

## FOOD AND SAFETY – SCOPE OF BUILDING UP A CONCEPTUAL BASIS THROUGH AYURVEDA

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### ABSTRACT

Safety aspects of food are always discussed in the view of defining its role in causing toxicity, contamination, intolerance, food borne health hazards etc. Prevention of food borne illness is the aim here. The guidelines for safe food practices formulated as a part of food safety measures seem to focus on the production of food ingredients, its processing, package and environmental tuning. Safety, in relation with food, is an idea which has primary influences from within the person who use it. The position of the user, in a personalized outlook, is rather ignored in defining safe usage of food. Quality of food always evolves into a standard diet model, balanced diet, which ensures an ideal supply of essential food ingredient to a normal, standard human being. Standardization of “human being-ness” has many hurdles, as conceived in Ayurveda. The societal, cultural, traditional and psychological aspects of food are ignored when the question of standardization arises. Concepts of *Annaraksha*, *Hitodarka*, *Pathya-Apathya*, *Satmya-asatmya* and *Viruddha* should be evaluated in making a hierarchical order of safety practices in Ayurveda. Differential understanding of these concepts in relation to the possible complications/effects would ensure better understanding of safety practices in Ayurveda. Incompatible usage of food, described as *Viruddha* is a wrongly addressed area in Ayurveda, where you can meet eighteen domains to be considered in formulating a standard criterion for safe usage of food. There are eight domains by which quality of food can get influenced, such as: (1) Environmental factors (2) Internal factors of the user (3) Quantity of food ingredients (4) Lifestyle factors (5) Processing (6) Combination (7) Nutritional aspects (8) Psychological factors related to the user. These domains can be very well considered while planning for alternative safety practices related to food and regimen in the present society. This paper tries to explore how safety concerns of food need to be humanized incorporating the food concepts discussed in Ayurveda.

**Keywords:** Food safety, *Viruddha ahara*, *Hita*, *Hitodarka*

### INTRODUCTION

Food has multidimensional implications, at least, when it comes in the context of human life, those make it significantly different from that related to animal life. In human life it is meant as a separate cate-

gory, the practices are highly influenced by multiple considerations including health, nutrition, disease, psychology, perception, bio-diversity, environment, market economy, industry, cuisine, processing, tech-

nology and many more. Among these varied concerns, three major themes sound vital – Safety, Security and Sustainability. Safety concerns speaks about the effects of food in human body, whether it conforms to sustenance of health or not. Security puts concern about quality, availability and access to assure humans to reach out to the sources safely. Sustainability tries to project the availability to a sustainable extent over a period of time. In other words sustainability is meeting needs of the present without compromising that in the future. Safety and security are mostly interlinked concepts, because they contribute to each other. While security speaks more about food utilization, food access, availability and quality, safety speaks about raw materials, pathogens, processing and cross contamination etc. But, two factors like poverty and environment share their roles equally in both of them. 20<sup>th</sup> century was the period where these three major concerns became prominent in varying proportions at different points of time. Scarcity of quality food was the major issue in the early years of 20<sup>th</sup> century. People were deprived of food by quality and quantity. It was the period where India addressed two major famines – Great Indian Famine and Bengal Famine where lakhs of people were deceased. The main reason for such episodes were climatic changes, lack of proper measures for food preservation and failure in sustainable food production. The great lessons from such episodes led man to think of a practical solution, which eventually turned to the use of pesticides for sustainable production of food materials. Sustainable

production of food materials could help people by assuring adequate quantity of raw food materials. The issue of food scarcity was coming to a decline comparatively. Especially after green revolution, the scene further changed a lot. While coming to mid-decades of 20<sup>th</sup> century, especially after 1940, reckless and unscientific use of pesticides could claim resistance to pests, which later on became major threat factor on food safety. Eventually safety concerns over food became more prominent. Public concern over the undesirable environmental effects of chemicals arose in the early 1960s with the publication of Rachel Carson’s book, Silent Spring [1]. There after many episodes of calamities were emerged all over the world, which invited global alert against wrong and harmful use of pesticides.

**Food safety – Contemporary Concerns**

Many terms are being referred while thinking about safety of foods. They are, quality, hazards, customer protection, food control system, food hygiene and finally the statutory regulatory system maintained for controlling the above aspects. Among these ideas, presently food hazard is the one having major concern. The major hazards come under physical hazards, microbiological hazards, and pesticide residues, misuse of food additives, chemical contaminants and adulteration. Among those hazards, 51% comprises of biological hazards, 26% physical, 14% chemical and 9% allergens. Details of chemical hazards are given in the table. 1:

**Table 1:** Chemical Hazards and their effects [2]

Source	Why a hazard
Agricultural chemicals (Eg. Pesticides, herbicides)	If improperly applied, can be acutely toxic or may cause long term health effects
Cleaning chemicals (Eg. Acids, caustics)	Can cause chemical burns
Equipment components (copper pipe fittings etc.)	Acidic foods can cause leaching of heavy metals from pipes and joints
Maintenance chemicals (lubricants etc.)	Some approved chemicals are toxic
Packing materials	High nitrite levels in food can cause excessive tinning of uncoated cans resulting in excessive tin in the food

