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RASAUSHADHIS IN SKIN CARE: AN INTEGRATIVE REVIEW OF TRADITIONAL AND MODERN PERSPECTIVES

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ABSTRACT

This article explores the pivotal role of Rasaushadhis- herbomineral formulations- in skincare, integrating traditional Ayurvedic wisdom with contemporary scientific advancements. Ayurveda utilizes mineral and metallic compounds, subjected to purification and processing techniques such as shodhan, maran, and bhasmikaran, to ensure their safety and enhance their therapeutic efficacy. Historically, these formulations have been employed to address various dermatological conditions, through their diverse pharmacological actions. Recently, advancements in nanotechnology have opened new possibilities for skincare, enabling the delivery of active ingredients deep into the skin layers and improving efficacy. Combining nanoscience with the principles of Rasaushadhi offers a promising approach to developing advanced skincare solutions that honour ancient wisdom while benefiting from contemporary technology. This review underscores the significance of skin health, examining how cosmetic formulations rooted in Rasaushadhis enhance skin vitality, hydration, and protection. Ultimately, the integration of traditional Ayurvedic formulations with advanced technological methods holds substantial potential for advancing skin care, promoting not only aesthetic appeal but also overall skin wellness.

KEYWORDS: Rasaushadhis, Ayurveda, Skin Care, Cosmeceuticals.

INTRODUCTION

Ayurveda, the traditional Indian system of medicine, emphasizes the use of natural substance-including minerals and metallic preparations for promoting health and wellness. A key aspect of Ayurvedic pharmacology is Rasaushadhi, which refers to herbomineral formulations that harness the therapeutic properties of both herbs and minerals. These formulations have been utilized for centuries, particularly in skin care, owing to their diverse pharmacological actions and holistic benefits. Ancient texts highlight the importance of combining minerals and metals with herbs to enhance efficacy, bioavailability, and treatment outcomes for various skin conditions. Traditional Ayurvedic practices often involved alchemical processes such as shodhan (purification) and maran (incineration) techniques to purify and transform minerals, rendering them safe and suitable for therapeutic use.

In recent years, advances in nanotechnology have opened new horizons for skincare, with nanoparticles capable of penetrating deeper skin layers to facilitate improved delivery of active ingredients. This modern approach aligns with the principles of Rasaushadhi, where the synergy between herbs and minerals is believed to optimize efficacy. By integrating nanotechnology with traditional Ayurvedic methods, skincare products can capitalize on ancient wisdom while benefiting from contemporary scientific innovations. Such integration holds promise for developing more effective treatments that enhance skin health and vitality. Today, cosmetics are not merely tools for aesthetic enhancement but also play a vital role in promoting healthy skin by providing hydration, protection, and targeted therapy for various skin concerns. This article explores the fundamental significance of the skin and examines how cosmetic formulations contribute to both aesthetic appeal and overall skin vitality, bridging traditional practices with modern scientific advancements.

Conventional Ayurvedic practices in skin care

Ancient Indian art of cosmetics was highly advanced, as evident by numerous references found in classical Ayurvedic literature. These texts outline different substances, procedures and therapies aimed at enhancing facial aesthetics and skin wellness. Ayurveda emphasizes topical applications known as lepa, to improve skin texture, reduce tanning, promote rejuvenation, maintain moisture balance, and address skin conditions such as acne, scars, and wounds.

Cosmetic formulations are classified into various Ganas (group of drugs) according to the classifications provided by different Acharyas. Notably, Acharya Charak dedicates an entire

chapter in the 'Aragwadheeya Adhyay'[1] of the Sutrasthan to external medicines and their applications. Dravyas beneficial for skin health are categorized under Ganas such as Varnyagana, Kushthaghnagana, Kandughnagana and Vayasthapangana. Additionally, Acharya Sushruta, while discussing Kshudraroga chikitsa[2] (minor skin ailments), describes various lepa formulations and oils that are advantageous for skin health. Ganas such as Lodhradi, Arkadi, and Eladi, which play significant roles in skincare, are also documented in Sushruta Samihita. Over the centuries, Ayurvedic medicine evolved, with Nagarjuna placing greater focus on mineral-based preparations called bhasmas. These mineral formulations are believed to be more potent in balancing the doshas and owing to their nanoparticle size, are easily absorbed through the skin, making them effective for cosmetic benefits alongside herbal treatments. This historical evidence highlights the sophisticated understanding and application of Ayurvedic principles in skin care practices of ancient India.

