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RAKTA VITIATION AND MODERN DIET: AYURVEDIC PATHOGENESIS OF BLOOD DISORDERS IN LIGHT OF NUTRITIONAL SCIENCE- A NARRATIVE REVIEW

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ABSTRACT

Rakta (blood) is one among the seven *Dhatus*(tissues) in Ayurveda and it is considered as the important factor for the survival of life. *Rakta Dushti*(blood vitiation) is central to the pathogenesis of various inflammatory, dermatological, metabolic and bleeding disorders. Classical Ayurvedic texts have described in detail dietary factors responsible for *Rakta* vitiation, but their correlation with modern day nutritional science has not been adequately explored. The present narrative review is an attempt to analyze the *Aharaja Nidanas*(dietary causes) of *Rakta Dushti* and to interpret them in the light of modern nutritional evidence. Information was collected from classical texts like *Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Bhavaprakasha, Kaiyyadeva Nighantu, Madanapala Nighantu* and related literature from PubMed, Ayush Research Portal and Google Scholar. This review identified the causative factors of *Rakta Dushti* as *Pitta* aggravation and *Srotorodha*. Substances such as *Kulattha*(*Dolichos biflorus*), *Masha*(*Vigna Mungo*), *Nishpava* (*Dolichos Lablab Linn*), *Tila*(*Sesamum indicum*), *Mulaka*(*Raphanus sativus*), *Pindaluka*(*Colocasia esculenta*), curd, oils, alcohol, spicy and acidic foods when consumed in excess *causes Rakta Dushti*. Modern evidence suggests that anti-nutritional compounds, dietary acid load, foods with high thermic effect, oxidative stress and inflammatory pathways may have parallels with such Ayurvedic mechanisms. The study highlights a strong similarity between the Ayurvedic dietary principles and modern nutritional science emphasizing their relevance in preventive and therapeutic healthcare.

Key-words: Blood, Blood vitiation, Diet, *Raktadushti , Nidana*.

INTRODUCTION: *Rakta* is given the prime importance in Ayurveda literature. *Rakta Dushti* is an important concept in *Ayurveda* and has great pathological significance. Classical Ayurvedic texts describe *Rakta Dushti* arising due to

imbalanced Doshas, mainly through *Aharaja* (Dietary), *Viharaja* (lifestyle) and *Manasika* (Psychological) factors. This vitiated *Rakta* plays a pivotal role in pathogenesis of conditions like *Kushta* (Skin diseases),*Visarpa* (Herpes),*Kandu (Itching), Pidaka (Boils), Vidhradhi (Abscess),Vaivarnya(Disco louration), Neelika (Blue*-black discoloration of skin), *Vyanga* (Melasma), *Piplava* (papular eruptions), *Tilakalaka* (Freckles) , *Dadru* (Dermatophytosis) *Asramandala* (Impetigo),*Pama* (Scabies),*Kota* (Urticaria),*Svitra* (Vitiligo),*Charmadala* (Chronic Dermatitis), Bleeding diseases like *Rakta Pitta*, *Asrigdhara* Inflammatory diseases of anogenital, oral region Other pathological conditions like *Pleeha* (Splenomegaly),*Gulma* (Palpable swellings),*Upakusha* (Gingivitis), *Rakta Meha* (Haematuria), *Vata Shonita* (Gout) ,weakness , headache ,burning sensation, bitter or sour eructation, *Kamala* (Jaundice), foul body odour, mental disturbances like anger, confusions, lethargy, sleep disturbances.[1] Nutritional science is the branch of science that studies the relationship between food, nutrients, and human health. It focuses on the physiological, biochemical, and metabolic effects of dietary substances on growth, immunity, tissue maintenance, disease prevention, and overall well-being. Contemporary nutritional science recognizes diet as a major determinant of metabolic health, inflammation, oxidative stress, immune regulation, and haematological balance. *Charaka Samhita* highlights numerous *Aharaja Nidana* for *Rakta Dushti,* which are still relevant in today's context. In addition, lifestyle factors like sleeping immediately after meals, overeating, suppression of natural urges, emotional disturbances, seasonal changes, and consumption of stale or putrid food further aggravate *Rakta* Vitiation.[2] This review analyses these substances through both Ayurvedic and contemporary scientific lenses based on recent researches on anti-nutritional factors, dietary acid load, thermic effect of food to understand their dual impact on health.

