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Review Article

Gut Microbiota

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Effect of Viruddha Ahara on the Gut Microbiota - A Review

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The Gut microbiota, which constitutes the various bacterial flora in our body, plays a vital role in maintaining Homeostasis, Immune balance, Emotional and mental stability and overall health. Disruption of this complex ecosystem is known as "Dysbiosis" which has been implicated in a range of disorders like inflammatory bowel disease, obesity, cardiovascular diseases etc. Among the various factors influencing this, the role of Viruddha Ahara remains to be established. In Ayurvedic literature, Viruddha Ahara refers to incompatible combinations of foods that disturb the physiological equilibrium. This study aims to establish that Viruddha Ahara contributes to dysbiosis through a review of published studies on Gut Microbiota and the effects of dietary behaviour on them. The findings suggest that Viruddha Ahara may act as a factor in gut balance, supporting the integration of Ayurvedic principles in modern gut-based health.

Keywords: Gut microbiome, Viruddha Ahara, Bacterial taxa, Dysbiosis

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Introduction

The gut microbiome comprises a trillion genes encoded by colonising bacteria, archaea and eukaryotes attuned to create an adaptive and complex ecosystem. A well-functioning gut ecosystem is essential for proper digestion, immune health, mood regulation and maintenance of energy. Deviation from this balance is known as "Dysbiosis" and is currently being proven as the "cause of all diseases". A survey by Country Delight and the Indian Dietetic Association in Mumbai found that 7 in 10 urban Indians experience gut health issues, with almost 60% experiencing digestive problems weekly and 12% daily.**[1]**

Maintaining Gut wellbeing has become crucial in India with researchers linking gut health with chronic lifestyle diseases like Diabetes , obesity and cardiovascular diseases .In 2025 the Health of Nation report analysing health data from 2.8 million individuals across India revealed that a significant portion of the Indian population is grappling with lifestyle-related diseases, with one in two individuals exhibiting signs of such disorders. This includes conditions like diabetes, thyroid disorders, lipid imbalances, and kidney issues, as well as more prevalent issues like obesity, hypertension, and fatty liver disease. According to the report 53% of all deaths in India are attributed to non-communicable disease (NCD's), and 44% of disability-adjusted life-years are lost due to these conditions.**[2]**

Studies have linked Dysbiosis to altered metabolism, increased inflammation, and impaired insulin sensitivity, influence on blood lipid levels **[3]** and hence The rising prevalence of lifestyle diseases necessitates a shift towards preventive healthcare beginning with change in diet and lifestyle.

The Indian diet is increasingly shifting from traditional, home-cooked meals towards processed foods, primarily due to factors like urbanization, globalisation, increasing income, and fast paced lifestyle.

In *Ayurveda* these changes in diet pattern and incompatible foods can be correlated to *Viruddha Ahara,* which causes *Dosha Prakopa* but does not eliminate it out of the body leading to hampering of physiological balance of the body. It is said to be the cause of many systemic and metabolic disorders by food - food and food - body interaction.

According to Sabnis M. (Viruddha Ahara: A critical view) - *Viruddha Ahara* taken regularly could induce inflammation at a molecular level, this inflammatory effect is an important effect as these are all the basic pathologies that create *Agni Mandya*, *Ama*, and a number of metabolic disorders**[4]** thus correlated to the pathology of dysbiosis.

Acharya Charaka has mentioned 18 types of *Viruddha Ahara***[5]** leading to various diseases summarized as -

1. *Desha Viruddha*
2. *Kala Viruddha*
3. *Agni Viruddha*
4. *Matra Viruddha*
5. *Satmya Viruddha*
6. *Dosha Viruddha*
7. *Samskara Viruddha*
8. *Veerya Viruddha*
9. *Koshtha Viruddha*
10. *Avastha Viruddha*
11. *Krama Viruddha*
12. *Parihara Viruddha*
13. *Upachara Viruddha*
14. *Paaka Viruddha*
15. *Samyoga Viruddha*
16. *Hrid Viruddha*
17. *Sampad Viruddha*
18. *Vidhi Viruddha*

Thus, it is of immediate concern that people understand the effect of *Viruddha Ahara* on the Gut microbiota and the contribution of various *Viruddha* on dysbiosis.

Objectives

1. To identify the various causes of dysbiosis and correlate it to *Viruddha Ahara*

2. Create awareness of hazardous effect of *Viruddha Ahara*

Methodology of Review

- Literature has been reviewed from both *Ayurveda Samhithas* and modern medicine literature
- Used electronic searching engine like PubMed and Google Scholar with key words "gut microbiota, diet and lifestyle, dysbiosis"
- Comparison with results and conclusion was done and summed up the derived findings

Influence of various *Viruddha Ahara* on Gut microbiome

1. Desha Viruddha

Acharya Charaka has described 3 *Deshas* (habitats) - *Jangala* (arid), *Anupa* (marshy), *sadharana* (temperate). When Similar quality of food is taken to that of respective region it may produce disease.