Table 1: List of Rasaushadhis from Bhaishajyaratnavali for external use in skin care.[3]

Skin concerns	Formulations	Form	Metal/mineral
1)Skin brightening (Varnya)	Manashila, hartal, manjishta, laksha, daruharidra, ghrita, madhu (Bh. R. 48/5)	Lepa	Manashila, Hartal
2)Depigmentation (Vyangnashan)	Kumkumadya tail (Bh.R. 60/124)	Taila	Manashila
3)Bad odour (Daurgandhyahar)	Hartal, haridra, daruharidra, godugdha (Bh. R. 39/16)	Lepa	Hartal
4)Anti acne (Mukha dushikanashan)	Matulunga jata, ghrita, Manashila, goshakrita ras (Bh. R. 60/44)	Lepa	Manashila
5)Healing Scarring (Vranaropan)	Jatyadi ghrita (Bh. R. 47/53)	Ghrita	Tutha
6)Depilation (Lomashatan)	Hartal, shankha, palashkshar, kadalikand swaras (Bh.R. 60/171)	Lepa	Hartal,Shankha

A review of various Ayurvedic formulations reveals a diverse range of yogas associated with skin enhancement and cosmetic benefits. In the category of Varnya (skin brightening yogas), formulations such as mukha kantivardhak, mukha karshnyahar, and tarunya pitikahar are documented. These can be analogized to modern cosmetic products like face powders, rouges, and creams. Similarly, yogas related to skin health (twachya) include shareer dourgandhyahar yogas, vipadikahar yogas and loma shatan yogas, which can be compared to contemproray antiperspirants, deodrants, and depilatory creams.

Classical Ayurvedic yogas are primarily designed for therapeutic purposes; however, they also confer cosmetic benefits. Most of the reviewed yogas can be equated with cosmeceuticals, as they offer both cosmetic and medicinal advantages. This dual functionality underscores the holistic approach of Ayurvedic formulations in skin care, integrating therapeutic efficacy with cosmetic enhancement.

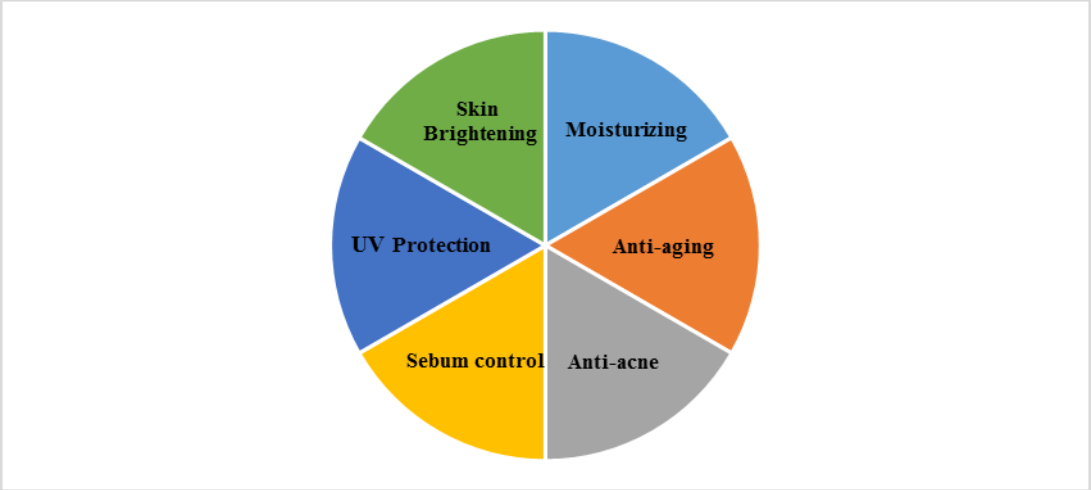

Fig. 1: Key functions of Skin Care cosmetics.

Skin care Aspects

- **Rejuvenation and Anti-ageing-** Preparation rich in certain minerals, such as shudha suvarna, are believed to offer significant benefits for skin health and counter the effects of ageing. Shudha Suvarna is specifically cited as a rejuvenator that promotes longevity and helps prevent early aging. Its description as "Saundarya kantiwardhak" highlights its perceived ability to enhance beauty and radiance, managing early aging symptoms by improving skin texture and increasing cellular regeneration.
- **Skin Brightening-** Both traditional Ayurvedic practices and modern science offer approaches to improving skin tone. Ayurveda emphasizes "Varnya" properties through substances like suvarna, rajat, tamra etc believed to enhance complexion by eliminating toxins and purifying blood. Modern research supports these ideas, showing gold and silver nanoparticles have antioxidant and anti-inflammatory effects, while bioavailable iron aids skin oxygenation and copper supports collagen synthesis, all contributing to a radiant and even skin tone through various internal and topical formulations.
- **UV protection-** Yashada is a widely researched ingredient in cosmetics, particularly for its sunscreen effects.[4] Unlike chemical sunscreens that absorb UV rays, mineral sunscreens like yashada reflect them, offering a potentially safer alternative. As a broad-

spectrum sunscreen effective against both UVA and UVB rays, yashada bhasma is suitable for inclusion in a wide range of facial products.

