



## Review Article

**THERAPEUTIC AND NUTRITIONAL SIGNIFICANCE OF DUGDHA (MILK) WITH REFERENCE TO COW'S MILK**Chawre Sushil Vilas<sup>1\*</sup>, Shinde Vandana Sitaram<sup>2</sup>, Kabra P.R.<sup>3</sup>, Raut Deokumar<sup>4</sup>, Bhivgade H.S.<sup>5</sup><sup>1</sup>Assistant Professor, Department of Kayachikitsa, Government Ayurved College, Nagpur, India<sup>2</sup>Panchkarma Vaidya, Department of Panchkarma, Government Ayurved College, Osmanabad, India<sup>3</sup>Professor, Head of Department of Kayachikitsa, Government Ayurved College, Nagpur, India<sup>4</sup>Assistant Professor, Department of Kayachikitsa, Government Ayurved College, Nanded, India<sup>5</sup>Associate Professor, Department of Kayachikitsa, Government Ayurved College, Nagpur, India

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**DOI: 10.7897/2230-8407.050692****ABSTRACT**

Godugdha (Cow's milk) is also elixir of life. Dugdha (milk) is a general term for the milk of any of the animals. In Ayurveda, Cow's milk is much appreciated for the therapeutic purposes as well as nutrition, so that it is included in Anukta (the description word dugdha (milk) in Ayurvedic text is an indication of use of only Cow's milk). Cow's milk was used in various types of uses as therapeutics and nutritional in various form of dietary contains. As the milk is having identical properties of Ojas (Immunological power), it promotes Ojas (Immunological power). The Cow's milk acts as Rasayana (medication for increase the immunity), Tarpaka, Jivaniya (life supporting), Hridya (beneficial for heart), Ahladakara (delighting), Buddhi prabodhaka (supporting the mental growth) and uses in many drugs preparations and as anupana (supportive content). Milk is only dietary form which is used in all stage of life so that it is called as "Jivan (life)." Milk was used from ancient Vedic era. Cow's milk is an opaque fluid in which fat is present as an emulsion; protein and some minerals in colloidal suspension and lactose together with some mineral and soluble protein in true solution. Godugdha (Cow's milk) is a liquid food which is used from the infant life to all stages of life. Every mammal's first diet is milk. The cow's milk is one of them. If mother's milk is not available, Cow's milk can be preferred. In Ayurveda, Cow's milk is used in various manners such as, various preparations in Kalpas (Drugs compounds). It is used as an Anupana (supportive content) for many Kalpas (Drugs compounds). Sometimes it is Pathya (beneficial) in some diseases and also it is Pathya (beneficial) during the medication. The Cow's milk is not exception for Apathya (contraindication/unbeneficial), it is Apathya (contraindicated/unbeneficial) in many diseases and during some specific medication.

**Keywords:** Godugdha, Anukta, Ojas, Rasayana, Tarpaka.**INTRODUCTION**

Godugdha (Cow's milk) is also elixir of life. Dugdha (milk) is a general term for the milk of any of the animals. In Ayurveda, Cow's milk is much appreciated for the therapeutic purposes as well as nutritive, so that it is included in Anukta (the word Dugdha in Ayurvedic text means indication of use of only Cow's milk). Cow's milk was used in various types of uses as therapeutics and nutritional in various form of dietary contain. As the milk is having identical properties of Ojas (Immunological power), it promotes Ojas (Immunological power). The Cow's milk acts as Rasayana (medication for increase the immunity), Tarpaka, Jivaniya (life supporting), Hridya (beneficial for heart), Ahladakara, Buddhi prabodhaka (supporting the mental growth) and uses in many drugs preparations. It is also used in the Anupana (supportive content) i.e. a liquid to be taken after oral administration of the drug. Milk is only dietary form which is used in all stage of life so that it is called as "Jivan (life)." Milk was used from ancient Vedic era also. Cow's milk is an opaque fluid in which fat is present as an emulsion; protein and some minerals in colloidal suspension and lactose together with some mineral and soluble protein in true solution. The yellowish white Colour of the milk is due to suspended fat globules. Milk is little more viscous than the water, taste is sweet and bland. Odour is faint and characteristic. Cow's milk possesses all the elements necessary for the growth and nutrition of various tissues of our body. As the calcium in the milk is readily absorbable, it is a most valuable food in the formation of

bone. The ratio in which the calcium and phosphorus present in the milk made it ideal for their proper absorption and assimilation and consequently for bone formation along with Vitamin D.

