polyethylene glycols (PEGs) used as cream thickener or softener	<ul style="list-style-type: none"> • Cancer • Genotoxicity • Systemic and irritation toxicity
Lotions	Mixture of oil, water, emulsifier products, with polycyclic aromatic hydrocarbon (PAHS), propyl glycol and lanolin Propyl glycol.	<ul style="list-style-type: none"> • Development of the cancer • Contact dermatitis • Allergic reactions.
Hair smoothing products	Formaldehyde	<ul style="list-style-type: none"> • Contact dermatitis • Irritation in skin, eyes, nose, throat
Sunscreen	Cinnamates, Salicylates and zinc oxide	<ul style="list-style-type: none"> • Allergic reaction • Eye irritation
Skin lightening creams	Mercury	<ul style="list-style-type: none"> • Skin rashes, • Scarring, Skin discolouration • Increase risk of neurotoxicity • Nephrotic syndromes
Body powder	Talc and Amorphous silica	<ul style="list-style-type: none"> • Lung irritation on inhalation • Females using talc in napkin area, it may increase risk of ovarian cancer.
Kajal, Kohl, Kumkum, Hair dyes	Lead	<ul style="list-style-type: none"> • Carcinogenic action, • Affects Nervous system • Allergic dermatitis
Skin and hair care products	Sulphates	<ul style="list-style-type: none"> • Skin irritants, • Endocrine disruptors
Soaps as an anti-drying agent	Glycerine	<ul style="list-style-type: none"> • Blister formation • Fungal infections
Creams, Moisturizers, Haircare, Shaving products	Parabens	<ul style="list-style-type: none"> • Skin irritation, • Skin rashes, • Eczema
Hair dyes, Ink of tattoos	Para-phenylene-diamine	<ul style="list-style-type: none"> • Dermatitis • Allergies • Hypersensitivity
Creams and Cosmetics	Imidazolidine, diazolidine urea, formaldehyde for preservation	<ul style="list-style-type: none"> • Skin sensitivity, • Allergies, • Contact dermatitis
Bodywash, Shampoos, Soaps, Shaving cream	Sodium laurel sulphate	<ul style="list-style-type: none"> • Eye and skin irritation, • Dryness, • Scaly skin.
Lipstick, Lotions, Hair colouring and	Benzyl-dimethyl-stearyl ammonium chloride	<ul style="list-style-type: none"> • Irritation in skin and eyes. • Allergic contact dermatitis

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Conditioners

Perfumes, Nail polish, Phthalates
Soaps, Shampoos,
Moisturizers

- Skin rashes,
- Liver cancer,
- Affects central nervous system

EXCESS PRODUCTION OF FREE RADICALS INVOLVE PATHOGENESIS OF MANY DISEASE INCLUDING⁷⁻

- A) Ageing process
- B) Skin disorder such as skin allergies and skin rashes.
- C) Infertility
- D) Carcinoma
- E) Neurogenerative disorder such as Parkinson's disease, Alzheimer's disease, memory loss and depression.
- F) Cardiovascular disease like atherosclerosis, ischemic heart disease, trauma.
- G) Autoimmune disorder like rheumatoid arthritis.
- H) Renal disorder such as glomerulo-nephritis, chronic renal failure, proteinuria.
- I) Gastrointestinal disorder like peptic ulcer, inflammatory bowel disease and colitis.

The Centre for science and environment (CSE), were tested 73 cosmetic products, included skin whitening creams, lipsticks, lip balms and antiaging creams, and found chromium in these products, which can cause cancer. In this study 15 out 30 lipsticks tested, in this range of chromium varies between 0.45 ppm to 17.83 ppm. Nickle in the range of 0.57 ppm to 9.18 ppm was found in 13 out of 30 in these products were found. Nickle is well known to cause skin allergies and cancer⁸.

Arsenic (As), Lead (Pb) and Mercury (Hg) are the most famous among the hazardous substances. Chronic exposure can affect almost all the systems of the body. lead poisoning can occur even at low concentration and may cause neurological damage and adverse effects on other system. Mercury inhibits melanogenesis in melanocytes by inactivating tyrosine, the important catalyst in melanin production thus reducing pigmentation. it also affects central nervous system, gastrointestinal system and develops nephron toxicities. Use of cosmetic is increasing in the society especially among women and teenage girls and now even men also⁹.

Some researchers are found in Boston university, school of medicine (BUSM) studied different type of people, who apply skin lightening creams on daily basis. The researchers surveyed 406 adults with cutaneous hyperpigmentation who had been seen in a US-based dermatology clinic from February 2015 through July 2016. The most common condition leading to use of lightening creams were melasma (brown to grey brown patches) and post-inflammatory hyperpigmentation (PIH)¹⁰.

DEFENSIVE SYSTEM AGAINST FREE RADICALS FORMATION¹¹

ANTIOXIDANT: Which are man- made as well as natural that may prevent or delays the damages that found in the cell membranes such as beta-

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carotene, Lupein, Lycopene, Vitamin A, Vitamin C, and Vitamin E. Fruits and Vegetables are the rich source of Antioxidants when we increased the intake of these fruits and vegetables than they help to prevent the many diseases that presents due to over production of the free radicals. Antioxidants is maintained the aerobic form of formation of free radicals. It provides defensive mechanism against the formation of the free radicals is as follows-

1) ENZYMES- Some enzymes are against the free radical's formation such as superoxide dismutase (SOD), Catalase (CAT), Glutathione etc. it works as to hold the molecules of superoxide ions which hold the molecules of superoxide ions which helps to create the destructive forms of the free radicals to much less reactive form. Those enzymes are works on glutathione system which is presents with in the cell. Other biochemical agents such as uric acid and ceruloplasmin react with free radicals which is presents in the intercellular spaces and bloodstream.

