



## A Review Study on *Ashta Ksheera* their Nutritional and Therapeutic Values in Children

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### ABSTRACT:

**Introduction:** Milk is a natural food source for mammals. Animals, including human, produce milk to feed their young until they are ready for solid food. Ayurveda identified eight different sources of animal milk under the name of *Ashta Ksheera*, of which human milk (*Nari Dugdha*) is also one; the other seven sources of milk are *Avika* (Sheep), *Aja* (Goat), *Go* (Cow), *Mahishi* (Buffalo), *Ustra* (Camel), *Hassthini* (Elephant), and *Ashwi* (Mare) milk.

**Objective:** To review nutritional value of *Ashta Ksheera* in comparison to human milk supported with evidence-based research studies.

**Methods:** Literature research of Ayurveda text and relevant studies depicting nutritional value and therapeutic value of *Ashta Ksheera* were searched, comprised an electronic database of Google scholar, PubMed, Ayush research portal and DHARA database.

**Results:** Data from previous studies on *Ashta Ksheera* were extracted and compared its nutritional values with human milk (*Nari Dugdha*) and their properties described in Ayurveda.

**Discussion:** Goat milk or sheep milk can be given to children allergic to cow milk. Cow milk acts as *Rasayana* (rejuvenating), *Oja Vardhak* (increasing immunity), it is best among the *Jivaniya Padarthas* (food enhancing life). *Aja Dugdha* (Goat milk) is similar to *Go dugdha* (Cow milk) and can be use in *Rajayakshma* (emaciation like condition).

**Keywords:** *Ashta Ksheera*, Nutrition, Ayurveda, Cow milk, Human milk, Mare milk

### INTRODUCTION

Every mammal feed their off springs till a particular age. In Ayurveda, milk has been given with a special status equal to nectar owing to its unique nutritional values.

*Ksheera* (Milk) is *Jeewaniyam* (Vitalizing) for organism develops from *Jarayu* (Placenta)<sup>1</sup>, it is *satmya* (suitable) to children<sup>2</sup>. *Acharya vaghbhatta* advocated only mother milk to child as it is sufficient for development and growth of



child<sup>3</sup>. Breastfeeding is the gold standard for infant feeding, as it provides not only nutritional excellence, but also protective effects during a time of unmatched antigenic and pathogenic challenges. It is the best gift that a mother can give to her baby. Human milk is complete and ideal form of nutrition for the developing infant as it contains all nutrients required for growth and development of growing infant. Human milk is complete food for infants up to 6 months of age. *Dugdha* having similar properties to *Oja*, *Charaka* says milk to be *Pravara Jweeniyam* (provides longevity) and *Rasayana* (rejuvenating)<sup>4</sup>. *Acharya vagbhatta* says in absence of mother milk baby should be given any one of goat milk, cow milk, *Laghupanchmoola sadhita dugdha* (milk processed with *Laghupanchmoola*) or *Prishnaparni sadhita dugdha* (Milk processed with *Prishnaparni*) for baby feeding<sup>5</sup>.

## METHODS

Literature research of Ayurveda text and relevant studies depicting nutritional value and therapeutic value of *Ashta Ksheera* were searched, comprised an electronic database of Google scholar, PubMed, Ayush research portal and DHARA database. In electronic database search terms were used “Sheep milk”, “Goat milk”, “Buffalo milk”, “Camel milk”, “Elephant milk”, “Mare milk”, “Cow milk” and “Human milk”.

## RESULTS

### *Avika dugdha* (Sheep milk)

According to *Charaka Samhita*<sup>6</sup> *Avika Dugdha* is *Ushna* in potency, *Kapha* and *Pitta Karaka*, It causes *Hikka* (Hiccup), *Shwasa* (Breathing disorders) and according to *Shushruta Samhita*<sup>7</sup> *Avika Dugdha* is *Madhura*, *Guru*, *Snigdha*, *Pitta* and *Kapha Vardhaka*. It is used in *Vataja Kasa* (Cough). Sheep milk can be considered an ideal substitute for cow milk for allergy sufferers due to its high nutrients levels. Specific antibodies in people allergic to milk (IgE) weakly recognize the protein fractions  $\alpha$ S1-casein,  $\alpha$ S2-casein, and  $\beta$ -casein from goat and sheep milk, which is not observed for cow milk<sup>8</sup> Taurine in goat and sheep milk derived from sulphur-containing amino acids has important metabolic functions as does carnitine, which is a valuable nutrient for the human neonate. Mineral and vitamin contents of goat and sheep milk are mostly higher than in cow milk<sup>9</sup>. The nutritional value of sheep milk is higher than those of goat and cow milks, with higher levels of proteins, lipids, minerals, and vitamins essential to human health and a caloric value corresponding to 5932

