



## Cosmetics ingredients and mushroom cosmetics

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ARTICLE DETAILS	ABSTRACT
<p><i>Article history:</i> Received on 25 February 2023 Modified on 24 March 2023 Accepted on 29 March 2023</p> <hr/> <p><i>Keywords:</i> Cosmeceuticals, Cosmetic Ingredients, Anti-Acne Ingredients, Mushroom Cosmetics, Anti-Wrinkle Activity.</p>	<p>Cosmeceuticals are a new category of products that are put between cosmetics and pharmaceuticals to improve both skin health and appearance. Cosmeceuticals are manufactured from a multitude of ingredients, Cosmetic ingredient and Mushroom cosmetics are discussed in this article. Given the increasing interest among patients in these products and the strong claims made by manufacturers, it is crucial that doctors recognise these agents and consider their advantages, disadvantages, and possible adverse effects.</p>

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### INTRODUCTION

Except for colour additives that are not intended for use as coal tar hair colourants, the Federal Food, Drug, and Cosmetic Act does not require cosmetic products and ingredients to be licenced by the FDA before they go on the market. However, under marked or customary conditions of use, they must be safe for consumers [1]. For the protection of their goods and ingredients, businesses and individuals that sell cosmetics have a legal obligation [2].

### Classification of Cosmetic and Cosmeceutical Products

- Because cosmetics do not treat any conditions or change the structure of the skin, the active ingredients are not used.
- Cosmetic products contain cosmetic ingredients only.
- Since OTC drug-cosmetic products are used, in addition to cosmetic ingredients, for the prevention, diagnosis, cure, or treatment of a disease, they contain active ingredients. Cosmetic ingredients are referred to as inactive ingredients in these products.
- As many ingredients have multiple functions, they can belong to more than one group [3].

### Cosmetic Ingredients

#### Abrasives

The word "abrasive" refers to an element that, by rubbing or grinding, is able to polish or clean a harder surface. Abrasives are solid particles and are widely used in skin care products and toothpastes, such as face, hand, foot, and body scrubs. Although these ingredients have the same effect, the forms used in products for oral and skin care are different. Abrasives have an exfoliating effect in skin care formulations, which means that they help rub off and peel the skin's outer layer, known as the stratum corneum (SC). The skin has its own natural process of peeling, called desquamation. However, it may be useful to help the skin peel off the dead cells from its surface in some situations [4].

#### Antioxidants

Antioxidants provide protection against oxidative reactions, as their name implies. This property is commonly used to provide cosmetic formulations with durability and can be used to slow down skin ageing induced by different oxidative mechanisms. Within a formulation caused by oxygen in the presence of light, heat or metal ions, antioxidants can prevent undesirable chemical changes (such as decomposition, rancidity, colour shift, and odour formation).

They lead, thus, to the stability of cosmetic products. The majority of cosmetics and cosmetic products contain these ingredients, especially those containing oils, fats, butters and waxes, because these ingredients are generally more susceptible than other ingredients to oxidation reactions. They are also beneficial for the skin of the consumers, moreover. It is understood that free-radical oxidative stress accelerates skin ageing and leads to the development of lines and wrinkles, pigmentation, or even malignant processes. In order to neutralise free radicals, we have natural antioxidants and defence mechanisms in our skin; however, adding antioxidants helps to inactivate these reactive molecules and avoid symptoms related to sunlight-induced ageing of the skin. In skin moisturising products, antioxidants for this reason are also identified [5,6].

### **Chelating Agents**

Chelating agents are molecules that are capable of being complex with metal ions with a particular three-dimensional structure. Metallic impurities, including cosmetic products, water systems, metallic equipment and storage containers, may come from many different sources. They can deteriorate cosmetic products if not deactivated, by reducing visibility, sacrificing the purity of the scent, and causing rancidity. By trapping (sequestering) metal ions, chelating agents may help preserve cosmetics and avoid their degradation [7].

