



ISSN NO. 2320-5407

Journal Homepage: -[www.journalijar.com](http://www.journalijar.com)

## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/8893  
DOI URL: <http://dx.doi.org/10.21474/IJAR01/8893>



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ADVANCED RESEARCH (IJAR)  
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Journal Homepage: <http://www.journalijar.com>  
Journal DOI:10.21474/IJAR01

### RESEARCH ARTICLE

#### PREBIOTICS AND PROBIOTICS IN AYURVEDA.

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#### Manuscript Info

##### Manuscript History

Received: 12 February 2019

Final Accepted: 14 March 2019

Published: April 2019

##### Key words:-

Pathya, probiotics, Ayurveda  
pharmaceutics, prebiotics.

#### Abstract

Ayurveda pharmaceutics deals with the preparation of medicines using herbal, mineral, metallic, marine drugs, etc. It also deals with dietetic preparations. Pathya is an important aspect in the maintenance of health. Many dietetic preparations are mentioned in ayurveda pharmaceutics and few are fermentation products. There are preparations that are hydro alcoholic in nature termed as sandhana kalpas. These preparations have therapeutic effect as well as have nutritive value. These formulations and dietetic preparations have the effect of probiotics and prebiotics.

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#### Introduction:-

Ayurveda pharmaceutics have therapeutic preparations termed as asava- arishtas (fermentation preparation) that are fermented products as well as a few pathya kalpas (diet preparations) that are fermented products. These preparations probably have the effect of probiotics and prebiotics.

Probiotics are live microbes that can be formulated into many different types of product, including foods, drugs, and dietary supplements. Species of lactobacillus and bifidobacterium are most commonly used as probiotics, but the yeast saccharomyces cerevisiae, some E. Coli and bacillus species are also used as probiotics. Lactic acid bacteria including lactobacillus species, which have been used for preservation of food by fermentation for thousands of years, can serve a dual function by acting as agents for food fermentation and, in addition, potentially imparting health benefits<sup>1</sup>.

Prebiotics are dietary substances (mostly consisting of non-starch polysaccharides and oligosaccharides poorly digested by human enzymes) that nurture a selected group of microorganisms living in the gut. They favour the growth of beneficial bacteria over that of harmful ones.

Sandhana kalpana (fermentation preparation) is mentioned in ayurveda which is prepared with drava dravya (liquid materials) along with other medicinal drugs are put in a closed inert vessel for a specified time period to carry out fermentation. Sandhana kalpana (fermentation preparation) is mainly classified into two i.e., madhya kalpana (alcoholic preparation) and shukta kalpana (acidic preparation).

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Shukta varga: shukta kalpana (acidic preparation) includes aerobic spoilage processes brought about by film forming yeast and acetic acid bacteria, both of which grow at the expense of alcohol; converting it to acetic acid or to carbon dioxide and water in which the product is called chukra.

Madya sandhana kalpana (alcoholic preparation) are classified as sura, sidhu, varuni and asava- arishta. Sura is prepared by keeping completely boiled rice for fermentation, the clear supernatant fluid of sura is prasanna, the slightly thicker part is kadambari, the thicker and lower part is jagala, medaka is thicker than jagala and the left-over portion after filtration is termed as surabeeja or vakkasa or kinwa.<sup>2</sup>

The rice based fermented products are believed to confer more health benefits over dairy-based products.

Pakwa rasa sidhu- is prepared by fermenting sweet juice of different fruits without boiling them whereas apakwa rasa sidhu is prepared by fermenting sweet juice of different fruits, etc. after boiling them<sup>3</sup>. Varuni is prepared by fermenting the juice of tala (palm, *Borassus flabellifera* linn) and kharjura (date palm, *Phoenix dactylifera* linn).

Asava are formulations that are prepared without the application of heat and arishtas are prepared by subjecting the drugs to the process of heat.

### Shukta kalpas

1. Shukta is a preparation made by fermenting tubers, roots, fruits, etc. with oil and salt in liquid.
2. Tushodaka is a fermented drink prepared by fermenting the boiled broken yava (*Hordeum vulgare* linn.), godhuma (*Triticum aestivum* l) with husk.
3. Souviraka is prepared by fermenting boiled yava (*Hordeum vulgare* linn.), godhuma (*Triticum aestivum* l), without husk.
4. Kanjika is prepared by fermenting incompletely boiled masa (black gram), dhanya (cereals) with gruel prepared with rakta sali (*Oroxylum indicum*)
5. Sandaki is prepared by fermenting mulaka (*Raphanus sativus*), sarsapa<sup>4</sup> (*Brassica juncea*), etc.
6. Maireya is the madhya (alcohol) prepared along with dhataki puspha (*Woodfordia fruticosa*), guda (jaggery) and dhanya vishesha (cereals).<sup>5</sup>
7. Chukra is that when the fermented liquid loses its amlata (sourness) or madhurata (sweetness) and the liquid gets spoiled and is called as chukra.

The advantages of acidic fermentation are said that they render the food resistant to microbial spoilage and the development of food toxins, they make the foods less likely to transfer pathogenic microorganisms, they preserve foods between the time of harvest and consumption, and they modify the flavour of the original ingredients and improve the nutritional value.

