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Review Article

Deepana Panchana Herbs

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An Insight to effect of Deepana Panchana Herbs on Gut microbiota

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Introduction: Ayurveda has emphasized on being healthy by not only what we eat but also how we digest it. So utmost significance is given to Agni. The ancient science signifies the root cause of all metabolic disorder is imbalance of Agni told in terms of "Sarve Roga Api Mandagni". Deepana Pachana (Appetizers and digestants) herbs are playing crucial role in treating any metabolic disease. The Gut Microbiota is collection of good bacteria, fungi, archaea and is key to many aspects to maintain Human health, builds up immunity, regulates metabolism and control neurobehavioral traits. The alteration in this Gut flora can lead to various metabolic disorders from Obesity to Cancer. Restoring the same with diet, probiotics, prebiotics and medicine is crucial for prevention and treatment for all these metabolic disorders. This review of Paper aims to identify the effect of Deepana, Pachana herbs on Gut microbiota.

Materials and Methods: Literature search was done in classical text of Ayurveda for Deepana and Pachana herbs. Relevant Database for gut microbiota and relevant research articles on herbs on gut microbiota were chosen and reviewed.

Result and Discussion: The review clarified that most of herbs that have Deepan, Pachana property have got Gut modulation effect and most of herbs have shown prebiotic potential gaining improvement in a positive gut bacterial alteration.

Conclusion: This gut modulation effect of herbs can be used to prevent obesity, Diabetes, Cardiovascular diseases, maximizing our Health and Immunity.

Keywords: Deepana, Pachana, Gut microbiota, Ayurveda

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Introduction

Ayurveda gives prime importance to *Agni* as it is inherent factor behind every change that occur in our body**[1,2]** When *Agni* is balanced, it ensures proper digestion, absorption, and assimilation of nutrients, which is crucial for maintaining overall health. *Agni Dushti* is key factor for formation of *Ama*. '*Ama'* is considered to be a potent factor that has the capacity to disturb the metabolism and cause wide range of diseases from *Jwara* to *Unmada*, "*Sarve Roga Api Mandagni".***[3]** *Ayurvedic* physicians always focuses on restoring normal status of Agni. The first line of treatment for these diseases is *Deepana Pachana Chikitsa.***[4]** *Deepana* and *Pachana* have to be administered in both *Shamana* or *Shodhana* modalities of treatment. There are many herbs which are preliminary choice for most of a metabolic condition; termed as *Deepaniya* (Stomachic) and *Pachaniya* (Digestants) herbs. It is noteworthy to mention that these herbal extracts possess a vast number of 'phytochemical constituents' whose bioactivities were assigned to such active principal ingredients (APIs). These ingredients are known to modulate the normal flora, especially gut microbiota when these medicinal/herbal extracts are administered orally. Most of these herbs have Anti-inflammatory, Antioxidant, Anti-hypertensive, Hypolipidemic, Hypoglycemic, Antimicrobial, Antidiabetic, Anti-mutagenic activities.**[5,6]** The gut microbiota is a complex microbial community that interacts with one another and with the host organism, influencing many aspects of human health. Most ingested compounds, whether taken for dietary, therapeutic benefits, or other purposes, influence the microbiota, and conversely the microbiota also can metabolize many orally ingested substances. The healthy microbiota comprises four main groups of bacteria, which include Actinobacteria, Firmicutes, Bacteroidetes, and Proteobacteria**[7]** Gut microbes play key role of human health, immunity, metabolic**[8]** and neuro behavarial traits.**[9]** The gut microbiota encodes untold biotransformation potential of phytochemicals, exemplified by microbiota-dependent bioconversion of polyphenolic compounds that serve to increase their absorption and bioactivity, including anti-inflammatory compounds.**[10]** Lower diversity has been observed in people with inflammatory bowel syndrome,**[11]** psoriatic artitis.**[12]** Type 1 and type 2 diabetes,**[13,14]** arterial stiffness. **[15]** While indirect prebiotic and, direct prebiotic effects of herb carbohydrate and amino acids on gut microbiota communities have been scarcely been studied

