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## Review Article

# Diet and metabolic influences on skin aging and diseases: Ayurvedic prospectives

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### ABSTRACT

Skin aging and disorders are related to environmental factors, genetic makeup, nutrition, and other factors, but Ayurveda emphasized the dietary etiologies for all types of skin disorders and skin aging. The concept of Jara(aging) is entirely dependent on the Prana(life energy force for circulation and respiration) supported by ojus and tejos. The digestive power (Agni) is very vital for skin disorders and aging. Undigested food residue(Ama) influences the occurrence of diseases in the body; like that, it influences skin aging and skin disorders. The particular rasa(taste dominant), dietary items, and dieting procedure for genesis skin disorders are described. Food items included or avoided in a diet for a particular skin condition are also narrated. There is a positive correlation between diet and metabolism in skin aging and disorders. Therefore, fruit and vegetable consumption, along with other polyphenols containing food items, exercise, and pranayama may represent the healthiest and safe method in order to maintain youthful skin and can prevent skin disorders aging.

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## 1. Introduction

Skin is the body's largest organ and constitutes 10% of normal body weight known for physical sense(Spasenedriya). It plays a vital role in maintaining homeostasis, offering protection, and covering our organs and restoring body fluids as well. When the skin is afflicted by disease, these essential functions are disrupted, putting the entire body at risk. Skin aging is a natural phenomenon that is a fold, ridge, and crease in the skin that occurs due to loss of body mass, poor hydration, and disintegration of the dermis and epidermis junction.<sup>1</sup>The description of six layers of skin, the individual function of each layer, and its embryogenesis are described in Ayurveda. The condition of the skin is also an indication of an individual's overall state of health.

Skin diseases have been known to mankind since their origin. People can early recognize skin conditions due to uncontrollable itching sensation, involvement of vast body covering, and sensation by the visual component of themselves and others.<sup>2</sup> The Ayurvedic perspective of dermatology starts from the Rig Vedas to the Arthava Veda, then Ayurveda. Dermatology can be regarded as Tvaka roga Vigyana and, usthā is considered primitive skin diseases and early details in dermatology.<sup>3</sup> Ayurveda dermatology has very extensive elaboration of skin anatomy, physiology, etiology, pathophysiology, and therapeutics, even adding to the concept of modern dermatology. Knowledge of infection and allergy in dermatology is also known to Ayurveda.<sup>4</sup> Although there is a growing number of dermatologists rendering their services in various hospitals across our country, still skin disorders are accounting for 10 to 15% of the outpatient department of Ayurveda

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hospitals and research institutes. Clinical resistance to antimicrobial and antifungal agents in dermatitis, long-term use of immune suppressants, high cost of biologics in auto-immune skin conditions, and unsatisfied patients with pigmentary skin disorders are the specific reasons to attract common patients towards Ayurveda.<sup>5</sup> Ayurveda is a holistic approach considering the influence of diet, bowel movement, and metabolism in skin care.<sup>6</sup> Patients always seek dietary advice from Ayurveda practitioners for effective skin self-care. It is observed that diet greatly influenced the treatment outcome and recurrence of skin disorders. Metabolism is a series of chemical reactions that occur within the body to sustain life. Undigested food residue (Ama) influences the occurrences of diseases in the body; like that, it influences skin aging and skin disorders. There is a definite role of metabolism and diet in the genesis of skin disorders aging in skin. Therefore, a systemic review of Ayurveda literature and recent published data was done for a diet intervention and metabolism-related new treatment strategy in skin care.