**Vedic reference of Godugdha (Cow's Milk)**

In Atharvaveda Cow's milk is used for Punsavana Vidhi<sup>1</sup>. In Yajurveda it is indicated for the nutrition of fetus<sup>2</sup>.

**Ayurvedic view**

The Cow's milk possesses qualities like Madhura (Sweetness), Sheeta (Coldness), Mridu (Softness), Snigdha (Unctuousness), Sandra (Density), Shlaksna (Clarity). These ten properties were stated by Acharya Charaka in Gorasavarga. These properties were similar to Oja (immunological power) so that the cow's milk is helpful for increasing the Oja (immunological power) in the body in according to 'Samanyadabhivardhayate'<sup>3</sup> (Ca. Sa. Su.27/217)

**Guna Karma****Rasa:** Madhura**Guna:** Guru, Snigdha**Virya:** Shita**Vipaka:** Madhura**Prabhava:** Not specified

Milk alleviates Vata and Pitta Dosha by the above said properties. As the milk is having identical properties of Ojas (immunological power), it promotes Ojas (immunological power). The Cow's milk acts as Rasayana (medication for

increase the immunity), Tarpaka, Jivaniya (life supporting), Hridaya (beneficial for heart), Ahladakara and Buddhi prabodhaka (supporting the mental growth)<sup>4</sup>. In Ayurveda, descriptions are available regarding the quality of the milk of the cows of various Colours.

#### Colour of the Cow along with Therapeutic properties

- Black Cow's milk Vatahara
- Yellow Cow's milk Vata Pittahara
- White Cow's milk Heavy for digestion, Kapha Vardhaka
- Red Cow's milk Vatahara
- Small hill Cow's milk Oily and heavy
- Milk of Cow's with calves not good for use
- Scanty eaten Cow's milk Heavy
- Milk of Cow's calved long age good for all the age groups
- Milk of Cow's whose has calf and very small calf is tirdoshkaraka<sup>5</sup>.

#### Properties of Milk According to Stage of Delivery of animal

The milk of Navprasuta (recently delivered) cow is Madhur (sweet), Kshariya (alkaline) and Ruksha. The milk of Madhyaprasuta (deliver cow) is Madhur (sweet), Tridoshshamak. The milk of Chirprasuta (deliver cow from long duration) is Madhur (sweet), Vidahi (produce acidity) and Lavan Rasayukta (salty). Firstly deliver Cow milk is Gunarahita (having no effect). Madhyama deliver Cow milk is having Rasayana properties. Vriddha (old) deliver Cow milk is Balahina (less energetic)<sup>6</sup>

#### Use of Various Animals Milk With Respect To Temperature

Cow's Milk is used as naturally lukewarm as possible. Buffalo's milk is used after naturally cooling. Ship's milk is use lukewarm after heating. Goat's milk is used after cooling. Such methods of using milk may be preventing natural useful properties of milk<sup>7</sup>.

#### Properties of raw milk

Raw milk is responsible for choking the channels and increase various fatal secretion in the body. It is very heavy to digest and increases Kapha Dosha in the body. It is advised to avoid use of Buffalo's milk as raw milk while Cow's milk can be used as soon as it has been taken out from cow, termed as Dharoshna (naturally lukewarm)<sup>8</sup>. Raw milk can produce the Shvasa (Asthama) and Kasa (cough)<sup>9</sup>.

#### Properties of Evaporate/Boil milk

Evaporated hot milk is Kapha-Vataghna. Evaporate cool milk reduces Pitta. Evaporated half water in milk is very light for digest and very useful<sup>10</sup>.

#### Useful contents mixed with milk

Mango, Dry grapes, Honey, Ghee, butter, Ginger, Pipali (*Piper longum*), Marich (*Piper nigrum*), Sita (Type of sugar), Pruthuka (Mixture of poha), Saindhav (type of salt), Patol (A species of cucumber), nagar (dry Ginger), abhaya (*Terminalia chebulla*) and sweet<sup>11</sup>. As per the concept of Viruddha milk to mix with fruits such as Banana is contra-indicated, however in this context it is allowed to mix may be milk must not be boiled to mix.