METHODOLOGY: For the review, *Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya* is reviewed to find the references about the dietary factors leading to *Rakta Dushti*. Foods mentioned as being responsible for Rakta Dushti is further reviewed in *Bhavaprakasha, Kaiyyadeva Nighantu*, *Madanapala Nighantu*. Research articles published in Pubmed,Google scholar, Ayush Research portal are searched using key words Food and Blood disorders, Nutrients and blood disorders, "*Rakta Dushti*" OR "blood vitiation" AND "*Kulattha OR Masha OR Nishpava OR Mulaka OR Pindalu OR Tila OR* Dolichos biflorus OR Vigna Mungo OR Dolichos Lablab Linn OR Sesamum indicum OR Colocasia esculenta OR Raphanus sativus", " Anti nutritional factors AND Dolichos biflorus OR Vigna Mungo OR Dolichos Lablab Linn OR Sesamum indicum OR Colocasia esculenta OR Raphanus sativus", "Adverse effect of Curd", "Dietary acid load" AND "Food", "Pulses" AND "High thermic effect". 3527 articles were obtained. Articles with abstract or full text, in English were included. Articles not relevant to the review topic, related to food processing, in language other than English, whose only title is available were excluded. 73 Articles were considered for final review to find information related to *Rakta Dushti*

and chemical composition action of those substances said to vitiate blood.

RESULTS:

***Kulattha* (*Dolichos biflorus*)**

Ayurveda View: Benefit vs. Harm

Katu Rasa(Pungent taste*)*, *Ushna Veerya*(Hot potency), *Laghu*(Light quality)*, Vidahi Guna's*(Causing burning sensation) it will aggravate similar *Guna*(Properties) in body. As *Rakta* share Similar property like *Ushnata* with *Kulattha*. On excessive consumption it will aggravate similar *Gunas* in body, extreme increase in *Ushnata, Vidahata* can lead to *Rakta* vitiation.[3] *Vidahi Guna* can be better compared with high thermic effect of the food where the energy requirement for the digestion of the food compound is quite high.

Contemporary View: Benefit vs. Harm

The chemical composition of *Dolichos biflorus* includes compounds such as phytates, oxalates, protease inhibitors, tannins, oligosaccharides, lectins, saponins, dietary fibre, polyphenols, and carbohydrates.[4] The plant have demonstrated anti-inflammatory and antioxidant properties.[5] Mineral binding properties of these compounds offer various health benefits. They can help reduce the risk of certain cancers, support cardiovascular health, and aid in the management of renal (kidney) stones. Scientific research has also highlighted specific effects such as anti-diabetic properties attributed to lectins[6], antioxidant and anti-cholesterolemic effects from phytates and other protective roles against metabolic and inflammatory conditions.[7]

Plant-based foods contain varying amounts of anti-nutritional compounds, when consumed in excessive amounts may have adverse health effects.[8,9] Phytates reduce the bioavailability of essential minerals like iron and zinc, which can lead to iron deficiency and contribute to anaemia. This aligns with the Ayurvedic understanding of Rakta vitiation resulting in *Pandu* (anaemia). Oxalates which are naturally present in plant diets as part of the plant's calcium regulation, defense mechanisms, and metal detoxification processes can increase the risk of conditions such as hyperoxaluria, nephrolithiasis, oxalate nephropathy, and chronic kidney disease when consumed in large quantities.[10] Certain lectins are resistant to digestion and may negatively affect gastrointestinal health and immune function. For instance, phytohemagglutinin has been linked to inflammatory responses and autoimmune disorders, whereas wheat lectin may aid nutrient absorption.Additionally lectins from legumes have been identified as potential food allergens due to their ability to specifically bind to IgE antibodies in allergic individuals, trigger basophil degranulation and stimulate interleukin secretion in sensitized people.[11]

