



# Classification of food groups: An Ayurvedic and contemporary overview

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## Abstract

The edible items consumed by humans come from variety of sources hence there is a need to classify these food items in different classes to ease their scientific description, easy prescription and better planning of balanced diet for population. Food groups refer to a method of classification for the various foods that animals consume in their everyday lives, based on the nutritional properties of these types of foods and their location in a hierarchy of nutrition. There are various systems of dividing foods into groups to develop models of optimum nutrition for humans. The classification found in *Ayurvedic* texts is in much more detail comprising of many new food items which although edible are no longer classified as different class of foods. All the needed nutrients for our body are supplied by different foods class described in ancient texts, which is one of the main aim of classification of food items.

Keywords : Diet, Food groups, Ayurveda, aharavarga, nutrition

## Introduction

The establishment of healthy nutritional practices during childhood period and early adolescence lay the foundation of healthy individual in later life. Lack of proper nutrition during the crucial childhood period, faulty eating habits and ignorance specifically in an economically underprivileged environment results in growth deficiency along with compromised productivity and mental ability.<sup>1</sup>

There is a detailed and exhaustive classification of dietary items available in ancient Ayurvedic texts. The basis of classification by *Charaka* has been mainly the type of food item i.e whether it is a cereal, pulse, Vegetables or fruits and so on.<sup>2</sup> *Sushruta*<sup>3</sup> and other scholars have first broadly classified all the food items into liquid and solid food and then subdivided these two types accordingly.

As scholars have tried to describe as many types of food items which were existing at their time; there are a great number of examples for a particular food group, hence a brief classification along with the relevant examples which are of use in today's time along with their nutritional and therapeutic benefits have been described in this paper.

Food groups refer to a method of classification for the various foods that animals consume in their everyday lives, based on the nutritional properties of these types of foods and their location in a hierarchy of nutrition. Eating certain amounts and proportions of foods from the different categories is recommended by most guides to healthy eating as one of the most important ways to achieve a healthy lifestyle through diet.

There are various systems of dividing foods into groups to develop models of optimum nutrition for humans. Among these systems are the USDA's program titled My Pyramid, the Healthy eating pyramid published by the Harvard School of Public Health, the Canadian Government's Canada's Food Guide, the United Kingdom Food Standards Agency's "Balance of Good Health" guide, the Portuguese food wheel etc.<sup>4</sup>

### Classification of food items by *Charaka*<sup>5</sup>

All the food items have been grouped under following twelve types

- *Shuka dhanya* (Cereals)
- *Shami Dhanya* (Pulses & Legumes)
- *Mamsa varga* (Flesh and meat) On the basis of origin it has been subdivided into eight types: *Prasaha, Bhushaya, Anupa, Jalaja, Jangala, Jalechara, Vishikir, Pratuda*
- *Shaka varga* (Vegetables)
- *Phala varga* (Fruits)
- *Harita varga* (Class of green)
- *Madhya varga* (Alcoholic beverages)
- *Jala varga* (Water): It Includes *Aindra, Kara, Hima*
- *Gorasa varga* (Milk and milk products)
- *Ikshu varga* (Sugarcane and its products): It includes varieties of Sugarcane and *Madhu* (Honey). *Madhu* is of four types: *Makshik, Bhramar, Kshaudra, Paitikka*
- *Kratanna varga* (Class of cooked foods)
- *Aharopyogi* (Class of useful contents for diet)

*Sushruta*<sup>3</sup> and *Vagabhatta*<sup>6</sup> has first broadly classified all the food items into two types

- *Drava varga* (Liquids)
- *Anna varga* (Solid food items)

**Drava varga:** It has been further subdivide into following types

- *Jala* (water) It is of eight types *Kaupya, Saras, Tadak, Chauntya, Prasravan, Audabhida, Vapi, Nadi*
- *Ksheer* (Milk)
- *Ikshu* (Sugarcane and its products)
- *Taila* (Oils)
- *Madhya* (Alcohols)<sup>7</sup>
- *Mutra*<sup>8</sup>
- *Dadhi*<sup>9</sup>(curd)
- *Takra*<sup>10</sup> (butter milk)
- *Ghrit*<sup>11</sup> (clarified butter)
- *Madhu*<sup>12</sup> (honey): Further divided it into 6 Types *Makshik, Bhramar, Kshaudra, Paitikka, Chhatra, Adharya, Dal*