## 2. Description about Skin in Ayurveda

Ayurveda described seven layers of skin in *Susruta Samhita*, viz., avabhasini, lohita, shveta, tamra, vedini, rohini, and mamsadhara. Avabhasini, the outermost layer, reflects the complexion and the quality of the Rasa Dhatu infiltration (nutrient fluid, the first of the seven tissues of the body). It also acts as a mirror of both physical and mental health. Mamsadhara, the innermost layer, is the platform for the skin's stability and firmness. When this layer is in balance, the skin looks young and supple. Any skin products that have *vayasthapana* (antiaging) properties nourish this layer to help in reverse the aging process. Vata in skin, which is dry, thin, fine-pored, delicate, and cool to touch, tends to develop wrinkles earlier than the other skin types. Pitta in skin, which is fair, soft, warm, and medium thickness, is photosensitive, has the least tolerance to sun, and is most likely to accumulate sun damage over the years. Kapha in skin, which is thick, oily, soft, and cool to touch, tends to develop wrinkles much later in life than Vata or Pitta, but because of its thickness and oiliness, is more prone to accumulating ama (toxins) under the skin.<sup>7</sup>

The embryogenesis of skin is also described in Ayurveda. Acharya Vagbhatta described the formation of Tvacha due to the pak of Rakta Dhatu by its Dhatvagni in the fetus. After Paka, it dries up to form Tvacha, just like the deposition of cream over the surface of boiled milk. Vriddha Vagbhatta says that Rakta Dhatu plays a main role in the manifestation of Tvacha. According to Bhavmisha, Tvacha is formed by Pachan of Shukra and Ras Dhatu.<sup>8</sup>

Individuals having excellence of Tvak (TTvaksara) or skin are characterized by Snigdha Tvacha (unctuous, oily), Shlakshna Tvacha (smooth), Mridu Tvacha (soft), Prasanna Tvacha (fresh in appearance), Sukshma, Alpa, Gambhir, Sukumar Loma (having very fine, clear, less numerous,

deep-rooted, and tender body hairs.), and Suprabha Tvak (having a natural glow over it). Such individuals are endowed with Sukh (happiness), Saubhagya (good fortune), Aishwarya (prosperity), Upbhoga (enjoyment), Buddhi (good intellect), Vidhya (knowledge), Arogya (health), Praharsa (cheerfulness and happiness seen on the face), and Avushatvan (longevity of life).<sup>9</sup> Charak Samhita explained that drugs can be administered through the skin (VVhir parimarjan).

## 3. Skin Aging & Disorders in Ayurveda

Skin aging is a process in which there is a qualitative deuteriation of skin with age due to the synergistic effects of chronological aging, photoaging, hormonal deficiency, and environmental factors. The most common signs of aging skin are atrophy, laxity, wrinkling, sagging, dryness, pigmentation, blemishes, and sparse gray hair due to damage to the collagen and the elastin fibers in the skin.

The Ayurvedic concept of Jara (aging) entirely depends on the Prana (life energy force for circulation and respiration). If we think about the fundamental theory of aging in Ayurveda, then another two essential substances are Ojas and Tejos. Ojas (the essence of the seven dhatus, or bodily tissues) is responsible for the immune system and mental intelligence; it is necessary for longevity. Ojas displacement creates the kapha-related disorders, and decreased ojas creates vata-related reactions. Tejas (the essence of a very subtle fire or energy) governs metabolism through the enzyme system. Agni (the central fire or energy source in the body) promotes digestion, absorption, and assimilation of food. Tejas is necessary for the nourishing and transformation of each dhatu. Aggravated tejas burn away ojas, reducing immunity and overstimulating pranic activity. Aggravated prana produces degenerative disorders in the dhatus. Lack of tejas results in overproduction of unhealthy tissue and obstructs the flow of pranic energy. The condition occurred in premature aging and cancer. Therefore, it is essential to maintain balance amongst the tridosha—vata, pitta, and kapha principles of motion, metabolism, and architecture, respectively—the dhatus and the three malas (bodily wastes); it is also important for longevity to maintain balance of prana, ojas, and tejas. The tridosha play a very important role in the maintenance of cellular health and longevity. Kapha maintains longevity on the cellular level. Pitta governs digestion and nutrition. Vata, which is closely related to pranic life energy, governs all life functions. Proper diet, exercise, and lifestyle can create a balance among these three subtle essences, ensuring long life.<sup>10</sup>

The eighteen types of kusta, seven types of visarpa, eight types of vispota, kilasha, svitra, and forty types of kshudra roga come under Tvak roga vigyana (Ayurveda dermatology).