### **Colour Additives**

Color additives add colour to products, rendering them appealing, enticing, appetising, and informative. "A colour additive is: "Any material which, when added or applied to a food, drug, or cosmetic or to the human body or any part thereof, is a dye, pigment, or other substance, is capable of imparting a colour therein. A dye is a chemical compound in which the same solvent in which it is distributed is soluble (e.g., oil or water). Examples include green and indigo. In the specific solvent in which it is dispersed, a pigment is a portion that is insoluble. Black iron oxide offers an example [8]. The adsorption of water soluble dye on a substrate, such as aluminium, calcium, or barium, creates a lake, making the colour insoluble in water. These pigments are commonly used in nail lacquers and lipsticks. Yellow 5 Al Lake provides an instance. Dyes can be said to have an affinity for the substrate on which they work, which means that with the coloured surface they form

chemical bonds. They form a smooth surface because dyes completely bond with the substrate, resulting in uniform reflected light and the illusion that the dyed surface is more vibrant and bright. It can occur that a colour additive is approved in general for cosmetic use, but not for the eye area. Product manufacturers can use only colour additives that have been approved by the FDA for the intended uses specified in their respective regulations. The reasoning for this approval is that certain colour additives can cause skin irritation and allergic reactions; thus, not all of them can be used in cosmetics, and even for licenced ingredients there are some limitations. No tattoo pigments for injection into the skin have been approved by the FDA. This refers, including those used for ultraviolet (UV) and glow-in-the-dark tattoos, to all tattoo pigments. Many pigments used in tattoo inks are industrial-grade colours that are ideal for ink or car paint printers [9].

### **Flavoring Agents**

In general, a flavour is characterised as the sensory impression of a food or other material and is determined by the product's texture, taste, and smell. Flavoring agents include goods with a distinctive taste and/or smell. Besides, they can mask the bad taste as well. Overall, they lead to acceptance of goods. Flavoring ingredients are mainly used in products such as lip care formulas, such as lipstick, as well as dental and oral care products, such as toothpaste, that come into contact with the taste buds [10].

### **Fragrances**

Fragrances are natural or synthetic substances with a distinctive scent that are applied to products to give consumers an aesthetic impression and make them feel more desirable because of the good smell. To mask the unpleasant scent of one or more of the raw materials, fragrances may also be applied. Unlike perfumes, which are hydroalcoholic solutions with a high content of fragrance sprayed on the skin to transmit a pleasant redolence to the user, fragrances for personal and cosmetic care have a lower content of perfume and are generally used in makeup products and formulations for skin and hair care. Natural elements and synthetic elements are used in fragrances. Nowadays, to ensure reproducibility, mostly synthetic fragrances are used. Moreover, synthetic fragrances can be stronger, longer-lasting, more complex, simpler to produce and sophisticated,

much more reproducible, and less costly than natural fragrances [11, 12].

### **Moisturizers**

Ingredients that add moisture to the skin and help maintain moisture in the skin are defined by the word 'moisturiser' as an umbrella term. They minimise roughness, cracking, and inflammation and make the skin feel softer and smoother. In many of today's formulations, these ingredients are used either as a main component of a formulation, such as in a regular facial moisturiser, or as ingredients that have additional benefits, such as a nail polish remover, for example. Four subclasses of moisturisers are actually distinguished. Hygroscopic ingredients are moisturisers. They can serve two roles in general: They may contribute to skin hydration by drawing water from the deeper epidermis and dermis layers to the outer skin layer (SC). They avoid the evaporation of water from cosmetic products, i.e., provide protection from drying out. The emollient replenishes the skin's oils and lipids. By filling void spaces on the skin surface and substituting lost lipids in the SC, they soften and smooth the skin. They also provide the skin surface with protection and lubrication, reduce chafing, and improve the cosmetic properties of the skin. Occlusives are hydrophobic in nature and form a coating over the skin that is water-repellent. Physically, it prevents the loss of water through the skin or at least retards it. Skin barrier enhancers (otherwise referred to as skin rejuvenators) help to repair, secure, and improve the barrier function of the skin. In addition, they produce a film over the skin surface that smoothes the skin aesthetically and stretches fine lines [5].

### **pH Buffers**

The pH buffers can change the pH of formulations. pH adjustment may be necessary in formulations for many reasons.

Examples include:

1. Matching the formulation's pH with that of the application surface,
2. Stabilizing formulations since certain ingredients are stable at specific pH values only
3. Thickening formulations as certain thickeners must be neutralized in order to achieve optimum viscosity. An example for these types of thickeners is the carbomers [13].

### **Plasticizers**

As the film dries, plasticizers are additives that can soften films and give films versatility, such as nail polish film or hair spray film. The production film is also very rigid and brittle, making nail polish vulnerable to stiff and brittle chipping and cracking or hair spray film. These undesired results can be avoided by plasticizers. Nail polishes, nail hardeners, sunscreens, and film-former-based hair styling products also use plasticizers [14].