Studies have established that there is variation in gut microbiota based on region - Asian populations including Japan, China, India consume more starch predominant diet and hence contain more Bifidobacterium which has high abundance of glycoside hydrolases to degrade starch than the other microbes residing in the gut. whereas high abundance of the members of the genus of Ruminococcaceae is seen in the Colombian human gut microbiome.**[6,7]**

Thus showing the evolution and diversity of the bacterial species based on the food consumed in different habitats and any abrupt change in diet may overload or incapacitate the curated ecosystem

2. Kala Viruddha

Intake of *Sheeta*(cold) and *Ruksha*(dry) foods in *Sheeta Kaala* (cold climate) & *Ushna*(hot) and *Teekshna* (potent) foods in *Ushna Kaala* (hot climate) is considered as *Kaala Viruddha* (seasonal incompatibility)- consuming an unseasonal diet.**[8]**

In the Koliada et al. study, there was increased abundance of Actinobacter species and reduction of bacteroidetes in the summer fecal samples of the Ukrainian population attributed to the season dependent diet and nutrient availability.**[9]** However in the Davenport et al. study, the diet being high fiber and carbohydrate led to increased abundance of bacteroidetes.**[10]**

Thus seasonal modulation of Gut microbiota is affected by consuming seasonal diet and non-dietary factors like sunlight exposure, temperature etc. making it easier to digest certain foods and this fluctuation could synchronice the host metabolism and compensate for the seasonal lack of essential nutraceutical phospholipids playing an important role in physiological health.**[11]** However, in recent days due to efficient storage and preservation methods the concept of seasonal foods is not followed hence the gut composition may not change and support the body according to varying seasons.

3. Agni Viruddha

Consuming *Laghu*(light) and *Alpa*(less) food in *Tikshna Agni* and *Guru*(heavy) and more quantity of foods in *Manda Agni* - consuming foods without consideration of digestive power.

A direct correlation can be made between *Agni* (digestive power) and gut microbiome as -

- Seat of *Agni* is situated in the *Grahani* (gut)
- *Sarve Roga Api Mandagnau* - in *Ayurveda* the root cause of all diseases in *Manda Agni* Leading to *Aama* similar to how "all diseases begin in the gut"
- *Dhatvagni* and *Bhutagni* can be understood through various gut -organ axis

Thus *Mandagni* - dysbiosis leading to decline of abundance and loss of essential bacteria like Bacteroides and Firmicutes and *Tikshnagi* - dysbiosis leading to increase in pathogenic bacteria like prevotellaceae leading to an imbalance of pH and increased digestive power.**[12,13]**

Consuming foods without consideration of composition of gut microbiome can potentially affect the survival and growth of different microbes leading to more severe diseases.

4. Maatra Viruddha

Maatra Viruddha is when an improper quantity of the total meal (*Sarvagraha*) and individual components of a meal (*Parigraha*) are taken. It can be *Hina* (less) or *Adhika* (more).**[14]** *Acharya Charaka* has used the example of consuming equal quantity of *Madhu*(honey) and *Ghrita* (Ghee) together as it becomes toxic. Researchers have found that this is due to oxidative stress mediated toxicity caused by increased Amadori products, Dipeptidyl protease (DPP - 4) activity and decreased gastric inhibitory peptide leading to high postprandial hyperglycemic response.**[15]** Evidence suggests that increase in Reactive Oxygen Species (ROS) can damage the intestinal tract barrier leading to decrease in intestinal microbial diversity and Advanced glycation end products (AGE) like Amadori products negatively interact with gut microbiota.**[16,17]**

Maatra in today's era can be considered as the proportion of macronutrients in the diet - a study by Zhang P et al. suggests that lack of fibre rich foods can deplete the microbial diversity,

A high fat diet can promote microbial changes leading to obesity, a high protein diet can disrupt the gut mucosa homeostasis.**[18]** Thus, the quantity of consumption of each macronutrient and the total calories should be decided according to individual requirement and capability.

5. Satmya Viruddha

Satmya is the habitual intake and diet pattern of an individual according to their unique prakriti and lifestyle. Any food which deviates from this or which the person is not habituated becomes *Satmya Viruddha.***[19]** The gut microbial community displays the capacity of rapidly adapting to short term dietary changes causing variation in microbial composition, however these changes and disruptions are only temporary and are shown to revert back to the baseline ecosystem within days. The short-term effect of these imbalances needs to be further studied. Thus, for any positive changes in gut microbiome, sustainable dietary habits need to be maintained and the use of *Paadamshika Krama* is beneficial while advising any dietary changes.

6. Dosha Viruddha

Food items having similar properties to that of *Doshas*, which causes *Dosha Dushti* are called as *Dosha Viruddha.*

Here we can consider the Intrinsic constitution of an individual (*Prakriti)* based on the varying proportion of *Dosha; Vata, Pitta, Kapha Prakriti* Jnana et al. and Chauhan et al. have attempted to relate these 3 *Prakriti* phenotypes to gut microbiome constitution [Table 1].

