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A CRITICAL ANALYSIS OF EFFECT OF *GARA VISHA, DOOSHI VISHA* ON *AGNI* WITH ITS CORRELATION WITH GUT MICROBIOME

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ABSTRACT

Background: With modernisation, food consumption has been evolved in various aspects.

Aim: To study *gara visha & dooshi visha* as the aetiology of various diseases in the form of food.

Objective: To explore the basic gut microbiome and its association with *gara visha & dushi visha.*

Material & method: Ayurvedic review is obtained from *Bruhattrayi Samhita*. Modern text is evaluated from online database such as pubmed, google scholar, frontier etc. and namaste portal was consulted for modern terms of ayurvedic terms wherever necessary.

Discussion: The concept of*, dushi visha & garavisham* has been modernized in the form of various changes in dietary patterns and need to be understood. There is an interrelationship between *ahara* & *agni*. In ayurveda we need to know the importance of our dietary habits and use it to maintain our gut health as well as *agni*. And this *agni* can be correlated with its role as gut microbiome. The pathophysiology of many inflammatory conditions appears to include

the gut microbiota, and GI disorders are frequently accompanied by cutaneous symptoms. This can be linked with intestinal dysbiosis.

Conclusion: The knowledge about human gut microbiome and its role in both health and disease is a subject which can be explored in terms of *ayurveda*, while integrating *ayurveda* & modern science. People need to be aware of the terms like *gara visha and dooshi visa*. The practitioners at clinical level need to incorporate the concepts of *gara visha & dooshi visha* as the first line of pathogenesis.

Keyword: agad, *ahara, agni, dooshi visha, garavisham*, gut microbiome

INTRODUCTION

Hippocrates, the father of modern western medicine, has famously given the expression "All disease begins in the gut." As per *Acharya Sushruta*, *ahara* is term as *"prani moola"* i.e., *ahara* is responsible for protecting human body and is also responsible for maintaining *bala, varna & oja* in body **[1]**. There is no collective data which shows how much toxin has been going inside our body invisibly. At least we are aware of what we are taking inside our body.

In agada tantra concept of *garavisham* (combination of non-poisonous substances*)* & *dooshi visha* (artificial poison) need to be understood under this broad heading rather than just a mere concept of visha. And how exposure to these creates a disturbance in our gut microbiota rhythm. These need to be understand as pretty much today it forms the basis of various diseases.

MATERIAL & METHODS

Brief understanding of *garavisham & dushi visha*

As per *Acharya Charaka*, *Garavisham* is prepared artificially by the mixture of various substances and can act as a causative factor in the production of various diseases. It takes a long time to get metabolised inside the body; therefore, it does not produce instantaneous death of the person. In short *garavisham* collectively produces the gastrointestinal diseases **[2]**.

Dushivisha is a low potent slowly progressive poison which affects all *dhatu's* gradually which can be sthavar, jangam & *krutrima* **[3]**.

Various examples of the, *garavisham* & *dushi visha* can be understood from **Table 1**.

Table 1: Contemporary examples of *visha*

Garavisham	*Dushi visha*
1. Adulteration / preservatives **2. Cosmetics** **3. Psychoactive drugs** **4. Occupational poisoning** **5. Toxicity by improper preparation of different *Bhasmas* (nanotoxicology)**	**1. Insect bite** **2. *sthavar visha* (Inanimate poison)** **3. *Viruddhahara and Ahitahara*** **4. Fast foods and cold beverages** **5. Alcohol, tobacco etc.** **6.Drugs like quinine, NSAIDS, steroids etc.** **7. Pesticides, heavy metals, minerals, pollutants etc.**

Agni

Without proper *agni, ahara* cannot be utilised properly **[4]**. Acharya charaka has defined the importance of *agni* in the reference of *grahani*. According to him, *ayu, varna, bala, swasthya, utsaha, prabha, oja* are based on *agni* **[5]**.

Gut Microbiome

The human microbiome comprises of collective genomes of microbiota inhabiting us, such as protozoa, archaea, eukaryotes, viruses and as well as bacteria that coexist symbiotically on and within different sites of the human body. Examples of occupied habitats include oral cavity, genital organs, respiratory tract, skin and gastrointestinal system **[6]**.

The diverse gastrointestinal microbiota is predominantly composed of bacteria from three major phyla, namely *Firmicutes, Bacteroidetes,* and *Actinobacteria* **[7]**

Good bacteria & bad bacteria

Intestinal bacteria can be classified according to their actions into three types. Good bacteria are involved in health maintenance and managing anti-aging effects such as aiding digestion and absorption, and stimulating immunity. Representative examples are bifidobacteria and lactic acid bacteria. In contrast, bad bacteria can have adverse effects on the body such as *Clostridium perfringens*, *Staphylococcus*, and *Escherichia coli* (*E. coli*; toxic strain). They inhibit health by triggering disease and promoting aging.