### **Preservatives**

Preservatives are used in liquid, semi-solid, and powder products to avoid the unwanted growth of moulds, yeast, and bacteria. Their use in water-based products is particularly important because water provides an ideal environment for microbial growth. Between the various types of preservatives, the mechanism of action and the range of efficacy typically vary. Therefore, they are commonly used to defend against a wide range of microorganisms in conjunction with each other [7].

### **Propellants**

In order to maintain an acceptable pressure inside the aerosol can, propellants are applied to aerosol formulations and remove the material of the container when the valve is open. They are normally gases that are compressed or liquefied. Aerosol products, such as shaving creams, hair sprays, antiperspirants, and sunscreen products, among others, use propellants [15].

### **Solvents**

They may contribute to the stability of formulations, regulate the rate of evaporation, provide a cooling effect, help in the application of the substance, change the feeling of the skin, modify the viscosity, influence the properties of film-forming, and have many other functions. In a given solvent, the solubility of an element is largely a function of the solvent polarity. Under the general rule of like dissolves like, solvents operate [9].

### **Surfactants**

The most commonly used ingredients in cosmetics and beauty products are surfactants, also called surface active ingredients. They have a very unusual chemical structure that allows them to be dissolved both in water and in oil, having both a hydrophilic (i.e., water loving) and a hydrophobic (i.e., oil loving) component. The surface tension between two liquids or between

a liquid and a solid can be reduced by surfactants, making them ideal for many applications.

1. Emulsification
  2. Solubilization
  3. Cleansing
  4. Foaming and foam boosting
  5. Wetting
  6. Conditioning
  7. Preserving
  8. Stabilizing
  9. Controlling viscosity and many others.
- They contribute to the formulation, stability, and applicability of personal care and cosmetic products.
  - They can fulfill a variety of functions including:
    - In their hydrophilic head, the anionic surfactants contain a negative charge. For their foaming and outstanding cleaning properties, anionic surfactants are usually used. Their major disadvantage is the irritating potential, especially for sulphates, which can cause many consumers to worry.
    - Cationic surfactants contain a positive charge in their hydrophilic head.
    - They reflect the skin and hair's most potent conditioning agents. As the total surface charge of the skin and hair is negative, these negative sites are electrostatically attracted to cationic surfactants [16].
    - Amphoteric surfactants have both a negative charge in their hydrophilic head and a positive charge. They have good properties for cleansing, bactericidal, bacteriostatic, lathering, and softening and can stabilise and cause the formation of foam. They are therefore used in shampoos, cosmetics for infants, and aerosols.
    - Nonionic surfactants do not dissociate into ions, and no charge is borne by their hydrophilic head. They are the surfactants most commonly used in cosmetics and beauty products. Their fields of application include stabilisation, conditioning, and solubilization of emulsions. Their advantages over other types include pH independence and electrolyte presence, as well as a low propensity for discomfort and compatibility with other types. Typically, surfactants are distinguished by the 'hydrophile-lipophile balance' of their HLB numbers. Based on the affinity of the surfactant to oil and water, the

HLB method uses a scale of 1-20; the greater the HLB value, the more water soluble the surfactant is. In general, antifoaming agents are emulsifiers with HLB values of 1-3; water-in-oil (W/O) emulsifiers are those with values of 4-6. Wetting agents are those with values of 7-9; oil-in-water (O/W) emulsifiers are those with values of 8-18. Cleansing agents are those with values of 13-15. Solubilizing agents are those with values of 10-18 [17, 18].

### Sweeteners

In products that come into direct contact with the taste buds, sweeteners have a sweet flavour and lead to product acceptance. Toothpastes, mouthwashes, lipsticks, lip balms and lip glosses are included in these items.

Sweeteners are generally categorized into two major groups:

1. True sweeteners (also known as no-calorie sweeteners) that do not provide any calories
2. low-calorie sweeteners that add some calories to products.

They are usually used in combination with flavors as the combination of flavors and sweeteners provides an acceptable and attractive taste for the formulations [19].