#### 4. Role of Agni (Digestive Power) in Skin Aging & Disorders in Ayurveda

We discussed Tejos, which is Agni(digestive fire) of our body. Agni is 13 types in three components: jathagni(digestive fire), dhatvagni(metabolism of seven dhatu), and five bhutagni. Tvacha(Skin) is upadhatu of mamasa dhatu and majja dhatu. When describing Tvakasara purusha(a good-skinned person), Ayurveda considered Rasa dhatu, which was produced from Ahara Rasa(food) by means of kayagni/Jatharagni(digestive fire). Again, if deranged, Kayagni Kayagni(central fire) can produce Ama(undigested food) that remains in the skin and produces skin diseases. The transdermal intervention is mostly done by Panchakarma therapeutic procedures.<sup>11,12</sup>

Skin's internal architecture is crucial to understanding skin aging and skin disorders beyond the external factors like pollution, heat, cold, allergens, etc. Currently, various types of skin cells, such as keratinocytes, fibroblasts, and melanocytes, are well identified and, as described above, play significant roles in the structure and function of the skin. With the passage of time, changes in the cellular and structural elements in the skin manifest as aging characters, e.g., wrinkles, reduced elasticity, and pigmentation fluctuations. Comprehending the complexities of skin aging hinges on a grasp of the skin's biological process. Intertwined within this narrative lies the symbiotic relationship between skin biology and metabolism, a key element in unraveling the mystery of skin aging. The interplay of the skin's biology, which is intricately woven with metabolic processes, constitutes the foundational bedrock upon which we embark our quest to comprehend and combat the effects of aging on our skin.<sup>13</sup>

Metabolism, in general, refers to a series of organized biochemical reactions that occur within an organism to sustain life. These metabolic processes enable organisms to grow, reproduce, maintain their structures, and respond to the external environment. Metabolism is categorized into material metabolism and energy metabolism, with material metabolism primarily encompassing three major metabolites: glucose metabolism, protein metabolism, and lipid metabolism. Metabolism plays a vital role in maintaining physiological functions and influences the occurrence and development of diseases within the body. Glycogen is synthesized from glucose monomers and plays an energy storage role in the skin. When glucose is lacking in energy, the distribution of fuel is redistributed, and the skin's energy source shifts to other fuels such as glycogen or lipids. Glucose metabolism may be slowed down by aging, a high local glucose concentration in the skin, and susceptibility to glycation, leading to increased AGE production and damage to the skin and accelerating the process of skin aging. The metabolism of skin proteins is an indispensable and important process for maintaining skin function, and the integrity of skin tissue largely depends

on its protein matrix. Glutamine has been proven to be the amino acid with the highest content in plasma and muscle and responsible for skin aging. In aging skin, there is a notable slowdown in lipid synthesis and metabolism, resulting in reduced lipids that serve as protective barriers for the skin. This phenomenon contributes to skin thinning and heightens the propensity for an accelerated aging process.<sup>14</sup>

Skin metabolism is crucial for skin diseases, as lipid domains are considered to be very important for the skin barrier function. If skin metabolomics are deranged, then inflammation in skin.<sup>15</sup>

#### 5. Ahara in Skin Aging & Diseases

Total skin disorders come under the domain of the Kusta roga of Ayurveda. Ayurveda described the ahara nidan(dietary etiology) for all types of skin disorders and skin aging. Diet has an integral role in health; therefore, the World Health Organization recommended dietary changes, including balancing energy intake, limiting saturated and trans fats, shifting toward consumption of unsaturated fats, increasing intake of fruits and vegetables, and limiting the intake of sugar and salt.<sup>7</sup>The prakruti(individual constitution)-based diet and regimen as per season are well explained in Ayurveda. If any individual likes one particular type of food and takes in excess quantity, then a number of skin diseases occur. The food has a special role in a number of skin disorders. Unhealthy practice diets such as less water intake, high fat and oil in diet, refined sugar, and certain food additives cause damage to the skin, while alternative healthy diet habits such as adequate water intake, consumption of antioxidants and polyphenol-rich fruits and vegetables, nuts, legumes, low glycemic index diet, probiotics, and phytoestrogens are essential for the development of normal skin cells and healthy skin tone.<sup>8</sup> The specialized diet regimen and Ayurveda treatment procedure showed a higher treatment outcome.<sup>9,10</sup> A generalized diet as described in Ayurveda is illustrated in(Table 1), and specific foods along with combinations of foods described in Ayurveda are also described in(Table 2).