**Anna dravya:** Solid food items have been further classified into following groups:

- *Shukadhanya* again further classified into *Shali* and *Kudhanya varga* (Cereals)
- *Shimbidhanya* called as *mudgadi varga* (pulses) by *Sushruta*
- *Kratanna* (processed food)
- *Mamsa varga* (meat, flesh and fishes)
- *Shaka* (vegetables)
- *Phala varga* (Fruits)
- *Aushadh* (herbs)
- *Pushpa*<sup>13</sup>(edible flowers)
- *Kanda*<sup>14</sup> (roots and tubers)
- *Lavana*<sup>15</sup> (salts)
- *Bhakshya*<sup>16</sup> (hard eatables)
- *Anupana*<sup>17</sup> (drinks after or with meal)

### Classification of food groups in contemporary science

United States Department of Agriculture (USDA) has suggested three different food group plans

- The 7 food group plan
- The 4 food group plan
- The 11 food group plan

The 7 food group plan: Developed by USDA in 1943. The food groups along with the nutrients they contribute are shown below:

**Table No. CL1 showing 7 food group plan and nutrients they provide**<sup>18</sup>

S.No.	Food group	Main nutrients contributed
1	Green & Yellow Vegetables	Carotene, Ascorbic acid & Iron
2	Oranges , Grape fruit, tomatoes or raw cabbage or salad greens	Ascorbic acid
3	Potatoes, other vegetables and Fruits	Vitamins and minerals in general and cellulose
4	Milk and milk products	Calcium, phosphorus, proteins and vitamins
5	Meat Poultry fish and eggs	Protiens phosphorus iron and B – Vitamins
6	Bread flour and cereals (Whole grain enriched and restored)	Thiamine, niacin, riboflavin, iron, carbohydrate and cellulose
7	Butter or fortified Margarine	Vitamin A and Fat

The four basic food groups, was developed by the United States Department of Agriculture (USDA) in 1956. The food groups along with the nutrients they contribute are shown in table no. CL2.

**Table No. CL2 Showing 4 food group plan and nutrients they provide** <sup>19</sup>

S.No.	Food group	Main nutrients contributed
1	Milk group : Milk , cheese, ice cream	Calcium,phosphorus,proteins and vitamins
2	Meat group : Beef, veal, pork, lamb, poultry, fish, egg	Protiens, phosphorus, iron and B– Vitamins
3	Vegetable- Fruit Group	Thiamine, minerals and cellulose
4	Bread flour and cereals (Whole grain enriched and restored)	Thiamine, niacin, Riboflavin, Iron, carbohydrate and cellulose

The 11 food group plan was suggested by USDA in 1964. The food groups along with the nutrients they contribute are shown below:

**Table No. CL3 Showing 11 food group plan and nutrients they provide** <sup>20</sup>

S no.	Food Group	Main nutrients contributed
1	(a) Milk and cheese (b) Ice cream	Calcium, phosphorus,proteins and vitamins
2	Meat, Poultry, fish	Protiens, phosphorus, iron and B – Vitamins
3	Eggs	Protiens, fats, iron, phosphorus and Vitamins
4	Dry beans, peas and nuts	Protien and B vitamins
5	Flour and cereals and baked products (Whole grain enriched and restored)	Thiamine, niacin, riboflavin, iron, carbohydrate and cellulose
6	Citrus foods and tomatoes	Ascorbic acid and potassium
7	Dark green and deep yellow vegetables	Provitamin A (carotene), ascorbic acid and iron
8	Potatoes	Carbohydrates and ascorbic acid
9	Other vegetables and fruits	Ascorbic acid and cellulose
10	Fats and oils	Essential fatty acids and vitamin E
11	Sugar syrup and preserves	Carbohydrates

The food groups described under 11 food group plan can be compared with different food groups described by ancient scholars. The probable comparison between different food groups described by *Ayurveda* and USDA can be understood as follows:

**Table No. CL4 Showing comparision of different food groups**

Food group by USDA	Food group described in Ayurveda
Milk ,cheese and ice cream	<i>Dhugdadi varga, Ghrit varga, takra varga,</i>
Meat, Poultry, fish	<i>Mamsa varga</i>
Dry beans, peas and nuts	<i>Shami dhanya or Mudgadi varga (Functionally)</i>
Eggs	Not described in ayurveda
Flour and cereals and baked products (Whole grain enriched and restored)	<i>Shuka and shami dhanya</i>
Citrus foods and tomatoes	<i>Phala varga (Includes all types of fruits)</i>
Dark green and deep yellow vegetables	<i>Shaka varga</i>
Potatoes	<i>Kanda varga (Sushruta)</i>
Other vegetables and fruits	<i>Phala varga</i>
Fats and oils	<i>Taila varga</i>
Sugar syrup and preserves	<i>Ikshu Varga , Madhu varga</i>
Not described	<i>Lavana varga</i>
Not described	<i>Jala varga</i>

The Basic foods are conveniently divided into eleven groups. Every food group is a good source of two or more nutrients and as such deserves to be included in every meal to maintain health.<sup>21</sup>

## Cereals

They form the staple food in our diet. Besides Rice, Wheat, Jowar, Bajra and Ragi, this carbohydrate-rich group of food grains, also include unfamiliar millets such as wari, samai, kodra, rajgira etc. They are the main source of energy in our diet.