### Thickeners

Ingredients that can improve the viscosity of goods are thickeners. They also enhance stability, change the aesthetics of appearance and goods, increase applicability, and modify a product's rheology. Thickeners may also be used in suspensions to create viscosity and serve as suspending agents. For aqueous systems which increase the viscosity of the aqueous (water) phase, such as the water phase of the O/W emulsion, and for nonaqueous systems which increase the thickness of the oil phase of cosmetic products, such as the oil phase of the W/O emulsion, we generally distinguish between viscosity-increasing agents. For the selection of thickeners, a variety of factors should be taken into consideration, including:

1. The products' use
2. Application surface
3. Compatibility with other ingredients in the formula
4. pH (certain thickeners, e.G., Carbomers, are alkali swellable, and they need an alkaline pH to reach optimum viscosity; therefore, they cannot be used in an acidic environment)
5. Clarity

6. The presence of electrolytes
7. During processing, temperature (waxes have to be melted in order to be mixed with oils; if a product is made without heating, waxes cannot be used) During production, 8. Shear (some ingredients, such as carbomer, require shear in order to be activated and gain optimum viscosity, while others may be sensitive for shearing, such as fumed silica) [20].

### Active Ingredient

The major active ingredient types (without completeness) that can be found in various types of OTC drug-cosmetic products:

- **Anti-Acne Ingredients**

To extract the excess amount of oil and peel the skin, the ingredients have abrasive, exfoliating (peeling), and antiseptic effects. Such ingredients can be used in skin care items, such as facial washes, toners, and moisturisers, as well as in makeup products, such as concealers [21].

- **Anticaries Ingredients**

To avoid caries, these ingredients are used; reinforce the tooth enamel and slow down the formation of an opaque, sticky film (called plaque) leading to the formation of caries; and repair and harden the teeth. These ingredients are available, including toothpaste, toothpaste gel, and mouthwash, in all forms of oral care products [22].

- **Antidandruff Ingredients**

These ingredients have antimicrobial properties, and some of them also have exfoliating properties. Generally, they are formulated into shampoos.

- **Antiperspirant Ingredients**

Through minimising the amount of sweat that enters the skin surface and not just masking bad body odour as deodorants do, anti-transpirants affect the body's work. Underarm odour is caused by sweat-based bacterial breakdown. Skin Protectant Ingredients-Several subcategories are included in this group, such as astringents, ingredients for lip protection and ingredients for skin protection. A local and minimal protein coagulant effect is added to the skin or mucous membranes by astringents. They are widely used for tightening pores in facial toners and aftershave solutions [23].

- **Lip protectants**

Lip protectants temporarily prevent dryness and help relieve chapping. Traditionally, they are called lip balms. The lips are moisturised by ingredients used as lip protectants to provide protection against further water loss. Skin protectants shield wounded or exposed surfaces of the skin or mucous membrane temporarily from harmful or irritating stimuli. Examples of skin protective products are similar to those of lip protective products. Or Sunscreens Sunscreens (also referred to as UV filters) shield the skin from the sun's damaging rays [24].

### Mushroom Cosmetics

For decades, mushrooms have been valued as a traditional source of natural bioactive compounds and have recently been exploited in the cosmetics industry for potential components. It has been recognised that various mushrooms and their ingredients are good for the skin and hair. Phenolics, polyphenolics, terpenoids, selenium, polysaccharides, vitamins, and volatile organic compounds are the representative ingredients. These compounds have outstanding antioxidant, anti-aging, anti-wrinkle, skin whitening and moisturising effects, making them perfect candidates for cosmetic items [25].

- **Beneficial Components of Mushrooms**

Many experiments have been conducted to find out more about the various components that are beneficial to the skin in mushrooms. Many bioactive metabolites have been found to contain mushrooms, such as lectins, polysaccharides, phenolics and polyphenolics, terpenoids, ergosterols, and volatile organic compounds. Lentinian, schizophyllan, polysaccharide Kersti (PSK), and polysaccharide peptide (PSP) mushroom polysaccharides are now available on the pharmaceutical market. A significant number, if not all, of higher Basidiomycetes mushrooms contain biologically active fruiting body polysaccharides, cultured mycelia and cultured broth [26].

- **Antioxidant Activity**

Numerous tests of mushroom antioxidant activity with different applications in cosmetics have been performed. Antioxidant activities and free radical scavenging abilities are demonstrated by *Lentinula edodes* and *Volvariella volvacea* extracts. As for grape fruit and wine, this pharmacological effect is

associated with the quality of phenolic compounds in mushrooms. *Lentinula edodes* is also a superoxidase dismutase (SOD) and glutathione peroxidase (GPx) inducer, two antioxidant enzymes believed to defend the skin against oxidative damage and to reverse fibrosis by reverting myofibroblasts back to fibroblasts. L-ergothioneine, a histidine thiourea derivative that could decrease mitochondrial membrane oxidation, was present in high concentrations in *Lentinus edodes*, *Pleurotus ostreatus*, *Pleurotus eryngii*, *Grifola frondosa*, and *portabellas* (brown *Agaricus bisporus*) [27].