Opportunistic bacteria cause no trouble when you are healthy, but may have adverse effects upon the intestines when the body is weak. These examples include Bacteroidetes, E. coli (nontoxic strain), and Streptococcus **[8]**.

Gut Dysbiosis and associated diseases

Dysbiosis is often defined as an "imbalance" in the gut microbial community that is associated with disease. Changes in the relative number of microorganisms or the addition or removal of community members could be the cause of this imbalance **[9]**.

There is growing evidence that dysbiosis of the gut microbiota is involved in the pathogenesis of both intestinal and extra-intestinal disorders. Intestinal disorders include inflammatory bowel disease, irritable bowel syndrome (IBS), and coeliac disease, whereas extra-intestinal disorders include allergy, asthma, metabolic syndrome, cardiovascular disease, and obesity **[10]**.

Concept of probiotic & prebiotic

Prebiotics are relatively new, and their definition is described as "non-digestible food ingredients that selectively stimulate the growth and/or activity of one or a limited number of bacteria in the colon to improve the host's health" **[12]**. They naturally occur in different dietary food products, including

asparagus, sugar beet, garlic, chicory, onion, wheat, honey, banana, barley, tomato, rye, soybean, human's and cow's milk, peas, beans, etc. **[13]**

Probiotics are foods and/or supplements containing non-pathogenic microbes such as bacteria and yeast that colonize the gut and can potentially yield a variety of health benefits **[14]**.

The health benefits of probiotics are associated with prevention and reduction of many diseases, i.e., allergic diseases, cancer, hypercholesterolemia, lactose intolerance, inflammatory bowel disease, diarrhoea, and irritable bowel syndrome **[15]**.

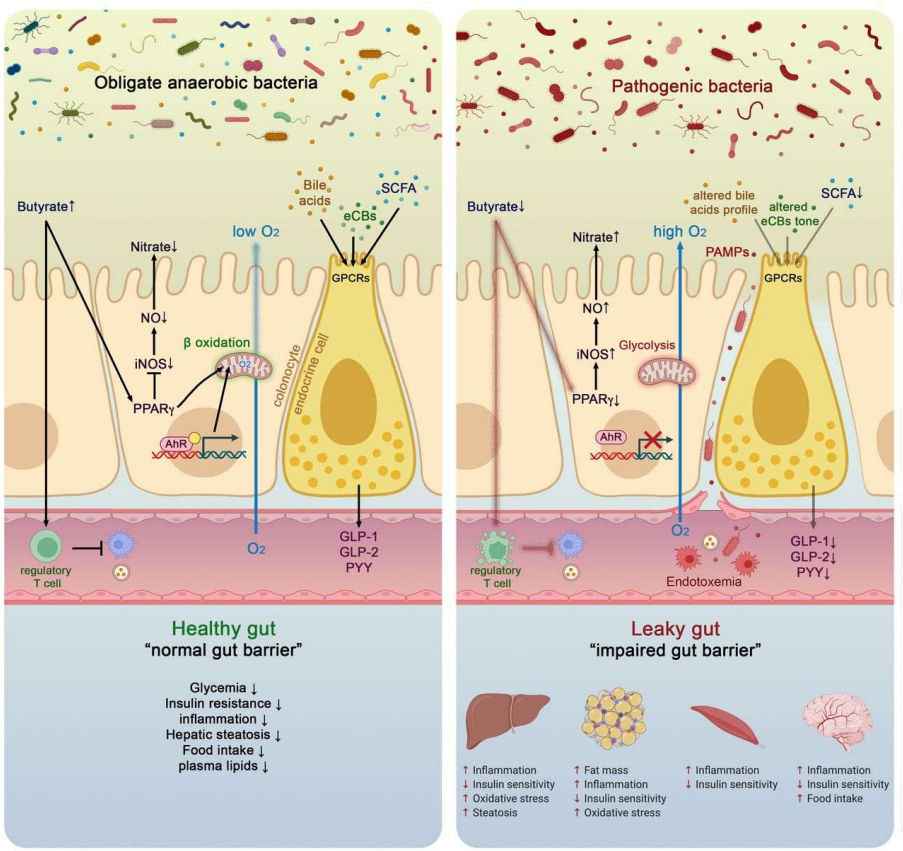


Figure 1: Healthy Gut & Leaky Gut [11]

Modern day gara visha & dushi visha and their effect on gut health

A study suggested that as soon as the skin's exposure to synthetic ingredients was decreased, the microbial diversity and richness increased. This could be the beginning of a link between exposure to chemicals and a repressed skin microbiome **[16]**.