## Pulses and Nuts and oilseeds

Both the whole pulse and the split pulse, called *dal* are a rich source of proteins and vitamin B. Pulses after germination (sprouting), also provide vitamin C. Nuts (and oilseeds) besides are a rich source of fats.

## Roots & Tubers

These include potatoes, sweet potatoes, raddish, yams, etc. which are rich in carbohydrates. Carrots are exceptionally rich in vitamin A (carotenes).

## Green Vegetables

They include both leafy and non-leafy vegetables. These are excellent sources of several vitamins and minerals. This is particularly true of the green (and yellow) leaves. Vitamin A content increases with greenness. They contain a large amount of indigestible fibre called roughage.

## Fresh & Dried Fruits:

Fresh citrus fruits are an excellent source of vitamin C. Mango and Papaya is rich in carotenes. Dry fruits like raisins, apricots, figs and dates are rich in sugars and minerals, especially iron.

## Fats & Sugars

These include the various cooking oils, salad oil, hydrogenated fats (*Vanaspati*), milk-fats (e.g. butter and ghee), lard and sweetening agents, such as sugar, *gur* and honey. Oils and fats collectively are the most concentrated source of energy.

## Milk & Milk Products

Milk is the most complete natural food. It is particularly valued for its protein, vitamins and calcium content. For the strict vegetarian it is the only source of good quality proteins (and vitamin B12).

## Flesh, Fowl, Fish

The inclusion of these foods makes the diet a non-vegetarian or a mixed one. They are an excellent source of good quality proteins and vitamin B complex. A non-vegetarian, therefore, needs to consume less of milk and pulses.

## Eggs

Excellent source of protein

## Spices and condiments

They enhance the palatability of diet. The essential oils present in them help to improve the flavor and acceptability of food preparations.

## Functional classification of food

From the nutritional point of view i.e. the functions which the above listed foods carry out in our body, the different food groups can be grouped under three headings:

- (a) Energy yielding
- (b) Body building food
- (c) Protective foods

## Energy yielding foods

Foods rich in carbohydrates and fats and also pure fats and carbohydrates are included in this group. It includes cereals, roots and tubers, dried fruits, sugars and fats.

## Body building Foods

Foods rich in protein are included in these groups. This may be broadly classified into 2 groups milk, egg, meat, and fish rich in high biological value and pulses, oilseeds and nuts and low fat oilseeds flour rich in proteins of medium nutritive value.

## Protective foods

Foods rich in proteins, vitamins and minerals are termed protective foods. They can be broadly classified into 2 groups (a) Foods rich in vitamins, minerals and proteins of high biological values e.g. milk, eggs, fish and liver (b) foods rich in certain vitamins and minerals only e.g. green leafy vegetables and some fruits.<sup>22</sup>

## Discussion

The edible items consumed by humans come from variety of sources hence there is a need to classify these food items in different classes to ease their scientific description, easy prescription and better planning of balanced diet for population. The act of classification of food items in ancient *Ayurvedic* texts is not only at par and consistent with the modern science, but at few instances much more scientifically superior and generalized covering a large variety of edible items.

The basis of classification of food items in ancient texts has been different types of available edible products like cereals, fruits, vegetables, milk and its products etc., which is still the basis of classification of food items into different food groups plan suggested by United States Department of Agriculture (USDA) as three different food group plans: The 7 food group plan, 4 food group plan and 11 food group plan which has been described in table no. CL1, CL2 & CL3. The comparison of food groups described in *Ayurveda* and in modern science has been done in table no. CL4. on the basis of comparison between two groups few dissimilarities and peculiarities of each group are discussed below:

- ❖ Few groups are subcategorized by *Ayurveda*, as there is a separate class of pulses which have been included under whole grains and cereals by USDA .
- ❖ Few groups are categorized by USDA as dark green and deep yellow vegetables, Potatoes, Citrus foods and Tomatoes while *Ayurveda* groups them under *shaka varga* and *phala varga*.
- ❖ There are separate groups of milk products as *dadhi*, *takra*, *grit varga* where as they are grouped under milk and milk products by USDA.
- ❖ There are a few completely new groups by *Ayurveda* as *madhya varga* (class of wines), *jala varga* (water), *kratanna* (class of cooked food) *ahara upyogi*, *bhakshya* (hard eatables), *anupana varga* (class of after drinks), *lavana varga* (class of salts), *ikshu* and *madhu varga* (sugarcane and honey)
- ❖ Separate class of egg is described by USDA.