The findings suggest that *Pitta prakriti* individuals have higher enrichment of microbiota and increased metabolic pathways and due to their higher tendency of inflammation , anti-inflammatory bacteria were found - to maintain homeostasis .In *Vata prakriti* individuals , a combination of beneficial as well as detrimental microbes were found hence a slight imbalance makes them more prone to diseases for example presence of high nitrogen metabolism pathways makes them more susceptible to neurological disorders. Microbiome of *Kapha prakriti* individuals were enriched in stress response and repair (increased *Vyadhi Kshamatva)* while at the same time phenotypes coding for insulin resistance were also found, increasing the probability of Type 2 Diabetes mellitus (*Prameha).* **[21,22]**

Thus, any disruption in these specific *Dosha* based enterotypes by consuming foods that cause *Dosha Prakopa* can lead to loss of beneficial function and increase vulnerability to *Prakriti* specific disease).

Table 1: List of *Prakriti* specific signature taxa with details of their functional importance in the human gut. (Chauhan et al.[22])

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Signature Taxa	Gender	Prakriti	OTUID	p-value	LDA	Physiological relevance in human gut	References
Prevotella copri	Female	Kapha	215670	0.006	5.620623	Proinflammatory, onset of rheumatoid arthritis, insulin resistance	Wu et al., 2011; Scher et al., 2013
Blautia luti	Female	Pitta	178762	0.005	5.19693	Butyrate producers, protect from graft versus host disease, restricts colonization of Vibrio cholera	Hsiao et al., 2014; Eren et al., 2015; Jenq et al., 2015
Blautia obeum	Female	Pitta	186748	0.018	4.759854	Butyrate producers, protect from graft versus host disease, restricts colonization of Vibrio cholera	Hsiao et al., 2014; Eren et al., 2015; Jenq et al., 2015
Blautia torques	Female	Pitta	3272764	0.003	4.885697	Butyrate producers, protect from graft versus host disease, restricts colonization of Vibrio cholera	Hsiao et al., 2014; Eren et al., 2015; Jenq et al., 2015
Butyricicoccus pullicaecorum	Female	Pitta	179826	0.001	5.158494	Butyrate producers, protects from IBS, potential probiotic	Eeckhaut et al., 2013; Geirnaert et al., 2014
Gemmiger formicilis	Female	Pitta	341024	0.028	4.878518	Induced during CTM treatment of T2D	Xu et al., 2015
Incertae Sedis Mahella	Female	Pitta	191783	0.026	4.828228	-	-
Lachnospira eligens	Female	Pitta	176269	0.005	4.822001	-	-
Bacteroides vulgatus	Female	Vata	184753	0.016	4.753459	Induces insulin resistance, but found to protect from obseity in mice	Ridaura et al., 2013; Pedersen et al., 2016
Blautia stercoris	Female	Vata	185824	0.018	4.654206	-	
Butyrivibrio crossotus	Female	Vata	4349261	0.001	5.137397	Depleted in patients with Chronic Kidney Disease	Barros et al., 2015
Clostridium indolis	Female	Vata	338992	0.015	5.224559	Carbohydrate metabolism	Biddle et al., 2014

Eubacterium rectale	Female	Vata	366794	0.001	5.658181	Butyrate producer, depleted during ulcerative colitis	Vermeiren et al., 2012; Machiels et al., 2014; Cockburn et al., 2015; Riviere et al., 2015
Oscillibacter valericigenes	Female	Vata	175828	0.049	4.617719	Oscillibacter related with bacterimia	Sydenham et al., 2014
Roseburia hominis	Female	Vata	198945	0.011	4.671769	Butyrate producer, depleted during ulcerative colitis	Vermeiren et al., 2012; Machiels et al., 2014; Cockburn et al., 2015; Riviere et al., 2015
Roseburia inulinivorans	Male	Pitta	199091	0.004	4.526317	Butyrate producer	Scott et al., 2006, 2011
Fusicatenibacter saccharivorans	Male	Vata	183401	0.045	4.705687	-	-

7. Samskara Viruddha

Samskara Viruddha refers to improper processing and preparation of food. Different cooking methods affect food digestibility and nutrient bio accessibility thus impacting microbial composition. In the modern context, ultra processed foods - additives, emulsifiers, flavouring agents - can be considered, which negatively impact the gut ecosystem by reducing diversity and promoting unfavourable growth.**[23]**

An example of *Samskara Viruddha* in classics is storage of ghee in bronze vessel. Experimental studies shows that this leads to increase in free fatty acids, peroxide values which are early signs of oxidation & degradation in unsaturated oils [Table 2].

Consuming oxidised oils causes alterations in microbial composition and induces inflammation. **[25,26]** Nowadays most of the cheap unsaturated oils used in packaged foods are already oxidised or degraded due to various processes hence packaged foods inherently become *Viruddha*.