This paper is aiming to review and analyse these herbs on Gut microbiota

Materials and Methods

Comprehensive review of Ayurvedic concept of *Deepan* and *Pachana,* also compilation and tabulation of *Deepaniya and Pachaniya* Ayurvedic drugs were done from the *Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha, Astanga Hridaya*. Relevant Database were reviewed for details of Gut biota and research articles from journals on these herbs were critically reviewed in context to their phytochemistry and Gut effect.

Observations and Results

Table 1: Drugs present in *Deepaniya Mahakashaya* of *Charaka Samhita*[19,20]

Name	Botanical name	Karma	Chemical constituents
Pippali.	Piper longum Linn	Deepana	Piperine, piperlonguminine[21]
Pippalimoola	Roots of Piper longum Linn	Deepana, Pachana	Piperine, piperlonguminine[21]
Chavya	Piper retrofractum Valh	Deepana, Pachana	Lignan, piperamine-2, Chabamide pipernonaline, guineensine[22]
Chitraka	Plumbago zeylanica Linn	Deepana, Pachana	Plumbagin[23]
Shringavera.	Zingiber officinale Rosc	Deepana, Pachana	Gingerol, shogaol, zingerone[21] [24]
Amlavetas	Garcinia pedunculata Roxb	Deepana	Garcinol, cambogin[25]
Maricha	Piper nigrum Linn	Deepana	Piperine, Chavicine[26]
Ajamoda	Apium graveolens Linn	Deepana	Caffeic acid, chlorogenic acid, apiin, apigenin[27]
Bhallataka.	Semecarpus anacardium Linn	Deepana, Bhedana	bhilawanols, sterols[28]
Hinguniryas	Ferula foetida Boiss	Deepana, Pachana	Hydroxyumbelliprenins, Asafoetidin, Ferocolicin, Disulphides[21]

Other *Deepana Pachana* drugs

Dadima	Punica granitum	Deepana	Egallic acid, Punicalagins[20]
Palandu	Allium cepa	Deepana	Polyphenols[20]
Rasona	Allium sativum	Deepana	Polyphenols[20]
Twak	Cinnamom zylenicum	Deepana	Polyphenols[20]
Haridra	Curcuma longa	Deepana, Pachana	Curcuminoids[20]

Table 2: Pharmacological effect of *Piper nigrum* Linn.

Botanical name	Gut modulation	Pharmacological effect
Piper nigrum Linn.	Elevation of caecal Lactobacillus Decrease in levels of Bacteroides, Firmicutes [29]	Hypolipidemic, lowers CRP levels, Antioxidant, insulin regulation
Zingiber officinale Rosc	Elevation of caecal Lactobacillus, Bifidobacterium. Decrease in levels of Bacteroides, Firmicutes [29]	Hypolipidemic, lowers CRP levels, Antioxidant, anti inflammatory
Apium graveolens Linn	Increase ratio of Firmicutes and Bacteroidetes, elevation of Rumino coccaceae and lactobacillus[30]	Prevent dyslipidaemia, prevent hyperglycemia, antispasmodic.
Piper longum Linn	Elevation of caecal Lactobacillus Decrease in levels of Bacteroides, Firmicutes[29]	Analgesic, Anti inflammatory, Anti microbial, Anti allergic, Antioxidant,
Plumbago zeylanica Linn	coliform bacterial proliferation[31]	Digestant, Antifungal, Antibacterial, Hepatoprotective activity.
Punica granitum.	Increase in L. acidophilus[32] bifidobacterium	Digestant, antibacterial, anti-oxidant
Onion Garlic Cinnamonum	Promote growth of Lactobacillus sp. And Bifidobacteria, reduce harmful bacteria.[33]	Prebiotic, Anti-inflammatory,
Curcum longa	Increase abundance of Bacteroidaceae and Rikenellaceae[34]	anticancer, antitumor, and antithrombotic agent