- **Skin Ailments-** Blood impurities are implicated in various skin disorders, including eczema, rashes, wounds, boils etc. Rasmanikya, a rasakalpa containing Hartal, addresses these issues by purifying the blood. It offers calming and soothing effects, reduces itching, and possesses immunosuppressant properties. It pacifies the body's doshas, thus aiding in the management of diverse skin conditions.

1) **Anti-acne-** Shankha bhasma is a traditional remedy used to alleviate inflammation and redness. Its effectiveness extends specifically to addressing acne, a condition referred to in traditional texts as tarunya pitika. This indicates that shankha bhasma is traditionaly recognized for its ability to help clear and manage acne breakouts. Its cooling nature is thought to soothe the skin and reduce the inflammatory aspects of acne, contributing to a reduction in redness and overall appearance of pimples.
2) **Healing and Scaring-** Minerals like Tutha (copper sulphate) can promote deep tissue healing, enhancing skin recovery and restoring its natural appearance. Tutha, specifically, exibits notable healing abilities due to its enzymatic properties.[5] These properties allow it to efficiently break down and remove dead tissue from wounds, which helps to minimize complications and prevent infections
3) **Skin Resurfacing-** In Ayurveda, various skin discolourations like freckles and other spots are collectively known as 'Vyanga'. The Ayurvedic approach to managing vyanga involves using formulations containing manashila, which are intended to address the root causes, such as imbalances in the dosha (biological energies) and rakta (blood tissue).
4) **Antiseptic-** Several minerals and metals like gandhak, yashada, tamra etc are used for their antiseptic and antimicrobial properties in cosmetics. Copper compounds, such as copper gluconate, are used in cosmetics for their potential antimicrobial and skin-conditioning benefits.

Modern advances in Skin Care

Recent advances in cosmetic skincare have increasingly harnessed the therapeutic potential of metals and minerals through innovative formulations and delivery systems. Nanotechnology, in particular, has enabled the development of metal-based nanoparticles, such as gold and silver, which exhibit enhanced bioavailability and targeted activity, thereby improving efficacy while minimizing potential toxicity. Silver nanoparticles, with their broad spectrum antimicrobial properties, are now incorporated into anti-acne products and wound healing

formulations, offering sustained antimicrobial effects.[6] Gold nanoparticles are utilized for their anti-inflammatory and antioxidant properties, contributing to skin rejuvenation and reducing signs of aging.[7] Copper peptides have gained prominence for their role in stimulating collagen synthesis, promoting tissue repair, and enhancing skin elasticity, which is pivotal in anti-aging skincare.[8] Additionally, mineral rich clay like kaolin and mica have been re-engineered into advanced masks and topical treatments, providing deep detoxification and oil absorption while delivering essential trace minerals to the skin.[9] The integration of these metals and minerals into innovative delivery systems, including liposomes and micro emulsions, has significantly improve their stability and penetration, leading to more effective and targeted skin treatments. Consequently, the convergence of nanotechnology, bioengineering, and mineral science continues to expand the horizons of cosmetic dermatology, offering safer, more efficacious solutions for skin repair, rejuvenation, and protection.

Table 2: Modern skin care cosmetics.[6,7,8,9,10]

Cosmetics	Ingredient	Metal/ Mineral	Function	Cosmetic use
1.Sunscreens	Zinc Oxide	Zinc	Physical UV blocker Anti-inflammatory Anti-microbial	UV protection Sensitive skin Acne-prone Non-comeodogenic
	Iron oxide	Iron	Tinted sunscreens protects from visible light	UV protection Melasma Hyper-pigmentation
2.Foundations,Powders & BB Creams	Mica	Mineral	Adds shimmer and light diffusion	Shimmering effect Optical brightening Improved spreadibility Dull or aging skin
	Kaolin Clay	Mineral	Absorbs oil, mattifies	Oily and acne prone skin
	Iron Oxides	Iron	Pigments for color matching	All skin types
3.Serums & Anti-aging products	Copper peptides	Copper	Boosts collagen, skin repair	Aging, sagging, dull skin
	Colloidal Gold	Gold	Firms and brighten skin	Mature or luxury skincare
4. Acne treatments and masks	Sulphur	Sulphur	Antibacterial, exfoliating	Acne prone Oily skin
	Zinc Sulphate	Zinc	Reduces sebum and bacteria	Acne and redness
	Colloidal	Silver	Antibacterial and	Inflamed or acne-