8. Veerya Viruddha

Consuming foods with opposing potencies in the same meal; *Sheeta* (cold potency) and *Ushna* (hot potency) foods together. Example

Table 2: Analytical study of Ghee samples in the study of *Abdul Sukkur M et al: J. Pharma. Sci. innov. 2015* [24]

Parameters	Cow's ghee API	Cow's ghee	Cow's ghee in bronze vessel
Rancidity	-	Not oxidised	Not oxidised
Acid value	-	1.67	2.63
Saponification value	Not more than 225	206.5	209.9
Iodine value (%)	Not more than 35	21.96	27.12
Peroxide value	-	1.60	1.99

Told by *Acharya Charaka* is consuming milk (cold) with fish (hot) which is said to cause *Shonitadushti* and generate *Amavisha.* However, the effect of opposing Potencies on the Gut microbiota is yet to be studied as we cannot consider general temperature to be potency and there is no way of measuring potency of an object other than its effect on the body. Hence, we cannot perceive how the Gut microbiota reacts to potency yet.

9. Koshta Viruddha

Food taken opposing the individuals *Koshta (*Digestive tract) is *Koshta Viruddha.* According to *Ayurveda* there are 3 types of *Koshta - Krura (*poor absorption and secretion), *Madhyama (*good absorption and secretions), *Mrudu* (increased secretion and absorption).**[27]**

The study by vandeputte et al. relates increased methanogens, methane producing bacteria, like *Methanobrevibacter* increased in harder stools proving the involvement of *Vata dosha* in *Krura Koshta*. Apart from this, the gut microbiota is involved in digestion of carbohydrates, proteins, in lipid metabolism and degradation of polyphenols thus changes in the microbial composition can impair the body's ability to digest food, metabolise enzymes and ferment carbohydrates. The 2 main bacterial metabolites produced - Short chain fatty acids (SCFA) and tryptophan are known to alter bowel motility.**[29,30]** Thus all these factors are involved in determining the functioning of GIT; *Koshta*. Consumption of *Koshta Viruddha Ahara* can further cause extreme diarrhoea or constipation depending on the microbial composition and in the long term may lead to Dysbiosis.

10. Awastha Viruddha

Incompatibility due to state of *Dosha* in an individual's body; *Vata Prakopa Ahara* after heavy *Vyayama* (exercise), an activity that causes *Vata Prakopa.*

Research done on the effect of diet patterns of various athletes on the gut microbiota suggest that a high protein and low carb may promote gut microbial diversity depending on the type & quantity of protein consumed and also on the type of activity done by the athlete; endurance or resistance training but the data is still inconclusive.**[31,32,33]**

Awastha Viruddha can also be considered as consumption of food without analysing *Vyadhi Avastha* (state of disease). Individuals with Chronic diseases have been reported to exhibit changes in the gut diversity thus affecting their digestion and immunity. The study by Durack et al. evaluates the microbial composition in autoimmune diseases, asthma, bowel disorders hence validating the need for a conscious diet in those suffering from chronic disorders.**[35]**

11. Krama Viruddha

Food consumed by the wrong sequence or while performing wrong actions. Ex. having food while doing *Vega Dharana* (suppression of natural urges) or when not hungry etc. Improper dietary habits are characterised as eating disorders, which have been negatively correlated with gut microbial diversity. **[35]** In the study by Glenny et.al. consumption of food with Anorexia nervosa (*Aruchi*) leads to decreased microbial diversity and metabolites produced by these microbes further contribute to the eating disorder.**[36]**

12. Parihara Viruddha

It is incompatibility with respect to what is contraindicated in the *Ayurvedic* classics. For example, consuming hot water after *Varaha Mamsa* (pork meat) & consumption of heated honey. Heated honey generates an increased amount of 5 - Hydroxymethylfurfural, a known carcinogenic, mutagenic and organotoxic, this can indirectly cause change in microbial composition when consumed in large quantities.**[37]** Similarly each and every advice in ayurveda related to diet must be impacting the gut microbiome thus it should be followed by every individual.

13. Upachara Viruddha

Upachara Viruddha is incompatibility due to consumption of food which is opposite to what is indicated in *Ayurvedic* text. For example, consumption of cold water after *Sneha Pana (*ghee intake).

Some Studies suggests that cold water can slightly decrease the efficiency of digestion**[38]** and hence if taken after a heavy intake of *Ghee* , being a dietary fat, can slow down its digestion causing more fat content to be pushed into the gut before complete digestion, A high fat diet can lead to increase of gut mucosal barrier disrupting species**[39]** further damaging overall health and it won't produce the positive intended effects of *Snehapana.*

14. Paaka Viruddha

It refers to improperly cooked foods - undercooked, overcooked and burnt - leading to potential digestive imbalances.

Cooking methods that require high temperatures like frying, roasting and burning of food can lead to the production of a toxic substance called Acrylamide, which has already been established as a carcinogen and neurotoxin.**[40]** The study by Wang et al. suggests that Acrylamide also alters the gut microbial composition and increases its susceptibility to T.Salmonella species thus causing dysbiosis.**[41,42]** Undercooked foods especially meats and leafy vegetables can harbor many harmful parasites and infective agents which can negatively impact the gut microbiome.