2) SELF-REPAIRS- Our body have the system to repair and replace the damaged part and prevents the most of formation of the free radicals that will increase the diseases formations. Most of proteinaceous components in the cells are completely replaced in every few days. These scavenge enzymes breaks and damaged the protein into their component's parts for reformation by the cells.

3) NUTRIENTS- some of the nutrients like carotene, bioflavonoids, vitamin C and Vitamin E

etc. are neutralize the oxyradicals and served as the second line defence system. The vitamin C and Vitamin E protects the body from the formation of the free radicals. It acts to neutralizes the free radicals donating one of their own electrons and there ending of electron stealing reaction.

VITAMIN-E: The most preventive, fat-soluble antioxidants in the body. It is one of the most defended agents against oxidation and lipid -per -oxidation. Vitamin-E and alpha tocopherol fat soluble vitamin present in nuts, vegetables, Seeds, and fish oil, whole grain (especially wheat grains) and fortified cereals.

VITAMIN-C: These are the abundant water-soluble Antioxidants, acts mainly in cellular fluid level. It defends against the free radical's formation and helps to create Vitamin E to more active form. Vitamin C or Ascorbic acid is a soluble vitamin prevent in citrus fruits like tomatoes, lemon, oranges etc.

VITAMIN-A: It is precursor of carotene found in some vegetables and fruits like carrot, egg yolk, milk, butter and grains etc.

ANTIOXIDANTS IN AYURVEDA:¹²

The essence of all the *dhatu*s is known as *Oja*, it is the very best material is soft, possesses the qualities of water, is pure, slightly reddish, with yellowish tinge, it is the first essential element of the embryo, the essence of the *rasa dhatu* of the foetus and gets localised in its heart very early. Even though residing in the heart, it is circulating everywhere and helps the life activities. It undergoes decreased by anger, environmental

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toxins, prolong use of cosmetics, beauty products, hunger, worry, grief, physical exertion, and other causes. By such decrease, the person begins to experience fear of loss of life, debility, ageing effect on the body, wrinkles, premature ageing effects, fine lines, greying of hair, hair loss, too much worry, and discomfort, in the sense organs, bad complexion, unstable mind, dryness and emaciation of the body. The treatment for such condition is the use of rejuvenating (*Rasayana* or *Vrishya*) drugs, milk, meat, soup and some herbal drugs that help to prevent from the free radicals to protect the aging process in the form of *Chaksushya* (drugs help to protects the vision), *Medhya* (Drug which help to protect the mental condition), *Varniya* (Drug help to increases the skin glow) . Increased of *ojas* gives the body good growth, nourishment and improvement of strength. Table no.2 shows plants having *rasayan* properties which is given below-

Table 2 *Rasayan Guna*(Antioxidant) Plants, Botanical Name And Their Properties

PLANTS ¹³	BOTANICAL NAME	PROPERTIES
<i>Guduchi</i>	<i>Tinospora cordifolia</i>	<i>Rasayan, vyashthapana, medhya</i>
<i>Haritaki</i>	<i>Terminalia chebula</i>	<i>Vyashthapana, medhya, chakshusya,</i>
<i>Haridra</i>	<i>Curcuma longa</i>	Antioxidants properties well proved
<i>Amalaki</i>	<i>Emblica officinalis</i>	<i>Chakshusya, Vryshya</i>
<i>Jivanti</i>	<i>Leptadenea reticulata</i>	<i>Rasayani, chakshushya, vryshya</i>
<i>Shatavari</i>	<i>Asparagus racemosus</i>	<i>Rasayani, medhya, vryshya, Sukrastanyakari</i>
<i>Mandukaparni</i>	<i>Centella asiatica</i>	<i>Medhya, Rasayani,</i>

<i>Shalparni</i>	<i>Desmidium gangeticum</i>	<i>Rasayani, Vrishya</i>
<i>Punarnava</i>	<i>Borhavia diffusa</i>	<i>Rasayan, Vrishya</i>
<i>Mulethi</i>	<i>Glycyrrhiza glabra</i>	<i>Chaksushya, Varnya, Keshya</i>
<i>Manjistha</i>	<i>Rubia cordifolia</i>	<i>Swarvarnakrita,</i>

CONCLUSION:

A large range of cosmetic including skin lotion, body washes, moisturisers, skin cream, nail polish, deodorants, soaps, shampoos and many other products used in daily needs now a days. They collectively produce the cumulative effects on body in the form of premature ageing due to excess release of free radicals. It may associate with premature greying of hair, wrinkling of skin, excess hair loss, development of skin allergies, acne, contact dermatitis, carcinomas etc.

Some fruits, vegetables and herbal drugs having some active components they protection against the Ageing factor and prolong effects of cosmetics. They also provide and slowing the aging process and prevents the formation of the free radicals. Therefore, from the public health perspective they help to decreased the risk of development of the diseases they protect with the antioxidant's supplements and herbal drugs such as *Mulethi, Manjistha* etc.

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