#### Useful contents according to taste with milk

In sweet, sugar can be used with milk. In sour, Amalaki (*Embelica officinalis*) can be used. In Vegetables group Patol (A species of cucumber) can be used. In spicy, Ginger can be used. In astringent, Yava can be used. In salt saindhav can be used<sup>12</sup>.

#### Therapeutic use of Milk according to Time and Age

Milk used in morning increases the Bala (power), Brihana (increase body mass), and appetite. Milk used in afternoon increases taste, and it helps Krichha Asmari Chhedan (can break the renal stone). Milk used in night alleviates various Dosha. In childhood it increases appetite, prevents deprivation, and increase Bala (power). In old age it is used for increasing Reta (semen)<sup>13</sup>. The effect of milk drink in Purvahna (time before 12 noon) ison Agni i.e. it is responsible to increase appetite, Vrishya and Brimhana (increase body mass). The effect of milk drink in Madhyana (time between 12 noon to evening) is Balya (energetic), Mutrakrichhahar (useful in renal disorder)<sup>14</sup>.

#### Contents harmful with Milk

Fish, Meat, Gud (jaggery), Muddaga (A kind of kidney bean), Mulaka, Shak (vegetables), Jambu, Sura (type of wine) are responsible to produce skin diseases and reacts like poisoning. Milk cannot be used with any type of oil such as oil of Haritaki (*Terminalia chebulla*), Pinyak (remaining parts of sesame after extracting oil and Sarshapa (mustard)<sup>15</sup>.

#### Effect of Accessory contents in the milk

The Sita (type of sugar) in the milk is Sukrala and pacify the aggravated Dosha. The Sharkara (sugar) mixed with milk increases the Kapha and alleviate the Vata. The milk with jaggery is useful in Mutrakrichha (A type of renal disorder i.e. dysuria) and increase the Pitta and Kapha<sup>16</sup>.

#### Indication of milk in Diseases

Cow's milk is indicated in Jirnajvara (chronic fever), Mutrakrichha (dysuria), Raktapitta (bleeding disorders), Madatyaya (alcoholism), Kaasa (cough), Shvasa (Asthama)<sup>17</sup>. It is useful in mental disorders, Daha (Burning), Trishna (thirst), Udavarta, Gulma, Atisara, Shrama (exert), Klama (fatigues), Kshata Kshina, Daurbalya (weakness), Bhrama (giddiness and vertigo), Pandu, Kshaya, Kamala (jaundice), Shoola<sup>18</sup>.

#### Contraindication of milk in Diseases

Navjvar (fever in seven days duration), Agnimandya (poor digestion), Ama (undigested diet), Kustha (Skin diseases), Kaphaj Shula, Kasa, Atisar (diarrhea), Krimi (Worm infestation)<sup>19</sup>.

#### Modern view

Cow's milk is an opaque fluid in which fat is present as an emulsion; protein and some minerals in colloidal suspension and lactose together with some mineral and soluble protein in true solution. The yellowish white Colour of the milk is due to suspended fat globules. Milk is little more viscous than the water, taste is sweet and bland, and odour is faint and characteristic. Cow's milk possesses all the elements necessary for the growth and nutrition of various tissues of our body. As the calcium in the milk is readily absorbable, it is a most valuable food in the formation of bone. The ratio in which the calcium and phosphorus present in the milk made

it ideal for their proper absorption and assimilation and consequently for bone formation along with Vitamin D<sup>20</sup>.

### Proteins

The casein is the principle protein and it constitutes 80 % of the total proteins present in milk. The other 20 % will be made up of Serum proteins, Lactalbumin and Lactoglobulin present in the Whey. Whey is the liquid portion of milk left over after the removal of casein. The lacto-globulin is composed of two immunoglobulins – euglobulin and pseudoglobulin, which account for the remaining 13 % of the total serum proteins. Besides the above proteins, Cow's milk contains proteose – peptone fraction of about 308.7 mg/100 ml. Milk proteins contain all the essential amino acids in marked quantity and rich in Lysine, Valine, Isoleucine and Leucine. Milk proteins contain all the essential amino acids<sup>21</sup>.

### Non-protein Nitrogen substances

Besides proteins, milk also contains non-protein Nitrogen substances. It makes 5 % of total nitrogen in milk.