15. Samyoga Viruddha

It is the incompatibility of certain foods when combined and consumed together, even though individually and separately they may be beneficial. In classics the combination of *Khadali Phala (*banana) and *Ksheera (*milk) is considered as *Viruddha.***[43]**

The study by Shweta et al. on wistar rats shows that continued consumption of this combination can lead to elevated SGOT, urea and creatinine levels which depicts the damage of liver and kidney tissue. **[44]** Due to Gut-organ axis, any negative feedback immediately alters intestinal flora and permeability, suggesting dysbiosis**[45,46]** caused by improper combination, however further research needs to done to prove the effects of various *Samyoga Viruddha* on gut microbiome

16. Hrid Viruddha

It encompasses all foods which are not liked by the individual or which are taken in an improper state of mind, stating the importance of Mental wellbeing on digestion and health.

The Gut -Brain axis is a bidirectional complex communication between the brain and the gut by means of neural,endocrine,humoral pathways.**[47]** [Fig 1] Therefore different psychological stresses affect the intestine irrespective of their duration, both directly and indirectly by altering gut motility, mucus secretions and mucus immune response.**[48]**

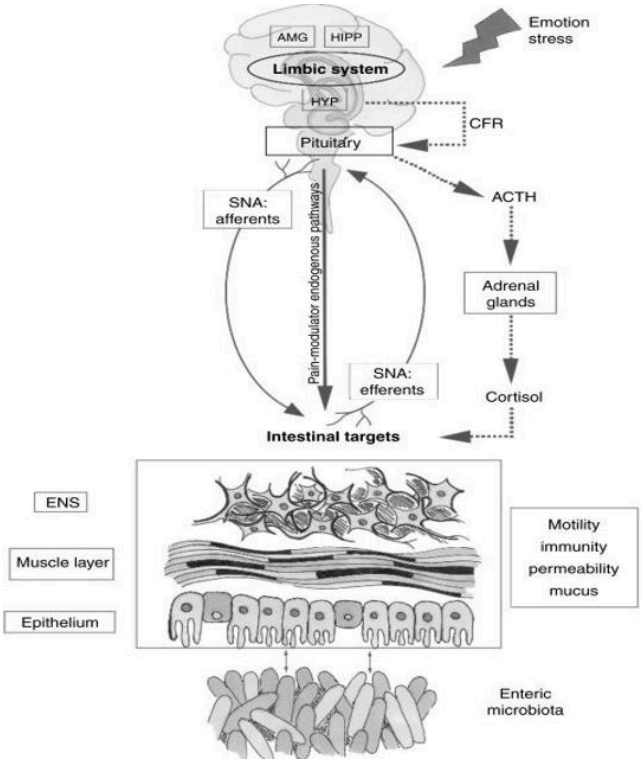

Figure 1: Microbiome gut brain axis structure (AnnGastroenterol.2015Apr-Jun;28(2):203–209.)[47]

17. Sampad Viruddha

It is incompatibility of quality; consuming overripened/ rotten or unripened - any foods that lack their intended potential.

In Classics, Unripe *Bilva Phala* (bael fruit) is indicated whereas ripened *Bilva* is not considered. Studies suggest that Over 35 strains of bacteria that cause diarrhoea, *Vibrio cholera, Escherichia coli,* and *Shigella* sp are effectively inhibited by ethanolic extract of fruit and the unripe fruit has potential against enterotoxins.**[49]** Compared to ripened fruit, the unripened Bael also shows increased anti-inflammatory effect thus proving beneficial in GIT diseases like diarrhoea.**[50,51]** Every naturally occurring food substance undergoes changes in quality at different stages of maturity**[52]** and hence all these changes need to be considered when choosing it for obtaining its optimum effects.

18. Vidhi Viruddha

It means consuming food without following certain dietary rules mentioned as *Ahara Vidhi Vidhana* (dietary regimens).

Example, *Jirne Bhunjitam* - consuming food only after digestion of previous meal.Today , due to a fast-paced lifestyle it is common to eat food before proper digestion of previous meal due to time constraints leading to increased prevalence of diseases like GERD (Gastroesophageal reflux disease). Research has linked changes such as increased pathogenic bacteria in the gut of patients with GERD further leading to dysbiosis.**[53,54]**

All the rules including the other types of *Viruddha* can be considered as *Vidhi Viruddha,* which varies from individual to individual based on one's needs and lifestyle.

Discussion

By analysing all these types of *Viruddha* it can be understood that they all lead to dysbiosis of gut bacteria and this can explain the pathogenesis of various *Viruddha Ahara Janya Roga* (diseases caused by *Viruddha Ahara*) -

Impotency, *Visarpa* (erysipelas), blindness, ascitis, bullus, insanity, fistula in ano, coma or fainting, intoxication, abdominal distention, stiffness in neck, varieties of anemia, indigestions, various skin diseases, diseases of intestines, swelling, gastritis, fever, rhinitis, and infertility. - which signifies the impact of food on all the systems of the body maybe through the various gut organ axis.**[4]** Understanding the relation between *Viruddha* and dysbiosis we can speculate that the mode of action is due to inflammation, increased oxidative stress, production of certain substances by a combination or by inhibition of beneficial bacteria, however still more enterotype specific research needs to be done using classical examples and standard parameters to quantify the impact of *Viruddha* Ahara on the gut microbiota.

Conclusion

In Today's context due to globalisation, western trends and increased trade, it is common for people to move away from traditional lifestyle and habits and adopt a more rushed way of living to keep up with the demand of an overwhelming world.