	Silver		soothing	prone skin
5.Deodrants, Lotions	Aluminium salts	Aluminium	Anti-perspirant	Strong perspiration
	Calcium carbonate	Calcium	Thickener, mild Exfoliant	All skin types

Metals and minerals play a vital role in modern cosmetic formulations, ingredients like zinc oxide and titanium oxide are widely used in sunscreens for their broad spectrum UV protection, while iron oxides serve as stable pigments in foundations and BB creams. Copper peptides, colloidal gold are popular in antiaging products for their ability to promote collagen production, brighten skin and support cellular repair. Meanwhile, sulphur and mineral clays like kaolin are valued in acne treatments and masks for their antibacterial, detoxifying, and oil-absorbing properties.[10] Each metal or mineral serves a targeted function depending on the product type and skin concern. The strategic use of these natural and engineered compounds enhances not only the performance of cosmetics but also their potential to improve skin health over time.

DISCUSSION

The role of rasaushadhis in skin care is deeply rooted in traditional Ayurvedic practices, where these substances have been employed for their purported therapeutic, rejuvenative, and protective properties. Historically, substances such as gold (Suvarna), silver (Rajata), copper (Tamra), zinc (Yashad), and iron (Loha) have been used in various formulations to treat skin ailments, promote complexion, and enhance overall skin health. The traditional processing techniques-shodhana (purification), bhavana (levigation), and marana (incineration)-were designed to detoxify and potentiate these metals, reducing toxicity and improving bioavailability.

Traditional Wisdom and Its Rational Foundations

Ayurvedic texts describe the specific indications and preparation methods of rasaushadhis, emphasizing their role in balancing doshas and promoting tissue regeneration. For instance, Suvarna Bhasma is renowned for its rejuvenating and anti-aging effects, while Tamra Bhasma is used for skin infections and inflammatory conditions. The antimicrobial, anti-inflammatory, and antioxidant properties attributed to these metals align with some modern pharmacological findings, suggesting a scientific basis for these traditional claims.

Modern Scientific Advances and Evidence

Contemporary research has validated several bioactivities of metal-based nanomaterials. Silver nanoparticles (AgNPs), for example, are well-documented for their broad-spectrum antimicrobial activity, which supports their traditional use in wound healing and skin infections. Zinc oxide (ZnO), widely used in sunscreens and dermatological formulations, has antioxidant, anti-inflammatory, and UV-protective effects, resonating with traditional uses of zinc compounds in skin care. Gold nanoparticles (AuNPs) have been explored for their anti-aging and skin-lightening properties, providing scientific credence to the use of Suvarna Bhasma in skincare.

Nanotechnology has facilitated targeted delivery and increased bioavailability of these metals, thereby enhancing their therapeutic efficacy while minimizing toxicity. For example, gold and silver nanoparticle formulations are being developed for topical applications to improve skin healing, reduce inflammation, and combat microbial invasion.

Safety Concerns and Regulatory Aspects

Despite their promising potential, safety concerns regarding heavy metal toxicity remain significant. Mercury-containing rasaushadhis, such as Parad Bhasma, require stringent purification protocols, adherence to safety standards, and rigorous quality control. Recent advances in analytical techniques, such as inductively coupled plasma mass spectrometry (ICP-MS), enable precise quantification of metal content and detection of contaminants, ensuring safer formulations. Regulatory frameworks in different countries are increasingly emphasizing the need for standardization, safety evaluation, and clinical validation of traditional mineral-based medicines.

Bridging Traditional Knowledge and Modern Science

Integrating traditional rasaushadhis with modern dermatology offers promising avenues for holistic skincare solutions. Scientific validation of their efficacy-through in vitro, in vivo, and clinical studies can facilitate their acceptance in mainstream medicine. Moreover, nanotechnology-based formulations can optimize delivery, reduce toxicity, and improve patient outcomes. Collaborative efforts involving traditional practitioners, scientists, and regulatory bodies are essential to develop safe, effective, and standardized products.

CONCLUSION

The incorporation of minerals and metallic Ayurvedic preparations in skincare and cosmetics serves as a bridge between ancient wisdom and modern consumer needs. As research continues to substantiate the benefits of these preparations, it is likely that the cosmetics industry will increasingly embrace these elements, providing consumers with holistic, effective, and safe beauty products. The ongoing fusion of Ayurvedic principles with contemporary formulation science presents exciting opportunities for innovation in the skincare and cosmetics landscape.

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