### Measures to assure food safety in India

The Food Safety and Standards Authority of India (FSSAI) has been established under Food Safety and Standards, 2006 which consolidates various acts & orders that have hitherto handled food related issues in various Ministries and Departments. FSSAI has been created for laying down science based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption [3]. The establishment of FSSAI consolidated all the erstwhile attempts to streamline safety practices and standard food such as Prevention of Food Adulteration Act (1954), Fruit Products Order (1955), Solvent Extracted Oil, De- Oiled Meal and Edible Flour (Control) Order (1967), Meat Food Products Order (1973), Vegetable Oil Products (Control) Order (1947), Edible Oils Packaging (Regulation) Order (1988) and Milk and Milk Products Order (1992).

### Food safety – contemporary principles

The contemporary practices base on parameters to prevent contamination, separate raw and cooked food, cook food with appropriate length time at appropriate temperature, store food at proper temperature, use safe water and safe raw materials. Recently an “integrated farm to table concept”, permeates to the premises of safe food practices to by-pass complicated Production-Processing-Marketing chain works. As Rutgers puts it, farm to fork is “a food system in which food production, processing, distribution, and consumption are integrated to enhance the environmental, economic, social and nutritional health of a particular place.” The main driving forces behind the farm to table or farm to fork movement, whichever you prefer to call it, have to do with the ethics of food production. There are four pillars to the movement: (1) Food security (2) Proximity (3) Self-reliance (4) Sustainability [4]. In the above concept, table is the endpoint of the chain. Usually, the safety considerations stresses on some standards to assure safety, security and sustainability, which pay attention on the food ingredients.

### Ayurvedic considerations on safe food

In Ayurvedic parlance, food and medicine are no longer different in content, but they differ with reference to processing and application [5]. Food is conventionally designated as “the supreme medicine (*Mahabhaishajya*)” and practically and logically blended with the process of treatment as regulations in the form of *Pathya & Apathya*. When modern concept of food safety end with the concern of a standardized approach where all standard, edible food items should be ideally safe, where the safety parameters are encoded as guidelines pertaining to the cultivation, processing and packaging of food items. A label of “tested OK” will satisfy such a concern. Whereas in Ayurveda, safety itself seems to be graded as safe, safer and safest, explainable in a more personalized approach, than to present them to be standardized for all human beings.

### Safe food – the *Annaraksha* concept

Usually, food safety is discussed in the context of *Annaraksha* in Ayurvedic textbooks. This context explains how food is saved from different sorts of contaminants and toxic substances. Especially, in the food served to the King should be free from such contaminants. Concept of *Garavisha* becomes relevant in this context. Presently, chance of contaminants and pesticide residues become strong predisposes for such food stuffs to become like *Garavisha*. *Annaraksha* practices explains different methods to test food (either prepared or raw) for the presence of toxic substances, with separate measures for different sources of food. Safety of the food are usually tested with animals and birds by watching peculiar changes in them after the intake of toxic food stuffs. Changes in the organoleptic features of the food materials also are indicative of suspected toxic substances. These practices resemble different tests (either in vitro or in-vivo) to ensure safety, and when such tests indicates absence of toxins, such materials are declared to be safe (tested OK). Substances which are tested OK are not absolutely free from such contaminants; instead the contaminants / toxins are tested to be within permissible limits. Such substances include coloring agents, preservatives, chemical flavors which, in a single pack may be

under permissible limits, but may invoke bad effects through continuous usage or intake in larger quantities. That means, tested OK are harmless under specific conditions, where as human beings use them violating such conditions.

**Safer food – the Hitodarka concept**

A food item is safer, only when it is harmless on a reasonably longer duration. The term *Hita* (wholesome) becomes more relevant in this context. *Hita ahara* will be devoid of ill effects through a reasonably longer duration. The term *Hitodarka* used by *Caraka* in the context of explaining *Prabhava* (specific activity) of *Ahara* [6] reveals a more comprehensive dimension in this respect. By meaning *Udarka* is “after effect” (*Uttarakaleenam phalam*), more precisely it is the effect of intake for a longer period. When *Annaraksha* concept explains the instant safety of the food item, *Hita* and *Hitodarka* concept speak about the safety pertaining to long term use of the food, where accumulated effect also appear in the consideration. Classifying food items into *hita-tama* (extremely wholesome) and *Ahitatama* (extremely unwholesome) [7] also refer the same consideration. Enlisting some food items as permanently wholesome (*Sadapthya*) and permanently unwholesome and (*Sada apathya*) makes this concept more precise and practical .