This is especially common in India as seen by increased prevalence of lifestyle diseases in our population. Thus, more holistic understanding of diet to identify various *Viruddha* we perform daily can help reduce etiological factors of many diseases & help to maintain balance in gut, mind & overall health.

References

1. Country Delight. Country Delight & Indian Dietetic Association did a survey: Why Gut Health is Important? | Dr. Naznin [Internet]. YouTube; 2023 [cited 2025 Jun 16]. *Available from: [Article] [Crossref][PubMed][Google Scholar]*

2. Apollo Hospitals. Health of Nation Report [Internet]. 2025 Apr 4 [cited 2025 Jun 16]. Available from:https://www.*apollohospitals.com/sites/default/files/2025-04/hon_apollo-hospital04042025-_e-draft.pdf [Crossref][PubMed][Google Scholar]*

3. Vijay A, Valdes AM. Role of the gut microbiome in chronic diseases: a narrative review. Eur J Clin Nutr [Internet]. 2021 Sep 28;76(76):489–501. *[Crossref][PubMed][Google Scholar]*

4. Sabnis M. Viruddha Ahara: A critical view. AYU. 2012;33(3):332. *[Crossref][PubMed][Google Scholar]*

5. Charaka Samhita. Sutrasthana. Chapter 24: Atreyabhadrakapiya Adhyaya. . *[Crossref][PubMed] [Google Scholar]*

6. Amrut A, Rajaram KS, Pandey R, Vyas M. Desha Viruddha in different regions of India. Int J Ayur Pharma Res. 2014;2(3):17–21. *[Crossref][PubMed] [Google Scholar]*

7. Mobeen F, Sharma V, Prakash T. Enterotype variations of the healthy human gut microbiome in different geographical regions. Bioinformation. 2018 Dec 31;14(9):560–73. *[Crossref][PubMed][Google Scholar]*

8. Arora L, Jallundhara N. A review of Kala Viruddha Ahara in different seasons. J Ayurveda Integr Med Sci. 2020;6:141–4. *[Crossref][PubMed][Google Scholar]*

9. Koliada A, Moseiko V, Romanenko M, et al. Seasonal variation in gut microbiota composition: cross-sectional evidence from Ukrainian population. BMC Microbiol. 2020;20:100. *[Crossref][PubMed] [Google Scholar]*

10. Davenport ER, Cusanovich DA, Michelini K, Barreiro LB, Ober C, Gilad Y. Genome-wide association studies of the human gut microbiota. PLoS One. 2015;10(11):e0140301. *doi:10.1371/journal.pone.0140301 [Crossref] [PubMed][Google Scholar]*

11. Huang G, Wang L, Li J, Hou R, Wang M, Wang Z, et al. Seasonal shift of the gut microbiome synchronizes host peripheral circadian rhythm for physiological adaptation to a low-fat diet in the giant panda. Cell Rep. 2022 Jan;38(3):110203. *[Crossref][PubMed][Google Scholar]*

12. Shruti, Nandesh Mohan P, Hadapad HM. Relation between Agni and gut microbiota. J Ayu Int Med Sci. 2025;10(2):118–22. *Available from: [Article] [Crossref][PubMed][Google Scholar]*

13. Prabhakaran V, Yadav CR. Genomic insights into the correlation between gut microbiota and Dehagni: a review. Int Res J Ayurveda. 2024;7(8):8–12. *[Crossref][PubMed][Google Scholar]*

14. Walkikar SS. Conceptual insights of Matraviruddha Ahara in Ayurveda. J Ayurveda Integr Med Sci. 2023 Jul 29;8(6):203–8. *[Crossref] [PubMed][Google Scholar]*

15. Aditi P, Srivastava S, Pandey H, Tripathi YB. Toxicity profile of honey and ghee when taken together in equal ratio. Toxicol Rep. 2020;7:624–36. *doi:10.1016/j.toxrep.2020.04.002 [Crossref] [PubMed][Google Scholar]*

16. Zhao J, Zhao F, Yuan J, Liu H, Wang Y. Gut microbiota metabolites, redox status, and the related regulatory effects of probiotics. Heliyon [Internet]. 2023 Nov 1 [cited 2024 Apr 16];9(11):e21431. *Available from: [Article] [Crossref][PubMed][Google Scholar]*

17. Phuong-Nguyen K, McNeill BA, Aston-Mourney K, Rivera LR. Advanced glycation end-products and their effects on gut health. Nutrients. 2023;15(2):405. *doi:10.3390/nu15020405 [Crossref][PubMed][Google Scholar]*

18. Zhang P. Influence of foods and nutrition on the gut microbiome and implications for intestinal health. Int J Mol Sci. 2022;23(17):9588. *doi:10.3390/ijms23179588 [Crossref][PubMed] [Google Scholar]*

19. Pillewan MB, Verma AP. Naharia R. Ayurveda concept of Satmya Viruddha and pathological involvement of Madhur and Katu Rasa. . *[Crossref] [PubMed][Google Scholar]*