- **Anti-Wrinkle Activity**

Wrinkle formation is one of the key features of skin ageing; the degradation of structural protein (type I collagen) in the dermal layer of the skin is the main cause of fine wrinkles. Elastase is a metalloproteinase that is involved in the degradation of elastin in the ageing of the skin and the inhibition or repair of wrinkle formation, while collagen and elastin degradation are caused by matrix metalloproteinases (MMPs). *Tricholoma matsutake* (pine mushroom) mycelium extract significantly reduced the activity of elastase in a dose-dependent manner and decreased MMP levels. These extracts may prove to be an important biomaterial in cosmetic products for anti-wrinkle treatment [28, 29].

- **Hair Cosmetics**

Hair cosmetics are designed to both preserve the scalp's hygiene and exploit the hair's structural properties. Shampoos, conditioners, serums, hair colouring products (sprays, waxes, gels, and mousses), straightening products, bleaching agents, perming agents, and hair dyes are formulated for hair cosmetics. Sometimes, prescription drugs, such as minoxidil and finasteride, concentrate on enhancing the density of scalp hair. If the medical prescription is paired with cosmetic hair care products that may increase hair fibre diameter in a non-permanent manner, many postmenopausal women may achieve a better cosmetic look [30-33].

## CONCLUSIONS

Mushrooms are now being exploited for possible ingredients in the cosmetics industry as a common source of natural bioactive compounds.

Several mushrooms and their extracts are either currently used or patented for their antioxidant, anti-aging, anti-wrinkle, skin whitening and moisturising effects as beauty items. As described previously, only a small percentage of the total amount accounts for the mushroom species currently known and used, and more species will be found, confirmed, and cultivated. All of these suggest further exploitation and stimulation of the cosmetic industry's growth. The molecular mechanisms of medicinal effects of mushrooms (so-called the research field of molecular cosmetology) will be revealed through interdisciplinary studies combined with genomics, proteomics, metabolomics, and system pharmacology, and more mushrooms may find their way into cosmetics with multiple approaches.

## REFERENCES

- [1] Padma PJ, Karthika K. Cosmeceuticals-an evolution; *Int. J. Chem Tech Res.* 2009; 1(4): 25-28.
- [2] Kaplan DL, Moloney SJ, Pinnel SR. A new stabilized ascorbic acid solution: Percutaneous absorption and effect on relative collagen synthesis. *J. cutaneous aging & cosmetic dermatol.* 1988; 1(2): 115-121.
- [3] Kilgman AM. Cosmeceuticals: A broad-spectrum category between cosmetics and drugs. In: Elsner P, Maibach H, eds. *Cosmeceuticals and Active Cosmetics. Drug versus Cosmetics*, Boca Raton, Fla: Tylor and Francis. 2008; 12: 1-9.
- [4] Draelos ZD. New developments in cosmetics and skin care products. *Adv. Dermatol.* 1997; 12: 3-17
- [5] Klingman AM. Cosmetics a dermatologist looks to future: promises and problems. *Dermatolclin* 2000; 18: 699-709.
- [6] Dover JS, *Cosmeceuticals: A Practical Approach*, Skin Care Physicians, Chestnut Hill, MA, USA Yale University School of Medicine, New Haven, CT, USA Dartmouth Medical School, Hanover, NH, USA.
- [7] Webber LJ, Whang E, Fabo DEC. The effects of UVA-I (340-400 nm), UVA-II (320-340 nm) and UVA-I+II on the photo isomerization of urocanic acid in vivo. *Photochem Photobiol*, 1997; 66(4): 484-492.
- [8] Puvabanditsin P, Vongtongsri R. Efficacy of Aloe vera cream in prevention and