Pathya kalpana: the concept of pathya (wholesome) and apathya (unwholesome) is the uniqueness of ayurveda to fulfil its aims and objectives. The definition of pathya (wholesome) and apathya (unwholesome) include both material substances and specific regimes but in general these words had been particularly used for food articles in the texts of ayurveda.

A list of preparations made up of rice, cereals and milk products are mentioned under pathya kalpana (wholesome preparations).

Takra kalpana (butter milk) - it is a liquid prepared by continuously churning the curd for three hours with different ratios of water added to it. There are different types of takra mentioned. Gholi is prepared by churning curd without adding water and butter will be retained, mathitha is prepared by churning curd without adding water and butter will be separated after churning, takra or katvara is prepared by churning curd after adding 1/4<sup>th</sup> part of water and butter will be separated after churning, udawasa is prepared by churning curd by adding 1/2 part of water and butter will be retained, chachika is prepared by churning curd with more quantity of water<sup>6</sup>.

Dandahata is a preparation done by churning curd with one and half parts of water, kalaseya is prepared by churning curd with 2 parts of water, karamathitha is prepared by churning with hand, galita after preparing takra (butter milk), it is filtered by cloth, svetamatha is prepared by churning curd with equal quantity of water and sadava is prepared by adding fruit juices.

Dadhi kurchika is prepared by boiling dugdha (milk) <sup>7, 8</sup> and dadhi (curd) <sup>9</sup> together over mild fire in an earthen vessel to a thicker consistency.

Takra kurchika is prepared by boiling dugdha (milk) and takra (butter milk) together over mild fire in an earthen vessel to a thicker consistency.

#### Satakra samidhanya khada

To one part of takra (butter milk) 1/16<sup>th</sup> part of any of the samidhanya (pulses and legumes) such as green gram, peas, bengal gram, black gram, beans, etc.<sup>10</sup> are taken in an earthen vessel and boiled over mild fire. It is reduced to half or 1/4<sup>th</sup> and required quantity of fried jeeraka (*Cuminum cyminum* L.) and maricha (*Piper nigrum*, linn, *Piper triocicum*, roxb.) churna (powder) along with salt and other spicy drugs may be added.<sup>11</sup>

#### Satakra saka khada

To one part of takra (butter milk) 1/16<sup>th</sup> part of yoga (preparation) prepared with kapittha (*Feronia limonia* (L.) Sw., *feronia elephantum* corr., *schinus limonia* L.), cangeri (*Oxalis corniculata* Linn.), maricha (*Piper nigrum*, linn, *Piper triocicum*, roxb.), ajaji (*Cuminum cyminum*), chitraka (*Plumbago zeylanica*) are taken in an earthen vessel and boiled over mild fire. It is reduced to half or 1/4<sup>th</sup> and required quantity of salt and other spicy drugs may be added.<sup>12</sup>

#### Kambalika

It is the yusa (soup) prepared using dadhimastu (upper liquid portion of curd). One part of amla (sour) dadhi (curd) added with 1/8<sup>th</sup> of mudga (*Vigna radiata* (L.) R. Wilczek), masa (black gram) etc are together boiled to prepare yusa (soup). To this needed quantity of sneha (oil or ghee), lavana (salt), jeeraka (*Cuminum cyminum* L.), nimbu (*Citrus limon*) swarasa (juice), twak (*Cinamomum zeylanicum*, breyn.), ela (*Ellettaria cardamomum*), patra (*Cinnamomum tamala* L), etc. Spices are added and the preparation is called as kambalika.<sup>13</sup>

#### Discussion:-

Fermentation is said to be one of the oldest forms of food preservations in the world. It is said that during the process of fermentation the microorganisms convert the chemical composition of raw materials. Fermented foods contain many microorganisms that are present as natural indigenous micro biota in uncooked plant or animal substrates, utensils, containers, earthen pots, and the environment. Fermented rice products like sura, sidhu not just give the desired therapeutic effect but also nutritionally enriches the body. The fermented drinks with curd, buttermilk and the ayurveda dietetic preparations from the same like dadhi kurchika, takra and takra kurchika also give the same benefit. Dadhi is said to be rich in lactic acid bacteria and has the probiotic effect, which helps in intestinal health as helps in controlling diarrhoea in children. The lactic acid bacteria produce bioactive compounds such as diacetyl, hydrogen peroxide, and reuterin that suppress the normal growth of undesirable flora, especially *E. Coli*, *bacillus subtilis*, and *staphylococcus aureus*. The dahi kurchika mentioned in dietetic preparations of ayurveda will also have a probiotic effect.

#### Summary and Conclusion:-

The fermented preparations explained under pathya kalpana can be said to have the benefit of enriching the health with good bacteria. In the process of fermentation the microorganisms convert the chemical composition of raw materials. Fermentation not just alters the taste of the product but augments the therapeutic and nutritive value. Asava, arishta, pathya kalpanas where fermentation has a role provides the dual benefit. A lot of research can be carried out in these areas of fermented products of ayurveda pharmaceuticals. The indigenous microbes from traditional fermented food as natural biological resource for health beneficial can be worked upon.

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