kJ/kg<sup>8</sup>. Sheep milk contains almost twice as much protein as goat and cow milks. These proteins molecular forms and amino acid sequences have nutritional quality, as well as positive impact on digestibility, and thermostability<sup>8</sup>. Mono and polyunsaturated fatty acids in sheep milk may contribute to the prevention of cardiovascular.<sup>10</sup>

### *Aja dugdha* (Goat milk)

According to *Charaka Samhita*<sup>11</sup> *Aja Dugdha* is *Kashaya*, *Madhura*, *Sheeta*, *Laghu*, *Malasangrahaka*. It cures *Rakta-Pitta* (Bleeding disorders), *Atisara* (Diarrhea), *Kshaya* (Malnutrition), *Kasa* (Cough), *Jwara* (Fever) and according to *Shushruta Samhita*<sup>12</sup> it is *Agni Deepaka* (Increases digestion), *Laghu* (Light), *Sangrahi* (Digestion promotive). *Shwasahar* (Cures breathing disorders), *Kasanashak* (Cures cough), *Raktapitta Nashak* (Cures bleeding disorders) *Aja Dugdha* is similar to *Go dugdha* and used in *Rajyakshma*. Goat milk has higher amounts of conjugated linoleic acids playing important roles in immune stimulation, growth promotion, and disease prevention<sup>13</sup>. Study suggest that goat's milk has a nutritional value similar to that of cow's milk and could be used as an alternative to cow's milk for rehabilitating undernourished children<sup>14</sup>. Study suggest Human Lysozyme (hLZ)-milk from transgenic goats of the Artemis line could provide a safe, sustainable, and direct source of lysozyme-rich milk for communities facing high rates of childhood diarrhea<sup>15</sup>. Goat milk is a good source of vitamin A, niacin, thiamin, riboflavin, and pantothenic acid<sup>16</sup>. Goat milk has a high content of conjugated linoleic acid (CLA) Anti-carcinogenic properties of CLA have been reported against mammary and colon cancer<sup>17</sup>.

### *Go dugdha* (Cow milk)

According to *Charaka Samhita*<sup>18</sup> *Go dugdha* is *Madhura* in taste, *Sheeta Virya* in potency, *Mrudu*, *Snigdha*, *Bahala*, *Shlakshna*, *Picchila*, *Guru*, *Manda*, *Prasanna*. Acts as *Rasayana*, *Oja Vruddhi*, *Rasa-Rakta-Mansa-Meda-Asthi-Majja-Shukrala*. It is best among the *Jivaniya Padarthas*. And according to *Shushruta Samhita*<sup>19</sup> *Go dugdha* is *Sheeta* in potency, *Snigdha*, *Guru*, *Madhura* in taste, *Madhura Vipaka*, *Jeevaniya*, *Vata-Pitta Nashaka*. *Alpa Abhishyandikaraka*, *Rasayana*, *Rakta Pitthara*. Research shows early introduction of whole cow's milk may lead to iron deficiency anemia. Cow's milk also has low contents of zinc, niacin, vitamin C and vitamin E<sup>20</sup>. Moreover, some immunological studies have suggested a possible mechanism whereby exposure to cow's milk protein could

result in beta-cell directed autoimmunity and subsequent Type 1 diabetes<sup>21</sup>. To avoid iron deficiency, infants should continue to receive iron-fortified formula throughout the first year of life or a daily iron supplement if they are fed whole cow milk before their first birthday<sup>22</sup>.