20. Leeming ER, Johnson AJ, Spector TD, Le Roy CI. Effect of diet on the gut microbiota: rethinking intervention duration. Nutrients. 2019;11(12):2862. *doi:10.3390/nu11122862 [Crossref][PubMed] [Google Scholar]*

21. Jnana A, Murali TS, Guruprasad KP, Satyamoorthy K. Prakriti phenotypes as a stratifier of gut microbiome: a new frontier in personalized medicine? J Ayurveda Integr Med. 2020 Jul;11(3):360–5. . *[Crossref][PubMed][Google Scholar]*

22. Chauhan NS, Pandey R, Mondal A, Gupta S, Verma MK, Jain S, et al. Western Indian rural gut microbial diversity in extreme Prakriti endo-phenotypes reveals signature microbes. 2018 Feb 13;9. . *[Crossref][PubMed][Google Scholar]*

23. Rondinella D, Raoul PC, Valeriani E, et al. The detrimental impact of ultra-processed foods on the human gut microbiome and gut barrier. Nutrients. 2025;17:859. *doi:10.3390/nu17050859 [Crossref] [PubMed][Google Scholar]*

24. Sukkur AM, PHS, Mundugaru R, Sudhakara BR. An experimental study of Samskara Viruddha (food incompatibility) with special reference to ghee stored in bronze vessel. J Pharm Sci Innov [Internet]. 2015 Jul 6 [cited 2025 Jun 16];4(3):196–201. *[Crossref][PubMed][Google Scholar]*

25. Tang M, Wu Y, Chen G, Olnood G, Gao Y, Wang F, et al. Effects of peroxidized lipids on intestinal morphology, antioxidant capacity and gut microbiome in piglets. Anim Nutr. 2024 Dec 28;20:430–43. *[Crossref][PubMed][Google Scholar]*

26. Bao Y, Osowiecka M, Ott C, et al. Dietary oxidized lipids in redox biology: oxidized olive oil disrupts lipid metabolism and induces intestinal and hepatic inflammation in C57BL/6J mice. Redox Biol. 2025 Mar 1;81:103575. *[Crossref][PubMed][Google Scholar]*

27. World Journal of Pharmacy and Pharmaceutical Sciences [Internet]. 2015 [cited 2025 Jun 16]. Available from: https://www. wjpps. *com/Wjpps_controller/abstract_id/15415 [Crossref] [PubMed][Google Scholar]*

28. Vandeputte D, Falony G, Vieira-Silva S, et al. Stool consistency is strongly associated with gut microbiota richness and composition, enterotypes and bacterial growth rates. Gut. 2016;65(1):57–62. *doi:10.1136/gutjnl-2015-309618 [Crossref] [PubMed][Google Scholar]*

29. Oliphant K, Allen-Vercoe E. Macronutrient metabolism by the human gut microbiome: major fermentation by-products and their impact on host health. Microbiome. 2019;7:91. *doi:10.1186/s40168-019-0704-8 [Crossref] [PubMed][Google Scholar]*

30. Waclawiková B, Codutti A, Alim K, El Aidy S. Gut microbiota-motility interregulation: insights from in vivo, ex vivo and in silico studies. Gut Microbes. 2022;14(1):1997296. *doi:10.1080/19490976.2021.1997296 [Crossref] [PubMed][Google Scholar]*

31. Chen Y, Yang K, Xu M, et al. Dietary patterns, gut microbiota and sports performance in athletes: a narrative review. Nutrients. 2024;16(11):1634. *doi:10.3390/nu16111634 [Crossref][PubMed] [Google Scholar]*

32. Clarke SF, Murphy EF, O'Sullivan O, et al. Exercise and associated dietary extremes impact on gut microbial diversity. Gut. 2014;63:1913–20. *[Crossref][PubMed][Google Scholar]*

33. Jang LG, Choi G, Kim SW, et al. The combination of sport and sport-specific diet is associated with characteristics of gut microbiota: an observational study. J Int Soc Sports Nutr. 2019;16(1):21. *doi:10.1186/s12970-019-0290-y [Crossref] [PubMed][Google Scholar]*

34. Durack J, Lynch SV. The gut microbiome: relationships with disease and opportunities for therapy. J Exp Med. 2019 Jan 7;216(1):20–40. *doi:10.1084/jem.20180448 [Crossref][PubMed] [Google Scholar]*

35. Terry SM, Barnett JA, Gibson DL. A critical analysis of eating disorders and the gut microbiome. J Eat Disord. 2022;10:154. *doi:10.1186/s40337-022-00681-z [Crossref][PubMed][Google Scholar]*

36. Glenny EM, Bulik-Sullivan EC, Tang Q, Bulik CM, Carroll IM. Eating disorders and the intestinal microbiota: mechanisms of energy homeostasis and behavioral influence. Curr Psychiatry Rep. 2017;19(8):51. *doi:10.1007/s11920-017-0797-3 [Crossref][PubMed][Google Scholar]*

37. Shapla UM, Solayman M, Alam N, et al. 5-Hydroxymethylfurfural (HMF) levels in honey and other food products: effects on bees and human health. Chem Cent J. 2018;12:35. *doi:10.1186/s13065-018-0408-3 [Crossref] [PubMed][Google Scholar]*