Diet plays a crucial role in various biological processes affecting skin health, aging, and disease. The skin's ability to heal and resist damage is closely linked to dietary habits and nutritional conditions. The foods that may raise IgE levels by triggering anaphylaxis are milk, eggs, soy, wheat, peanuts, tree nuts, fish, and shellfish. Certain diets influence the treatment outcome of psoriasis, atopic dermatitis, acne, vitiligo, chronic spontaneous urticaria, scleroderma, pemphigus, alopecia areata, etc. Stress and other psychological issues play an integral role in the treatment outcomes of acne, psoriasis, eczema, itching, hives, and other skin problems. Therefore, a Sattik ahara(purity diet) vegetarian diet with fewer spices and oil is good for skin as diet stabilizes our mood.<sup>16,17</sup>

**Table 1:** Particular Rasa (taste dominant), dietary items, and dieting procedure mechanism for genesis skin disorders in Ayurveda

Specific diet	Diet items	Mechanism
Ati lavan High salty food	Salt-predominant foods like pickles, bhelpuri, papad, chips, and namkeen	Pitt vridhi, Rakta dusti Increase pitta and deranged rakta and produce skin diseases.
Ati amla High sour items	Fermented products, pickles, bhelpuri, sour fruit juices, sauces, curd, buttermilk, pickles, lemon juice, vinegar, alcohol, sauce, squashes, sour beverages, and citrus fruits	Rakta dusti, Saithilakara Deranged rakta in the skin leads to collagen reduction
Gurbanna Pana Heavy food items	Pizza, cheese-mixed foods, bakery products, kidney beans, paneer, etc., food items prepared mainly from black gram such as dosa, idli, vada, beef, pork, and meat. Milk products, milk sweet items, milk shakes, etc.	Agni vaigunya and srotodusti Reduce metabolic power and deranged digestive power, production of ama, and blocking of channels
Snigdha annapana Oily food	Excessively oily foods such as biryani, fried oily foods, meat soups, sweets made of excess ghee, milk, etc., such as kheer	Agni vaigunya and srotodusti Reduce metabolic power and deranged digestive power, production of ama, and blocking of channels
Atidrava Excess liquids and beverages	Drinking an excess quantity of water/juices/madya/beverages/milk/liquid foods like rasam/sambhar more than needed for the body	Slow down metabolism and production of body fluids(inflammation).
Asatmaya Ahara Not familiar food	Foods that are not native to the place, such as fruits of foreign origin, eating food that is not native to the area, such as Chinese food, pasta or pizza, soybean, olive oil,	Produce Vidaha(irritability) and allergies.
Ahitasana Foods that are not good for health	Fast food, junk food, excessive spicy food, or excessive oily food	Agni Vasamya and Kosta Kathinya Deranged metabolic process and remain more time in gut and constipation Absorption of endotoxin
Mithya ahara Improper food Ajeernasana Intake food before digestion.	Dry, decomposed, preserved, and infected foods Forceful intake of foods to glorify others, mentally not satisfied, or by force	Agni dusti, Rakta dusti Infection Tridosha susti,Rakta dusti

**Table 2:** List of combination foods and individual foods causing skin disorders in Ayurveda

Food items	Combination items	Mechanism
Dahi (curd)	Curd and Fish	Abhisandhi(block channels)
Masa (black gram)	Non-vegetarians with milk	Abhisandhi(block channels)
Mulaka (Raddish)	Non veg with ice cream	Rakta and pitta dushti do
Tila(Til)	Cold items after exercise	Deranged Tridosha
Milk	Non veg with wine / alcohol	Kapha vridhi
Jaggery	Cereals with milk	Pitta and Kapha vridhi
Egg		Pitta vridhi
Honey		Pitta aggravation
Spicy and hot items		Kapha vridhi
Sea foods		Pitta vridhi
Lakucha		Pitta
Kakamachi		Kapha vridhi
Cream items		Kapha vridhi
Pisttanna Cakes		Pitta, vata vridhi
Kulattha(Dulicus biflorus Linn),		