### Milk Fat

The milk fat contains numerous triglycerides and as many as 64 fatty acids. The mixed glycerides make up about 98 % of the milk fat. Milk contains 0.2 – 1.0 % of phospholipids namely Lecithin, Phosphatidyl serine, Phosphatidyl ethanolamine, Phosphatidyl choline, Sphingomyelin, Inositol

and Cerebrosides. Milk fat is a good source of retinol and vitamin D<sup>22</sup>.

### Carbohydrates

The carbohydrate in all milks is lactose or milk sugar. Along with that, free glucose and galactose are present in traces in fresh milk. It is found nowhere else in nature. It is readily fermented by lactic acid bacilli<sup>23</sup>.

### Minerals

Minerals found in cow's milk are calcium, phosphorous, Iron, Chloride, Sulphate, Sodium, Potassium, Magnesium, Copper and Zinc. Milk is particularly rich in calcium; it is a poor source of iron<sup>24</sup>.

### Enzymes

Cow's Milk contains multiple enzymes like lipase, aryl esterase, cholinesterase, alkaline phosphatase, acid phosphatase, xanthine oxidase, lactoperoxidase, protease, A and B amylase, catalase, aldolase, carbonicanhydrase, salolase, rhodonase and lactase<sup>25</sup>.

### Vitamins

Milk is also a good source of Vitamins except vitamin C<sup>26</sup>. Thus multi factorial components of milk made it suitable for the body and hence a good nutritive even. Chemical and physiological constituents of Cow's milk composition/100 ml. are shown in below:

## Composition and Comparison of other milk

Composition of Milk from various species (per 100 ml)

| Nutrients        | Human milk | Cow's milk | Goat's milk | Buffalo's milk | Ass's milk       |
|------------------|------------|------------|-------------|----------------|------------------|
| Energy (kcal)    | 65         | 67         | 72          | 117            | 48               |
| Protein (g)      | 1.1        | 3.2        | 3.3         | 4.3            | 2.1              |
| Fat (g)          | 3.4        | 4.1        | 4.5         | 8.8            | 1.5              |
| Carbohydrate (g) | 7.4        | 4.4        | 4.6         | 5.0            | 6.5              |
| Minerals (g)     | 0.1        | 0.8        | 0.8         | 0.8            | -                |
| Calcium (mg)     | 28         | 120        | 170         | 210            | 80               |
| Phosphorus (mg)  | 11         | 90         | 120         | 130            | -                |
| Iron (mg)        | -          | 0.2        | 0.3         | 0.2            | -                |
| Vitamin A (mcg)  | 42         | 52         | 54          | 48             | -                |
| Thiamine (mcg)   | 20         | 50         | 50          | 40             | 60               |
| Riboflavin (mcg) | 20         | 190        | 40          | 100            | 30               |
| Niacin (mcg)     | -          | 100        | 300         | 100            | 100              |
| Vitamin C (mg)   | 3          | 2          | 1           | 1              | 10 <sup>27</sup> |

### Milk product

Milk is consumed in a variety of forms- as whole milk, butter, ghee, cheese, dried and condensed milk, khoa, ice cream etc. Milk form which fat has been removed is known as 'skimmed milk'. It is devoid of fat and fat soluble vitamins, but a good source of milk protein (35 %) and calcium<sup>28</sup>.

### Toned milk

The term 'tone' is an Indian coinage. It is a blend of natural milk and "made-up" milk. It contains 1 part of natural milk and 1/8 part of skim milk powder. The mixture is stirred, pasteurised and supplied in bottles. Toned milk has a composition nearly equivalent to cow's milk. It is cheaper and yet a wholesome product.

### Vegetable milk

Milk prepared from certain vegetable foods (viz. groundnut, soya bean) is termed "vegetable milk". It may be used as a

substitute for animal milk. The Central Food Technological Research Institute, Mysore, India has perfected techniques for the preparation of vegetable milk.

### Nutritive values of Indian foods – 1971

It may note that the protein content of these is about three times that of human milk. The type of protein is also different. The fat content is similar in the milk of these species. Human milk contains about twice, as much lactose as cow's or buffalo's milk. The energy supplied per 100 ml is about the same. Cow's milk contains more than three times as much mineral ash as human milk. This creates a high solute load for the kidneys to excrete. This problem is corrected by diluting the milk. Sugar is added to counteract the effect of dilution on energy supply. The modifications made in cow's or buffalo's milk to prepare commercial formulas are:

- Protein content is usually lowered; if possible, protein is treated to produce soft curd.