**Safest food – the Aviruddha concept**

When safety concerns come to more personalized, sustainable and secure dimensions, the concept of *Viruddha* as explained in *Carakasamhita* [8] becomes highly relevant. Generally *Viruddha* is considered to be the situation where food becomes harmful to the body. It happens in many ways, (18 ways as enlisted by *Caraka*), which consider as many variables as possible through which food becomes unsafe. Putting this in a reverse order, these 18 factors, if observed in a wholesome and conducive way, food becomes safest. Such a food can be designated as *Aviruddha*. The factors enlisted under *Viruddha* actually address almost all the aspects of food such as quality and quantity of ingredients, effect of season, effect of environment, effect of the peculiarities of the person who use it and many more (Table.2). That significantly means that the safety of food does not solely rely on the quality of the ingredients in itself, but affected by many factors outside, including the state of person who use it. In that sense, safety concerns become more and more personalized here, as it applies to the total approach of Ayurveda. Usually the concept of *Viruddha* is taken as a model of enquiry regarding unsafe use of food, where as, if it is put in a reverse order it definitely speak about the factors which determines the quality of food, in a highly integrated and holistic approach.

**Table 2:** Factors causing *Viruddha* and their contemporary relevance

Domain	Name of <i>Viruddha</i>	Implications	Public health advice related to the item
Geographical factors	<i>Desaviruddha</i>	Food from another geographical region may contradict health of a person	“Say no to imported items. Stick on to one’s own natural habitat.”
Seasonal factors	<i>Kalaviruddha</i>	Food from contradictory seasons may become harmful	“Say no to unseasonal fruits and vegetables”
Physical factors related to the person who consume food	<i>Kosht’haviruddha</i>	Food taken without considering the state of his digestive system may contradict health	“Consider one’s own internal parameters (agni, kosht’ha, satmya and dosha) for fixing quality & quantity of diet
	<i>Agniviruddha</i>	Food without considering one’s own digestive power may become harmful	
	<i>Doshaviruddha</i>	Food without considering one’s own <i>Dosha</i> state may become harmful	
	<i>Satmyaviruddha</i>	Food without considering person’s	

		accustomed habits may become harmful	food items”
Factors related to the quantity of food	<i>Matraviruddha</i>	Food in excessive/diminished quantity is harmful to the body	“Fix the quantity according to nutritional load of the food supplied.”
Lifestyle factors	<i>Avasthaviruddha</i>	Food just after physical exertion may become harmful	“Avoid cold items immediately after physical exertion”
	<i>Krama-viruddha</i>	Food intake suppressing natural urges may become harmful	“Eat after evacuation”
	<i>Vidhi-viruddha</i>	Intake of food disobeying rule of ingestion may be harmful	“Follow eight rule of food intake”
Food processing	<i>Samskaraviruddh</i>	Wrongly processed food may become harmful	“Avoid unhealthy processing of food”
Food combination	<i>Veery-viruddha</i>	Combining food items having contradictory veerya may be harmful	“avoid combinations of contradictory veeryas”
	<i>Samyogaviruddha</i>	Combined use of some food stuffs may be harmful	“Avoid faulty combinations”
	<i>Pariharaviruddha</i>	Use of faulty drinks (anupana) may become harmful	“Take care in drinking proper adjuvant drinks along with food”
Nutritional aspects	<i>Sampat-viruddha</i>	Intake of under nutritive food is harmful	“Avoid using junk food”
Psychological aspects	<i>Hrid-viruddha</i>	Avoid using food which in unpleasant form and circumstances	“ Eat with peace”

The above table reveals the idea that, food will become safe only when it is taken considering 18 variables which affects the quality of food. Food which avoids all such *Viruddhas* (i.e. becoming *Aviruddha*) will be definitely the safest of all. In another way, concept of *Viruddha* clearly explains the factors to be considered while planning an ideal food system, abiding the rules in Ayurveda. The farm to table concept of safety remedies may be modified to “farm to table to gut” concept where the personalised approach also is well integrated.

## CONCLUSION

1. Food safety is the major issue in the present era compared to security and sustainability issues.
2. Integrated farm to table concept is considered to be the approach to minimize safety issues in the field of food
3. In Ayurveda, there can be three grades of safety “Safe, Safer and Safest”, where the terms can be well corroborated to the concepts of “*Annaraksha* concept”, “*Hitodarka* concept” and “*Aviruddha*” concept respectively.

4. The description of *Viruddha* elaborately explains almost all domains of items through which quality of food gets affected such as quality and quantity of food stuffs, personalised parameters, environmental factors, lifestyle factors, psychological factors etc., which becomes a more integrated approach than proposals in contemporary food safety concerns.

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**Source of Support: Nil**

**Conflict Of Interest: None Declared**

How to cite this URL: Vinodkumar M. V & Upendra Dixit: Food And Safety – Scope Of Building Up A Conceptual Basis Through Ayurveda. International Ayurvedic Medical Journal {online} 2019 {cited March, 2019} Available from: [http://www.iamj.in/posts/images/upload/407\\_412.pdf](http://www.iamj.in/posts/images/upload/407_412.pdf)