Masha (*Vigna mungo*)

Ayurveda View: Benefit vs. Harm

Masha[12] undergoes *Katu, Amla, Swadu Vipaka*(Post digestive effect). Exhibits *Brimhana* (Nourishing), *Balya* (Tonic), *Vrishya* (Aphrodisiac), *Vatanulomaka*, *Pittavardhaka* (increases *Pitta*) also *Kapha-Bala-Stanya-Medo-Mamsabalaprada* properties. It is beneficial in conditions like *Gudakeela, Ardita, Shwasa, Pakshaghata*.[13] *Masha* Due to *its Katu- Amla Rasa ,Guru, Snigha (Unctuous)Guna, Ushna Veerya, Katu Vipaka* may contribute to *Pitta Vriddi* and *Rakta Dushti*.[14]

Contemporary View: Benefit vs. Harm

The seeds contain a range of macro-minerals including calcium, magnesium, phosphorus and micro-minerals such as copper, iron, and zinc. They also possess various bioactive compounds like amino acids, albumin, globulin, glutelin, prolamin, lectins, alkaloids, β-sitosterol, stigmasterol, campesterol, condensed tannins, flavonoids, glycosides, saponins, phenolic compounds, phytic acid, trypsin inhibitors, and oligosaccharides. Contemporary research has demonstrated that these seeds exhibit multiple beneficial properties, including antioxidant, immunostimulatory, immunomodulatory, aphrodisiac, antihyperlipidemic, anticonvulsant, anti-osteoarthritic, antidiabetic, hepatoprotective, nephroprotective, and antifungal effects.[15,16]

Phytic acid however binds essential minerals such as calcium, iron, and zinc, reducing their bioavailability and potentially causing mineral deficiencies. Tannins can inhibit the absorption of proteins and minerals, thereby affecting overall nutritional status. Studies suggest that soaking and boiling can effectively reduce tannin content in Vigna mungo seeds. Trypsin inhibitors, classified as anti-nutritional compounds, when consumed excessively, can decrease protein digestibility and may lead to pancreatic hypertrophy. Oligosaccharides like raffinose and stachyose are non-digestible sugars that can cause gastrointestinal discomfort. Lectins have the potential to trigger autoimmune disorders by binding to the gut lining or other tissues, leading to symptoms such as bloating and flatulence due to fermentation by gut bacteria. Furthermore, lectins may provoke immune responses associated with conditions like type 1 diabetes and rheumatoid arthritis.

***Tila*(*Sesamum indicum*)**

Ayurveda View: Benefit vs. Harm

It exhibits *Kapha-Pittahara karma*. *Tila*[17] is known for its actions like *Dantya, Alpamutrakrit, Grahi* (constipating*)* and *Vatahara.* On excessive consumption it will result in *Rakta Dushti* because of its *Ushna, Snigdha Guna, Katu Vipaka*.

Contemporary View: Benefit vs. Harm

The composition includes lignans, phytosterols, γ-tocopherol, phenolic acids, flavonoids, thiamine, riboflavin, niacin, pantothenic acid, folic acid, ascorbic acid, tocotrienol, tryptophan, protein, unsaturated fatty acids, and essential vitamins and minerals such as potassium, phosphorus, magnesium, sodium, iron, zinc, and manganese.[18] Contemporary literature recognizes it as a rich source of protein and minerals, offering antioxidant and cardiovascular benefits. Cephalin present in sesame seeds has been reported to exhibit significant haemostatic activity. Consumption of sesame seeds has been shown to increase plasma tocopherol levels and stimulate the activity of vitamin E, which plays a role in preventing cancer and cardiac diseases.[19]

While excessive consumption may pose risks due to the presence of anti-nutritional factors, these can be effectively reduced through processing methods such as boiling and fermentation.