Healthy eaters have a rich diversity of beneficial bacteria, such as bifidobacteria and lactobacilli, which are essential for digestion, production of SCFA, and gut wall reinforcement **[17]**. Junk food, on the other

hand, encourages the expansion of harmful microorganisms like Firmicutes, linked to inflammation and obesity. SCFAs play a crucial role in maintaining gut health by acting as an energy source for gut bacteria, maintaining gut barrier function, promoting immune modulation, regulating gut pH, influencing appetite and metabolism, anti-inflammatory effects, increasing mucus formation, and protecting against pathogens **[18]**.

Regarding the effects of long-term dietary exposure to pesticides on the incidence of neurodegenerative disorders, such as Alzheimer's and Parkinson's disease, there is increasing evidence that the steady exposure of the gut-microbiome to toxicants and the resulting dysbiosis can trigger a cascade of events that can cause these disorders in the long-term **[19]**.

The literature also demonstrates that pesticide residues and saturated fats disrupt the intestinal microbial balance and the intestinal barrier and BBB (blood brain barrier) structure and function. Because the gut microbiota is the most important part ensuring the communication between the intestinal tract and the brain within the gut-microbiota-BBB axis, it is becoming one of the targets to palliate food contaminants effects and treat intestinal and brain diseases **[20]**.

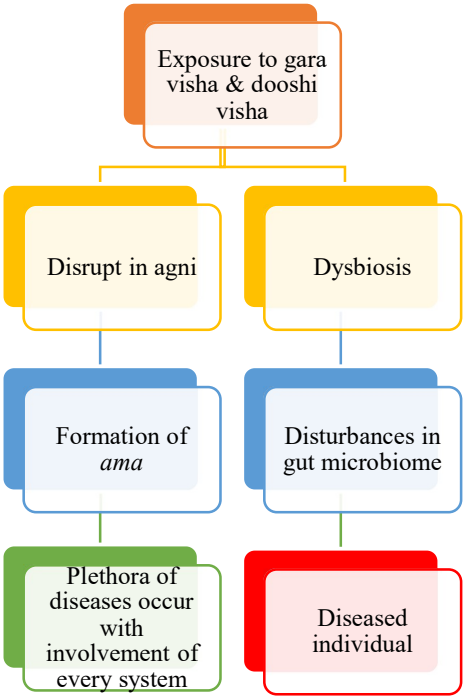
Common additives like sugar, salt, vinegar and alcohol have been used as preservatives for centuries, but modern-day food labels now reveal more unfamiliar ingredients such as sodium benzoate, calcium propionate, and potassium sorbate **[21]**.

A growing number of studies investigated the interactions between gut microbiota and food additives, indicating that these interplays might be involved in the pathogenesis of IBD. After summarizing the collected information from the current studies, in a review it was concluded that food additives exert multiple effects on gut microbiota and intestinal homeostasis, which may be associated with the onset and progression of IBD **[22]**.

DISCUSSION

Garavisham & dushi visha are type of *visha* or poison which affect the body with both short term & long-term effects. Symptoms of *garavisham* are mainly associated with gastrointestinal system such as *pandu, krustha, alpagni, rajyakshma, grahni* etc, whereas *dushi visha* is associated with the diseases involving many systems upto *dhatu* level as shown in **Table 3**.

Gut microbiome is a biome of bacteria found in the gut of a human beings which is collection of various diversity such as protozoa, bacteria, fungi etc. it is colony of microorganisms present in GIT like skin, oral cavity, stomach, duodenum, jejunum, ileum & colon.



Flowchart 1: ***Samprapti*** **of** ***gara visha & dooshi visha***

There is also the concept of gut-brain axis which control sometimes what we put inside our mouth. Then there is a list of good bacteria & bad bacteria which are beneficial for maintaining good gut health. Also disturbing the population of gut bacteria, definitely play a crucial role in causing diseases of various systems mainly gastrointestinal system, cardiovascular system, central nervous system, reproductive system & skin disorders as mentioned in the **Table 2**.

Altered digestive functioning can lead to the production of Ama (undigested food matter), a toxic material that initiates and promotes disease processes throughout the body. The G.I. tract needs a balanced microbiota and healthy mucosal integrity to perform at its best. Compromised mucosal integrity leads to 'leaky gut syndrome,' and causes imbalances in the microflora known as 'dysbiosis,' result in the formation of *Ama* **[23]**.