- treatment of sunburn and suntan. J. Med. Assoc. Thai., 2005; 88(4): S173-176.
- [9] Farrukh A, Mohammad AZ, Naghma K, Mark D, Hasan M. Protective effect of pomegranate derived Products on UVB-mediated Damage in human reconstituted skin. *Experimental Dermatol.* 2009; 18(6): 553-561.
- [10] <http://newhope360.com/cosmeceuticals-taking-root-europe>.
- [11] <http://www.wisageek.com/what-is-cosmetics-history.html>.
- [12] Cosmeceuticals to 2012-Market Research, Market Share, Market Size, Sales, Demand Forecast, Market Leaders, Company Profiles, Industry Trends.
- [13] Klingman A. the future of cosmeceuticals: an interview with Alberl Kligman, Interview by zoe Diana Draelos *Dermatol Surg.* 2005; 31 (7 pt 2): 890-1.
- [14] <http://www.insidecosmeceuticals.com/articles/2007/06/fulfilling-consumer-needs-in-the-changing-cosmeceu.aspx>.
- [15] Puvabanditsin P, Vongtongsri R. Efficacy of Aloe vera cream in prevention and treatment of sunburn and suntan. J. Med. Assoc. Thai., 2005; 88(4): S173-176.
- [16] Associates in medical and cosmetic dermatology p.c, skin savvy, edition 2008.
- [17] [www.pharaminfo.net](http://www.pharaminfo.net).
- [18] Thornfeldt C. Cosmeceuticals containing herbs: fact, fiction, and future. *Dermatol Surg.* Jul 2005; 31: 873-80.
- [19] Tasic Kostov M, Savic S, Lukic M, Tamburic S, Pavlovic M, Vuleta G. Lactobionic acid in a natural alkylpolyglucoside based vehicle: assessing safety and efficacy aspects in comparison to glycolic acid. *J cosmet dermatol.* Mar 2010; 9(1): 3-10.
- [20] Gollnick H, Cunliffe W, Berson D, et al. Management of acne. A report from a global alliance to improve outcomes in acne. *J Am Acad Dermatol* 2003; 46: S1-S38.
- [21] Leyden JJ. A review of the use of combination therapies for the treatment of acne vulgaris. *J Am Acad Dermatol* 2003; 49: S200-10.
- [22] Berson DS, Chalker DK, Harper JC, et al. Current concepts in the treatment of acne: report from a clinical roundtable. *Cutis* 2003; 72: 5-19.
- [23] Griffiths CEM. Nicotinamide 4% gel for the treatment of inflammatory acne vulgaris. *J Dermatol Treat* 1995; 6: S8-S10.
- [24] Bisset DL. Topical niacinamide and barrier enhancement. *Cutis* 2002; 70S: 8-12.
- [25] Yadav A, Mohite S. Aquasomes as a Self-Assembling Nanobiopharmaceutical Carrier System for Bio-Active Molecules. *Research J. Topical and Cosmetic Sci.* 2020; 11(2):66-70.
- [26] Yadav A, Mohite S. Potential Role of Peptides for Development of Cosmeceutical skin Product. *Research J. Topical and Cosmetic Sci.* 2020; 11(2):77-82.
- [27] Yadav A, Mohite S. Formulation, and Evaluation of Antidandruff Shampoo. *Research J. Topical and Cosmetic Sci.* 2020; 11(2):55-58.
- [28] Yadav A, Mohite S. Antioxidant Activity of Malvastrum Coromandelianum Leaf extracts. *Research J. Topical and Cosmetic Sci.* 2020; 11(2):59-61.
- [29] Yadav A, Mohite S. Screening of *In-vitro* anti-inflammatory and antifungal assay of *Psidium guajava* Leaf Extracts. *Research J. Topical and Cosmetic Sci.* 2020; 11(2):62-64.
- [30] Honmane P, Yadav A, Singh S, Mohite S. Formulation, and Evaluation of Herbal Ointment Containing Eclipta Alba (L.) Extract. *Seybold Rep.* 2020; 25(10):569-577.
- [31] Patil S, Yadav A, Chopade A, Mohite S. Design, Development, and Evaluation of Herbal Mouthwash for Antibacterial Potency against Oral Bacteria. *Journal of University of Shanghai for Science and Technology.* 2020; 22(11):881-898.1137-1148.
- [32] Yadav A, Mohite S, Magdum C. Preparation, and Evaluation of Antibacterial Herbal Mouthwash against Oral Pathogens. *Asian J. Res. Pharm. Sci.* 2020; 10(3):149-152.
- [33] Bisset DL, Oblong JE, Berge CA. Niacinamide: a B vitamin that improves aging facial skin appearance. *Dermatol Surg* 2005; 31: 860-866.