**Table 3:** Food items included or avoided in diet in a particular skin condition

Name of the diseases	Negative food	Positive foods
Acne	Egg, chicken, Reddish, pickle, fast food, salted food, onion, garlic, milk products	Coconut water, watermelon, buttermilk, patal, snake gourd
Alopecia areata	Pumpkin, egg, seafood	Sprout, amalakai, carrot, green vegetable
Atopic dermatitis	Pickle, egg, chicken, seafood, brinjal, salty food	Patal, green vegetable, lauki
Psoriasis	Brinjal, sea fish, sated snacks, bitter guard, black gram, mustard seed	Snake gourd, patal, green vegetable, lauki
Pemphigus	Brinjal	Snake gourd, patal, green vegetable, lauki
Vitiligo	Tamarind, bitter gourd, seafish	Snake gourd, patal, green vegetable, lauki, nuts
Scleroderma	Egg, chicken, fish, meat, milk, and milk products	Snake Guard, patal, green vegetable, lauki, mango, carrot, apple, grapes, nuts
Fungal infection	Egg, chicken, fish, meat, high sugar Milk and milk products	Mango, carrot, apple, onion, green vegetable, graphs
Viral warts	Egg, chicken, meat	Mango, carrot, apple, onion, green vegetable,

Food items included or avoided in a diet for a particular skin condition are described in (Table 3 ).

## 6. Discussion

Dietary interventions have been neglected as an aspect of skin care in modern medicine, but Ayurveda has given more emphasis on diet. Recent research, however, has found a significant association between diet and some dermatological diseases. Skin is regarded as the largest area of drug intervention, which was recognized by scholars of Ayurveda. Non-vegetarian food items, spicy, salty items, oily food, and fast food should be avoided.<sup>18,19</sup>

The biologically active natural products like mangiferin, lutein, curcumin, resveratrol, embelin, naringenin, quercetin, lycopene, gingerol, and apigenin have very good anti-aging, anti-inflammatory, and anti-cancer properties for various skin diseases. The plants rich in polyphenols are good for skin aging and increase skin immunity.<sup>20–22</sup>

Metabolism in skin constitutes many low-molecular-weight metabolites that maintain skin health. Our skin is home to millions of bacteria, fungi, and viruses that compose the skin microbiota. Similar to those in our gut, skin microorganisms have essential roles in protection against invading pathogens, the education of our immune system, and the breakdown of natural products.<sup>23</sup> Ayurvedic external procedures like abhyanga, lepa kalpana, pradeha, pariseka, utvartana, utshadana, vilayana, and avagahan are various modalities of external treatment in skin. Vagbhatta described one special type of Pachana lepa that is used to increase the skin's metabolism and varnikara lepa used to glorify the skin.

The concept of Jara(aging) is entirely dependent on the Prana(life energy force for circulation and respiration) supported by ojus and tejos. The molecular and cellular process of skin aging is similar to that occurring in most internal organs and involves slow deterioration in tissue

function. Pranayama(breathing control exercise) and certain yoga postures such as twisting, binding, and certain back-bend positions according to Ayurveda are suggested to help proper flow of the prana('life force') and help detox the body.<sup>24</sup>

## 7. Conclusion

Diet and metabolism in skin aging and disorders still remain a controversial and conflicting subject for all health care providers. A promising strategy for enhancing skin protection from oxidative stress is to adopt an Ayurveda diet regimen and external applications. Fruit and vegetable consumption, exercise, and paranayama may represent the most healthy and safe method in order to maintain a balanced diet and youthful-appearing skin and can prevent skin disorders.

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## 9. Conflict of Interest


None.

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