This *ahara* is dependent on *agni* for its utilisation and *agni* is further dependent on *ahara* for its maintenance. Hence it proves an important inter-relationship between *ahara & agni.*

Understanding these differences in gut microbiome composition can lead to dietary interventions to promote gut health and reduce related health risks **[24, 25]**. These include fibre-rich diets, prebiotics, probiotics, behavioural interventions like education and behavioural therapy, and personalized nutrition based on individual gut microbiota composition **[26]**.

Also, we are exposed to gara visha & dooshi visha on everyday basis. This article provides insight into its involvement in causing various disease.

The modern world is all about modern day poisons. And these newly introduced poisons could be understood under the concept of *garavisham & dushi visha.* Knowingly or unknowingly, we are consuming them on daily basis whether in the form of food or in any form which reaches to gut microbiome and can disrupt their population becoming a leading cause of various major diseases.

Table 2: Diseases due to intake of incompatible food & supporting researches

S. No.	System involved	Related diseases	Related researches
1.	Gastrointestinal system	*Andhya* (blindness),*Dakodar*, *Bhagandara*(fistula in ano), *Adhmana* (abdominal distension) *Galagraha* (choking sensation in throat),Pandu,Aamvisha ,Grahani Gada,Shotha (odema), Amlapitta (hyperacdity), Jwara (fever) *Peenasa* (cold or catarrh) Bhinna purisha (loose stools) Vigandha (foul odour from mouth), Vairsaya mukha(altered taste in mouth),Pipasa (thirst), Vaman (vomiting) Anna mada (sense of intoxication after meal) Avipaka (indigestion) Arochaka (tastelessness) Chardi (vomiting), Atisara (diarrhoea), *Visham jwar*, *Panduh (pallor*), *Krusatvam(emaciation), Alpagnih (insufficient digestive power), Hastasvayathuh(swelling in hands), Padasvayathuh (pedal odema) Jatharam (abdominal enlargement),Grahanidoshah (diseases due to malfunctioning of grahani) Yakshma (pthysis),Gulmah (abdominal lump),Kshayah(wasting)*	When healthy microbial structure is perturbed, a condition termed dysbiosis, the altered gut microbiota can trigger the development of various GI diseases including inflammatory bowel disease, colon cancer, celiac disease, and irritable bowel syndrome. (Nagao-Kitamoto, Hiroko *et al*.,2016) Gut microbiota and their metabolites are found to be associated with various non-alcoholic fatty liver diseases (NAFLDS), inflammatory bowels diseases (IBDS), hepatocellular carcinoma, cardiovascular diseases (CVDS), alcoholic liver disease (ALD), chronic kidney diseases (CKDS), and cirrhosis. (Hsu *et al*., 2020; Jansen *et al*., 2021; Ryma *et al*., 2021; Wang *et al*., 2021; Zhou *et al*., 2021; Philips *et al*., 2022)
2.	Cardiovascular system	*Marmapradhamanam(discomfort in vital organs)*	Gut microbiota can utilize trimethylamine, N-oxide, short-chain fatty acids, and primary and secondary bile acid pathways. By affecting these living cells, the gut microbiota can cause heart failure, atherosclerosis, hypertension, myocardial fibrosis, myocardial infarction, and coronary artery disease. (Rahman Md. Mominur et.al., 2022)
3.	Central nervous system	*Murcha* (syncope),*Mada* (insanity),*Unmada* (insanity), Gadgadvaka(stuttering, *Swapne marjargomayuvyalan snakulan kapin(dreams of cats, jackals, wild animals, mongoose & monkeys),Praya pashyati nadyadi shuskan svanaspateen(dried river & withered trees)*	There is also evidence, albeit preliminary and mostly from animal models, for a potential role for the microbiome in neuropsychiatric conditions, including depression and anxiety (Foster and McVey Neufeld, 2013), autism spectrum disorder (ASD) (Krajmalnik-Brown *et al*., 2015), schizophrenia (Severance *et al*., 2014) and even Parkinson's (PD) and Alzheimer's disease (AD) (Keshavarzian *et al*., 2015).(Sharon, Gil *et al*. 2016).