Nishpava(*Dolichos lablab linn*)

Ayurveda View: Benefit vs. Harm

Presence of *Ushna Veerya* and *Amla Vipaka* [20] may contribute to *Pitta vriddhi* thereby leading to *Rakta dushti* if consumed excessively.

Contemporary View: Benefit vs. Harm

Studies have evaluated Dolichos lablab for its anti-inflammatory[21], antimicrobial and anti-ulcerative colitis properties[22] as well as its benefits in mild functional dyspepsia.[23] The plant contains several anti-nutritional factors, including phytic acid, tannins, trypsin inhibitors, phytohemagglutinins (lectins), and trace amounts of hydrogen cyanide. When consumed in excess or without proper processing, these compounds may interfere with nutrient absorption, digestive enzyme activity, and overall metabolism, potentially leading to adverse health effects.

Mulaka (*Raphanus sativus*)

Ayurveda View: Benefit vs. Harm

It is mainly of 2 varieties *Laghu Mulaka* and *Nepala Mulaka. Nepala Mulaka is* described as *Ruksha(dry), Ushna, Guru in Guna* with *Tridosha-Karaka Karma* whereas *Laghu Mulaka* is *Ruchikaraka, Swarya* in nature with *Tridoshahara action*.[24] Due to its *Katu Rasa, Ushna Veerya,* and *Katu Vipaka*. Excessive intake may lead to *Rakta Dushti* as it causes *Pitta-Vriddhi according to Samanya Siddhanta.*[25]

Contemporary View: Benefit vs. Harm

Contemporary research highlights its nutraceutical benefits in managing pathological conditions like cancer, diabetes, hepatic inflammation and oxidative stress.[26] Radish also exhibits prebiotic and anti-adipogenic[27] effects and has been proven to provide hepatoprotective benefits. However, no contemporary research articles have been found documenting any adverse effects from excessive consumption of radish.

Pindaluka (*Dioscorea* species)

Ayurveda View: Benefit vs. Harm

The word *Pindaluka* is mentioned in different contexts in Charaka Samhita. The word *Pindalu* has been mentioned by *Acharya Charaka* in context of *Rakta Dushti Nidana*, *Nidana* of *Raktapitta*. In context of *Arshas , Pindaluka* is said to be the *Nidana. Hemadri* on commenting the Drug *Pindalu*, clarified that word *Pindalu* and *Pindaluka* Are synonymous and refers to *Varahi Kanda*. *Pindalu*[28] is *Katu* in *Rasa*, *Ushna Veerya*, *Vata kaphahara* and increases *Pitta* thus aggravated *Pitta* will vitiate *Rakta* due to *Ashraya Ashrayee bhava*.[29]

Contemporary View: Benefit vs. Harm

Based on the above observations the botanical identity corresponds to species of Dioscorea. Contemporary literature suggests that Dioscorea species have potential applications in managing inflammatory and metabolic disorders.[30] They possess proven nutraceutical value[31], including notable antioxidant properties.[32] However, these species also contain anti-nutritional factors such as free phenolics, tannins, hydrogen cyanide, total oxalates, and inhibitors of amylase and trypsin.

Harita Shaka (Green leafy vegetables)

Ayurveda View: Benefit vs. Harm

They are more commonly utilized in salad preparations, juices made of fresh veggies or green leafy vegetables. *Acharya Sushruta* did not mention separate group describing *Harita Shaka* (Green leafy vegetables) instead he included them under *Pippalyadi Varga* itself. The common properties of *Pippalyadi Varga*[33] are – *Katu, Ushana, Vata-Shleshma Hara*. As this Group have tendency to aggravate *Pitta*, it will result in *Dushti* of *Rakta* due to *Pitta Vriddhi*.