On viewing the above comparison it can be inferred that the classification found in *Ayurvedic* texts is in much more detail comprising of many new food items which although edible are no longer classified as different class of foods. The important class included by *Ayurveda* as *jala varga* (water) is very important, viewing the scarcity of pure drinking water and its importance in our existence. There is detailed classification of water depending on the source from which it is accessible and different forms of water, properties of safe drinking water, easy and scientific purification of impure water which can be of immense help in today's time. Similarly there is new class of *anupana varga*<sup>17</sup> which totally lacks in the modern science. The *anupana* consists of fluid drinks which are taken after eating meal it helps in proper digestion and assimilation of food items. The *anupana* has much more importance in therapeutic dietetics, where a particular food or food group is meant for therapeutic purpose and so consumed with a specific *anupana*. There is description of different vehicles to be taken with a specific food item in *Ayurvedic* texts.

New class of salts is added by *Ayurveda* which consists of salts obtained from different sources along with their properties e.g. *saindhava*, *vida*, *saunchar*, *samudra*, *romak*, *audbhid*, etc.<sup>15</sup> in modern times the common edible salt is sodium chloride. The salts described in *Ayurveda* have different edible and pharmacological properties; hence in the condition where salt or sodium is restricted others can be used as its substitute to increase the palatability of food without any harm of sodium intake. Though salt is an essential ingredient of our diet but its intake should be kept at minimum and its excessive and regular intake should be discouraged, otherwise it may lead to many harmful diseases.<sup>23</sup> which is consistent with the modern concept according to which too much or too little salt in the diet can lead to muscle cramps, dizziness, or even an electrolyte disturbance, which can cause severe, even fatal, neurological problems.<sup>24</sup> A decrease in salt intake has been suggested to treat edema (fluid retention)<sup>24, 25</sup>

From *ayurvedic* point of view the *lavana* taste has predominance of *jala* and *agni mahabhuta* in them, hence due to the large quantity of *jala* in salt it causes the increase of similar *mahabhuta* in body hence leads to water overload which again leads to oedema, hence less intake of *lavana* and *lavana* predominant taste can cure oedema.

The *ahara upyogi varga* consists of edible items such as spices, condiments, cooking oils etc., which though are not considered as nutritionally essential but they increase the palatability of food by adding taste and flavour and help in easy digestion. This group though described in modern texts but is not considered as an essential ingredient of balanced diet.

Knowing the importance of first class animal protein for our health the ancient *Ayurvedic* texts have given a detailed list of all available edible animals including sea food comprising of different varieties of fishes. On viewing the list of animals in the flesh group it can be inferred that meat served as an important protein source in ancient times, as many of these animals are no more edible or extinct in today's world.

The classification of vegetables is also very diverse in ancient texts depending on the edible part it includes *patra* (Leaves as edible part), *pushpa* (flowers as edible part), *phala* (fruits as edible part), *nala* (stem as edible part), *kanda* (bulb and tubers). Other than these there is description of few plants which are not edible today as vegetables but popular as herbs e.g. *punarnava* (*Boheirevia diffusa*), *brahmi* (*Centella asiatica*), *makoya* (*Solanum nigrum*) etc. But since these herbs serve many health benefits hence their daily consumption will offer potential nutritional benefits.

The classes of *ikshu* (sugarcane) and *madhu* (honey) are described as separate food class in *Ayurvedic* texts. There is description of many varieties of sugarcane as well as honey in ancient texts which signify their importance as natural sweeteners at that time.

In modern perspective the classification of food items on the basis of nutrients which different food groups offer as summarized in table no. CL1, CL2 & CL3 can be inferred from stand point of *Ayurveda* as follows: *shukadhanya*, *ikshu* and *madhu* provides carbohydrates, *shimbidhanya* offer vegetable protein, *gorasa* or *dhugdadi* and *mamsa* provides with animal protein, *shaka* and *phala* offer minerals vitamins and micronutrients, *ghrit*, *taila* and *ahara upyogi varga* provides with fats, *jala* supplies the water, *lavana* gives salts, *ahara upyogi varga* provides with spices and condiments. Hence we can see that all the needed nutrients for our body are supplied by different foods class described in ancient texts, which is one of the main aim of classification of food items.

## Conclusion

The careful observation of classification of food groups in *Ayurveda* and contemporary science reveal that the age old classification is inclusive, descriptive and complete. Viewing the importance of different food groups for our health, the need of classification of food groups is of immense importance and we must include all the food groups in our diet in order to be healthy.

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