		Kala cha gaura atmanam swpne gaurascha kalkam (dreams of opposite complexion) ***Vikarna nasikam vaapi prapashyet vihateindriya (sees himself with distorted sensory organs)***	
4.	**Reproductive system/ endocrine**	**Shandya (impotence)** ***Santana Dosha*** **(congenital anomalies in offsprings)**	**The gut microbiome is considered to be an endocrine organ and plays a major role in the reproductive endocrine system by affecting the fluctuation of sex hormones. The gut microbiome can affect estrogen levels by modulating the secretion of β-glucuronidase. The dysbiosis and reduction of gut microbiota diversity can decrease or increase β-glucuronidase activity and result in the fluctuation of circulating oestrogen's, which may lead to obesity, metabolic syndrome, cancer, endometrial hyperplasia, endometriosis, PCOS, and infertility. (Baker JM *et al*., 2017; Chadchan SB *et al*.,2022)** **The gut microbiome are also known to affect the level of circulating testosterone. The gut microbiota can synthesize and transform androgens by expressing the enzymes and are involved in the degradation of testosterone *via* microbial processes (Qi X *et al*., 2021)**
5.	**Skin diseases**	***Kilasa*** **(skin disease),*Kustha*, (skin diseases),*Visarpa*** **(spreading cellulitis)** ***Visphotaka*** **(blisters),** ***Aruh*** **(red colour)*Kitibha*** **(skin diseases),** ***Bhinna varna*** **(change in normal complexion),** ***Mandal*** **(circular eruptions),** ***Kotha*** **(wheal like eruptions)**	**Dysbiosis in the skin and/or gut microbiome is associated with an altered immune response, promoting the development of skin diseases, such as atopic dermatitis, psoriasis, acne vulgaris, dandruff, and even skin cancer.(De Pessemier, Britta *et al*. 2021) Several dermatologic conditions, such as acne, atopic dermatitis, psoriasis, and rosacea are linked with intestinal dysbiosis. (Lee SY *et al*., 2018). Changes in gut microbial communities could also trigger an immunological response, resulting in allergies, acne vulgaris, atopic dermatitis (AD), alopecia areata (AA), rosacea, hidradenitis suppurativa (HS) and other skin diseases (Polkowska-Pruszyska *et al*.,)**

Table 3: *Samhitaokta roga* due to improper food [27, 28]

S. No.	Dushi visha	Garavisham
	Aruh (red colour) **Kitibha (skin diseases)** **Kotha (skin diseases)** **Bhinna purisha (loose stools)** **Bhinna varna (change in normal complexion)** **Vigandha (foul odour from mouth)** **Vairsaya mukha(altered taste in mouth)** **Pipasa (thirst)** **Murcha (syncope)** **Vaman (vomiting)** **Gadgadvaka(stuttering)** **Anna mada (sense of intoxication after meal)** **Avipaka (indigestion)**	***Panduh (pallor)*** ***Krusatvam (emaciation)*** ***Alpagnih (insufficient digestive power)*** ***Marmapradhamanam(discomfort in vital organs)*** ***Hastasvayathuh(swelling in hands), Padasvayathuh (pedal odema)*** ***Jatharam (abdominal enlargement)*** ***Grahanidoshah (diseases due to malfunctioning of grahani)*** ***Yakshma (pthysis)*** ***Gulmah (abdominal lump)*** ***Kshayah(wasting)*** ***Jwarah(fever)*** ***Swapne marjargomayuvyalan snakulan kapin(dreams of cats, jackals, wild animals, mongoose & monkeys)***

	Arochaka (tastelessness) **Mandal (circular eruptions)** **Kotha (wheal like eruptions)** **Moha (confusion/delirium)** **Dhatu kshaya (diminutuion of dhatu or** **Padakara shopha (pedal oedema)** **Dakodar** **Chardi (vomiting)** **Atisara (diarroeha)** **Vaivarnya (discolouration)** **Murcha** **Visham jwar** **Trushna (excessive thrist)** **Unmada (insanity)** **Aanaha (barborygmus with distention)** **Shukra kshaya(loss of shukra)**	***Praya pashyati nadyadi shuskan svanaspateen(dried river & withered trees)*** ***Kala cha gaura atmanam swpne gaurascha kalkam (dreams of opposite complexion)*** ***Vikarna nasikam vaapi prapashyet vihateindriya (sees himself with distorted sensory organs)***

CONCLUSION

This study's primary goal was to study *gara visha & dooshi visha* as the aetiology of various diseases in the form of food and to comprehend the relation between *ahara* & gut microbiome. And how the exposure to dooshi visha & gara visha can cause dysbiosis in the gut microbiome. During diagnosis & treatment, the concepts of *dooshi & gara visha* need to be kept in mind while dealing with patients as their intake causes a wide range of pathologies. There are various ayurvedic herbs which could be studied for their effect on gut health. Various agad mentioned in the treatment of gara visha & dooshi visha could be explored for their effects on gut microbiome. It is the further topic of futuristic researches to explore ayurvedic formulations which can play a crucial role in maintaining gut health.

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