- Carbohydrate such as glucose or sucrose is added.
- Butterfat is reduced, if need be.
- Calcium level is reduced by dilution.
- Vitamin A, D and Ascorbic acid are usually added.
- Iron may be added.<sup>29</sup>

#### Milk born disease

A joint FAO/WHO Expert Committee (1970) on milk Hygiene classified milk born diseases as under

Infection of animals that can be transmitted to man:

Primary importance: Tuberculosis, *Brucellosis*, *Streptococcal* infection, *Staphylococcal* enterotoxin poisoning, *Salmonellosis* and Q fever.

Lesser importance: Cowpox, Foot and mouth disease, Anthrax, Leptospirosis and Tick-borne encephalitis.

Infection primary to man can be transmitted through milk:

Typhoid and paratyphoid fevers, Shigellosis, Cholera, Enteropathogenic *Escherichia coli* (EEC)

Non-diarrheal disease: *Streptococcal* infection, *Staphylococcal* food poisoning, Diphtheria, Tuberculosis, Enteroviruses, viral hepatitis<sup>30</sup>.

#### Milk Allergy

Milk allergy is IgE mediated. Vomiting is the most characteristic GI symptom that is clearly due to allergy. The allergy can be to any one of the Cow's milk proteins.<sup>31</sup>

#### Cow Milk Protein

Clinical and laboratory tests exist to help in the diagnosis of food allergy, each having drawback in terms of the interpretation of the test result. Routine screening tests include the radioallergen sorbent test (RAST), skin testing, quantification of circulating antibodies and quantification of leukocyte inhibition factor. Other test that may assist the clinician in the diagnosis of CMP allergy induce those associated with the gastrointestinal tract such as vomiting, diarrhoea, abdominal pain, abdominal colic, gastrointestinal bleeding, fat malabsorption and allergic gastroenteropathy.<sup>32</sup>

#### Cow milk allergy

Some investigators have claimed that cow's milk protein sensitive enteropathy commonly follows acute infective enteritis, the proof is not substantial. We do not believe that infantile colic typically occur secondary to cow's milk if there are no other signs and symptoms<sup>33</sup>.

#### Cow's milk

Cow's milk itself is not an appropriate diet for young infants because of the high renal solute load, high protein (3.3 g/dl) and casein content, high proportion of saturated fats, poor mineral bioavailability and increased risk for sensitization to milk proteins<sup>34</sup>.

#### Food induced Enteropathy

Malabsorption, protected diarrhoea, vomiting and failure to thrive caused by food hypersensitivity occur most often during 1<sup>st</sup> mo of life. Small bowel biopsy shows patchy villous atrophy with mononuclear cell inflammatory response. Reaction to food challenge as well as resolution of symptoms on removal of the offending food may take several days to weeks<sup>35</sup>.

#### Clean and safe milk

Methylene Blue Reduction Test: It is an indirect method for detection of microorganisms in milk. The test is carried out for pasteurization<sup>36</sup>.

#### Pasteurization of milk

Pasteurization may be defined as the heating of milk to such temperatures and for such periods of time as are required to destroy any pathogens that may be present while causing minimal changes in the composition, flavour and nutritive value (WHO, 1970).

#### Three Method

Holder (Vat) method (b) HTST method (c) UHT method

#### Tests of Pasteurized milk

(1) Phosphate test (2) Standard Plate Test (3) Coliform Count

#### CONCLUSION

Godugdha (Cow's milk) is very useful in healthy individuals. It is also useful in various diseases. It is a material on the earth which is useful from birth to all age groups. Godugdha (Cow's milk) having Madhur Rasa (sweet taste). Shit Virya (acting property), Madhur Vipaka (The taste emerge after digestion). Due to these properties it acts on the Vata and Pitta. Godugdha (Cow's milk) is useful in mental disorders, Daha (Burning), Trishna (thirst), Udavarta, Gulma, Atisara, Shrama (fatigues), Klama, Kshata Kshina, weakness, giddiness, vertigo, Mada, dyspnoea, cough, excessive thirst and excess appetite. It is used in so many diseases as Pathya (Beneficial). It is used as Anupana with lots of Ayurvedic preparations. Godugdha (Cow's milk) is promoting the Oja (immunological power) which helps to prevent the diseases and increase the strength of body. So that it is also called Jivana (life), really it helps in improving the quality of life.

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