Deepana is the *Karma* or *Dravya* which increases the *Agni* but is incapable of digesting *Ama.***[16]** *Pacana* is the *Dravya* or *Karma* which digests *Ama* without increasing *Agni.* As per the commentary of *Sharangdhara Samhita, Pachana* is the *Rookshana Karma* happening on the *Sama Dosha, Dhatu* and *Mala.***[16]** *Acharya Vagbhata* suggest as *Poorvakarma* in those who are moderately obese, of moderate strength, and with moderate vitiation of *Pitta* and *Kapha* having the *Ama Dosha* conditions, medicines which are *Pachana* and *Deepana* should be employed in advance before *Shodhana Chikitsa.* **[17]** In *Leena Dosha, Pachana* brings about the *Paaka* of *Leena Dosha* in *Dhatu* and *Deepana* separates this *Pakwa Dosha* from *Dhatu* to get eliminated by *Shodhana* procedures.**[18]**

Discussion

The review of articles shows the enhanced growth of beneficial microbes like lactobacillus, bifidobacterium, Coliform Rumino coccaceae , Firmicutes and Bacteroidetes (5,).

Chronic low grade systemic inflammation, following translocation of endotoxin (lipopolysaccharide), is the underlying pathogenesis of chronic non-communicable diseases (NCD) (Cani et al. 2008). **[35]** It is well known fact that the basal endotoxin [i.e., lipopolysaccharide (LPS)] levels of healthy humans are influenced by a wide range of factors such as dietary composition, stress, low grade inflammation, altered gut flora, etc. (Lyte *et al.* 2016). The critical role of gut bacteria has been suggested through intestinal membrane integrity and control of translocation of endotoxin into circulation (Cani *et al.* 2008).**[35]** The balance between beneficial bacteria such as Lactobacillus, Bifidobacterium, etc. and Firmicutes, Bacteroides are considered as an important aspect for basal endotoxemia. Medicinal plants are rich in phytochemicals such as phenolics, flavonoids, terpenoids, tannins, antioxidants, fibre, anthocyanins and essential oils, etc. contributing to the prebiotic potential which have a pivotal role in combating diseases. The studies reviewed here reported that the health benefits associated with the consumption of catechins were reduced concentrations of serum low-density lipoprotein cholesterol (LDL-c).**[33]**

Most dietary polyphenols arrive intact in the colon, where they become substrates for the gut microbiota, producing better-absorbing metabolites. Research indicated that curcumin markedly slowed down atherosclerosis development and glucose intolerance by lowering the levels of endotoxic lipopolysaccharides in the bloodstream.**[34]**

These compounds help for improvement of intestinal membrane integrity; regulation of systemic and mucosal immune responses of the host along with amelioration of inflammation and relieve symptoms and delay the progression of NDs by improving intestinal barrier function, reducing neuroinflammation, and modulating neurotransmitter production.

Notably, herbal medicine can mitigate the progression of metabolic diseases by regulating the gut microbiota. Therefore, an in-depth understanding of the potential mechanisms by which herbal medicine regulates the gut microbiota in the treatment of metabolic diseases can help explain the pathogenesis of metabolic diseases from a novel perspective and propose novel therapeutic strategies for metabolic diseases.**[35]**

Conclusion

Currently, the composition, diversity, and ecological stability of the gut microbiota are of crucial importance in delaying and ameliorating the occurrence and progressive development of many diseases Review of various research articles published on different herbs have shown the mitigation of the progression of many diseases by regulating the gut microbiota and showed favourable modulation of gut microbiota. Most of drugs have shown prebiotic potential gaining improvement in a positive gut bacterial alterations can be used to prevent obesity, Diabetes, Cardiovascular diseases, maximizing our Health and Immunity.

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