Contemporary View: Benefit vs. Harm

These substances typically have a high fibre content. From a contemporary perspective, boiling vegetables is regarded as an important method to reduce the anti-nutritional components in food. Raw green leafy vegetables often contain anti-nutritional factors that can interfere with nutrient absorption in the body.[34]

Dadhi (Curd)

Ayurveda View: Benefit vs. Harm

Dadhi is *Amla* in *Rasa* and *Paka, Guru* and *Ushna in Veerya,* it has properties like *Vatahara*, increases *Meda, Shukra, Bala, Kapha, Pitta, Rakta, Agni,* and *Sopha*. It is indicated in cases of *Aruchi, Vishama Jwara, Peenasa, Mutrakrichra*.[35]When consumed in excess or when consumed with incompatible combination like Milk it leads to disease.[36]

Contemporary View: Benefit vs. Harm

Curd is used to prevent a number of intestinal illnesses, according to modern literature. It has the ideal ratio of proteins, carbs, fats, vitamins, minerals, and water, as well as lactic acid bacteria. It is used in conjunction with medication for people with liver illness, diabetes, sleeplessness, gastrointestinal cancer, and other conditions.[37] We were unable to locate any recent research on the effects of excessive curd eating.

Acidic Substances

Ayurveda View: Benefit vs. Harm

Amla, Mastu, Shukta, Sura, Sauveera falls under acidic preparations. In small quantities it will increase taste of the food, aid in digestion. But *Amla Rasa* when excess will cause the *Dushana* of *Rakta*(Blood vitiation).[38]

Contemporary View:

Long-term diet-induced acidosis has been shown to decrease density of bone minerals.[39] Low-grade metabolic acidosis brought on by diet has been shown to have negative consequences on the body, including insulin resistance.[40] These days, it's normal to overindulge in carbonated drinks, pizza, burgers, sandwiches with sauce, sour sweets, artificial fruit-flavoured snacks, processed cheeses, beer, wine, and spirits. Consuming the ideal ratio of acids and alkalis in the diet is another topic of current research. Westernized diets frequently result in imbalances that raise the dietary acid load[41], which has a negative impact on health.

Excessive consumption of Salty, Alkali Food Substances

Ayurveda View:

According to principles of Ayurveda excess consumption of salty and alkali foods can vitiate blood due to Ushna *Guna*(Hot property), *Abhishyandi Guna* (That which increases the secretions channels), *Ushna Veerya* (Hot potency).[42]

Contemporary View:

Excessive sodium chloride (Nacl) intake is linked to hypertension, cardiovascular disease, and kidney problems.[43] These items include packed chips and crips, salted fries, instant noodles, Pretzels . These foods have raised concerns about the sodium overload.

Consumption of excessive alcoholic preparation

Ayurveda View:

Madya preparations (Alcohols) are *Alma Rasa* (Sour), *Ushna Guna* (Hot in property) and *Ushna Veerya*(Hot in potency). These properties vitiate blood on excess consumption.[44]

Contemporary View: Benefit vs. Harm

Drinking too much alcohol has an impact on the cardiovascular, neurological and

gastrointestinal system also alcohol plays a major role in both promoting proinflammatory immune responses and inhibiting anti-inflammatory cytokines and its involvement in the development of cancer has been investigated.[45]

Spicy substances

Ayurveda View: Benefit vs. Harm

Excess *Katu Rasa*[46](Spicy food) will vitiate blood because of its Ushna property and the contemporary examples include traditional Indian cuisines excess in spices, packed chips, chilli toasts, spicy wraps, Spicy Schezwan noodles, Spicy Burgers etc.

Contemporary View: Benefit vs. Harm

Overindulgence in spicy meals is linked to gastrointestinal problems. Additionally, research indicates a connection between eating too many spicy meals and mental health issues including anxiety.[47]

Consuming *Klinna (Kledayukta*, Sticky), *Puti* (Rotten) food Substances.

These substances can hamper digestive fire leading to its ill effects. *Pooti* substances may include dangerous microbes and poisons. These can result in foodborne infections[48] that can cause severe diarrhoea, nausea, vomiting and even death and further rotten food frequently has less nutritional value and can eventually lead to the onset of chronic illnesses.