38. Patel S, Patel J, Patel M, Sen DJ. Say yes to warm for remove harm: amazing wonders of two stages of water! EJPMR [Internet]. 2019 [cited 2025 Jun 16]. Available from: https://www. *ejpmr.com/home/abstract_id/220 [Crossref] [PubMed][Google Scholar]*

39. Paone P, Cani PD. Mucus barrier, mucins and gut microbiota: the expected slimy partners? Gut. 2020;69(12):2232–43. doi:10. *1136/gutjnl-2020-322260. Correction in: Gut. 2023;72(12):e7. doi:10.1136/gutjnl-2020-322260corr1 [Crossref] [PubMed][Google Scholar]*

40. Adimas MA, Abera BD, Adimas ZT, Woldemariam HW, Delele MA. Traditional food processing and acrylamide formation: a review. Heliyon. 2024 Apr 1;e30258. *[Crossref][PubMed][Google Scholar]*

41. Wang Z, Liu H, Liu J, et al. Dietary acrylamide intake alters gut microbiota in mice and increases its susceptibility to Salmonella Typhimurium infection. Foods. 2021;10(12):2990. *doi:10.3390/foods10122990 [Crossref][PubMed] [Google Scholar]*

42. Yu X, Zuo T. Editorial: Food additives, cooking and processing: impact on the microbiome. Front Nutr. 2021;8:731040. *doi:10.3389/fnut.2021.731040 [Crossref][PubMed] [Google Scholar]*

43. Kashikar V, Sirdeshpande M. Critical review on Samyoga Viruddha (combination incompatibility) with special emphasis on carcinogenic effect of combination of betel quid, areca nut and tobacco. AYU. 2017;38(2):97. *[Crossref][PubMed][Google Scholar]*

44. Sudhakar KS, Bhat KS. Toxicological evaluation of banana and milk combination as incompatible diet: an experimental exploration of Samyoga Viruddha concept. J Ayurveda Integr Med. 2021 Jul;12(3):427–34. *[Crossref][PubMed][Google Scholar]*

45. Hobby GP, Karaduta O, Dusio GF, Singh M, Zybailov BL, Arthur JM. Chronic kidney disease and the gut microbiome. Am J Physiol Renal Physiol. 2019;316(6):F1211–7. *doi:10.1152/ajprenal.00298.2018 [Crossref] [PubMed][Google Scholar]*

46. Maestri M, Santopaolo F, Pompili M, Gasbarrini A, Ponziani FR. Gut microbiota modulation in patients with non-alcoholic fatty liver disease: effects of current treatments and future strategies. Front Nutr. 2023;10:1110536. *doi:10.3389/fnut.2023.1110536 [Crossref][PubMed] [Google Scholar]*

47. Carabotti M, Scirocco A, Maselli MA, Severi C. The gut-brain axis: interactions between enteric microbiota, central and enteric nervous systems. Ann Gastroenterol. 2015;28(2):203–9. *[Crossref] [PubMed][Google Scholar]*

48. Navarro-Tapia E, Almeida-Toledano L, Sebastiani G, Serra-Delgado M, García-Algar Ó, Andreu-Fernández V. Effects of microbiota imbalance in anxiety and eating disorders: probiotics as novel therapeutic approaches. Int J Mol Sci. 2021;22(5):2351. *doi:10.3390/ijms22052351 [Crossref][PubMed][Google Scholar]*

49. Sarkar T, Salauddin M, Chakraborty R. In-depth pharmacological and nutritional properties of bael (Aegle marmelos): a critical review. J Agric Food Res. 2020 Dec;2:100081. *[Crossref][PubMed] [Google Scholar]*

50. Mazumder R, Bhattacharya S, Mazumder A, Pattnaik AK, Tiwary PM, Chaudhary S. Antidiarrhoeal evaluation of Aegle marmelos (Correa) Linn. root extract. Phytother Res. *2006 Jan;20(1):82–4 [Crossref][PubMed][Google Scholar]*

51. Rahman S, Parvin R. Therapeutic potential of Aegle marmelos (L.): an overview. Asian Pac J Trop Dis [Internet]. *2014 Feb [cited 2019 Nov 13];4(1):71–7. Available from: [Article][Crossref] [PubMed][Google Scholar]*

52. Karabulut I, Gokbulut I, Bilenler T, et al. Effect of fruit maturity level on quality, sensory properties and volatile composition of two common apricot (Prunus armeniaca L.) varieties. J Food Sci Technol. *2018;55(7):2671–8. doi:10.1007/s13197-018-3189-8 [Crossref][PubMed][Google Scholar]*

53. Clarrett DM, Hachem C. Gastroesophageal reflux disease (GERD). Mo Med. 2018;115(3):214–8. *[Crossref][PubMed][Google Scholar]*

54. Guan Y, Cheng H, Zhang N, et al. The role of the esophageal and intestinal microbiome in gastroesophageal reflux disease: past, present, and future. Front Immunol. 2025;16:1558414. *doi:10.3389/fimmu.2025.1558414 [Crossref] [PubMed][Google Scholar]*