***Taila* (oil)**

AYURVEDA VIEW

Property of Taila depends mainly on the ingredient from which it has been extracted. *Tila Taila* (Sesame oil*), Sarshapa Taila* (Mustard oil), *Eranda Taila* (Castor oil*)* in general have properties *Snigdha,Ushna, Teekshna, Drava, Pittakara* property which can vitiate *Rakta*.[49]

Contemporary view

Oils high in Monounsaturated fatty acid and Polyunsaturated fatty acids have lipid lowering effect on health.[50] Consumption of oils high in saturated fatty acids results in increase in LDL , thus increasing risk of cardiovascular accidents.[51]

DISCUSSION:

The concept of *Rakta Dushti*, as elaborated in Ayurvedic classics, represents an intricate interplay between dietary inputs and systemic imbalances that ultimately impact the quality and function of Blood. Usually food will be consumed in combination and property of the food will depend on all of its ingredients however the main ingredient used will play major role in determining the property of food as its quantity will be more. Further concepts of *Satmya* (Habituation), *Ahara Vidhi*(Dietary guidelines), *Desha*(place), *Kala*(season*), Prakriti*(Bodily constitution) of the individual must be considered to label a food as having adverse effect on health. In Ayurvedic physiology *Rakta* (Blood) shares an intimate relationship with *Pitta Dosha* and both are inherently *Ushna* (Hot) in nature. Consequently substances possessing similar *Guna*s (qualities) such as *Ushna, Vidahi* (irritant), *Guru* (heavy), and *Snigdha* (unctuous) tend to disturb the equilibrium of Rakta predisposing the body to a spectrum of pathologies.[52]These include *Kushta* (Skin disorders), *Rakta Pitta* (Bleeding disorders), *Pleeha* (Splenic enlargement), and other inflammatory conditions.[53]This review attempted to bridge classical Ayurvedic wisdom with contemporary biomedical understanding to deepen the appreciation of these dietary causes of *Rakta Dushti.*

Table:1 Examples for foods causing blood vitiation on excessive consumption with contemporary analogy

Contemporary analogy	Examples
Anti nutritional factors	Legumes such *as Kulattha(Dolichos biflorus), Nishpava* (*Dolichos lablab*),*Tila* (*Sesamum indicum*).
Dietary acid load	Acidic items like *Shukta,* Excessive Beer, Wine, Spirits, Sour curd, Limburger Cheese, aged yogurts
Thermic effect of food	High protein foods which are difficult to digest such as *Kulattha(Dolichos biflorus),Masha*(*Vigna mungo*)

Interestingly, despite their potential adverse effects on excess consumption, these food substances also offer therapeutic and nutritional value when consumed judiciously. *Kulattha* and *Masha* are rich sources of protein, fibre, and polyphenols, and exhibit antioxidant, antidiabetic, and lipid-lowering effects. Similarly, Tila is rich in sesamin and tocopherols, offering cardiovascular and antioxidant benefits. The dichotomy observed here aligns well with the Ayurvedic principle of "*Matravat Ahara*"—that even medicinal foods can act as poison if consumed in inappropriate quantities or combinations

Moreover, classical Ayurvedic texts emphasize *Ahara Vidhi Vidhana* (Proper rules of eating), highlighting that not just the nature of food, but also the timing, quantity, combinations, and individual *Prakriti* (Constitution) determine its impact on health.

CONCLUSION:

This integrative analysis highlights a profound congruence between ancient Ayurvedic principles and modern scientific evidence regarding the role of diet in blood-related and inflammatory disorders. It reinforces the timeless relevance of Ayurvedic dietary guidelines while offering a platform for contextualizing them in modern nutritional science.

DECLARATION REGARDING USE OF AI: No AI tool have been utilized in obtaining the contents of this article. Chatgpt-5 have been used only for language improvement and better presentability.

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