#### **Mahishi dugdha (Buffalo milk)**

According to *Charaka Samhita*<sup>23</sup> *Mahishi Dugdha* is *Guru, Sheeta* in potency, *Mandagnikaraka, Sneha, Cures Anidra* and according to *Shushruta Samhita*<sup>24</sup> *Mahishi Dugdha* is *Atyanta Abhishyandi, Madhura, Vanhi Nashanam*. Buffalo milk is healthier than cow milk in terms of lower concentration of cholesterol and higher magnitude of unsaturated fatty acids<sup>25</sup> Beta-lactoglobulin in buffalo milk inhibits angiotensin-converting enzyme, an enzyme that increases blood pressure by tightening blood vessels - thus reducing blood pressure levels<sup>26</sup>. Higher taurine content in buffalo milk (59moles/litre) compared to (41.4 moles/litre) cow milk is considered beneficial for infant because of its beneficial role in the absorption of fat<sup>27</sup>. Lower concentration of Urea (20 mg/100 ml) in buffalo milk as compared to cow milk (38mg/100 ml) make buffalo milk suitable for infant food formulation<sup>27</sup>. Due to higher level of lactoferrin in buffalo milk (320 mg/lit) as compared to 150 mg/lit in cow milk, the associated antimicrobial properties render buffalo milk more suitable for preparation of infant food<sup>27</sup>.

#### **Ushtra dugdha (Camel milk)**

According to *Charak Samhita*<sup>28</sup> *Ushtra Dugdha* is *Ruksha, Ushna* in potency, *Lavana, Laghu*. Cures *Vata Kaphaja Rogas, Anaha, Krimi, Shotha, Arsha* and *Shushruta*<sup>29</sup> says *Ushtri Dugdha* is *Ruksha, Ushna, Lavana, Madhura* in taste, *Laghu*. It cures *Shotha, Gulma, Udara Roga, Arsha, Krimi, Kustha, Visha*. Camel's milk can be considered an option for the individuals intolerant to lactose who present symptoms when ingesting cow's milk<sup>30</sup>. It is a rich source of insulin and also it containing approximately 52 units of insulin in each liter of camel milk, making it a great treatment option for Type 1 or Type 2 diabetics as well as Gestational Diabetes<sup>31</sup>. Camel milk could play an important role in decreasing oxidative stress by alteration of antioxidant enzymes and nonenzymatic antioxidant molecules levels and improvement of autistic behaviour<sup>32</sup>.

#### **Hastini dugdha (Elephant's milk)**

According to *Charaka Samhita*<sup>33</sup> *Hastini Dugdha* is *Balya, Guru, Sthairyakara* and according to *Shushruta Samhita*<sup>34</sup>

*Hastini Dugdha* is *Balya, Guru, Sthairyakara*. The GlcN content of the elephant's milk is 128, 43 and 14 times greater than those of the cow's, mare's and human milk, respectively<sup>35</sup>, Glucosamine GlcN has been found to facilitate cartilage healing, reduce subchondral structural changes and synovitis<sup>36</sup>. Elephant and human milks have high levels of oligosaccharides which may reflect the relative importance of these components in neonatal host defence, or in brain development<sup>37</sup>.

#### **Ekashapha dugdha (Mare's milk)**

According to *Charaka Samhita*<sup>38</sup> milk of *Ashwi, Shapha, and Gardabha* animal is *Ushna* in potency, *Balavardhaka, Stairyakara*. Cures *Shakhagata Vata, Madhura, Amla, Lavana* in taste, *Ruksha, Ushna, Laghu* in digestion and according to *Shushruta Samhita*<sup>39</sup> milk of *Ashwi, Shapha, and Gardabha* animal is *Ushna* in potency, *Balavardhaka, Stairyakara*. Cures *Shakhagata Vata, Madhura, Amla, Lavana* in taste, *Ruksha, Ushna, Laghu* in digestion. Mare's milk has been proven to play a role in curing Crohn's disease, ulcerative colitis, hepatitis and chronic gastric ulcers as well as other burdensome diseases, especially in children and elderly people<sup>40</sup>. The lowest atherogenicity and thrombogenicity indices were calculated for human and mare milk, which could make these types of milk the best nutritional source for people with the risk of developing cardiovascular disease. The differences in the nutritional value of milk could be perceived as a milk profile marker, helping to choose the best food for human nutrition<sup>41</sup>.

#### **Nari dugdha (Human milk)**

According to *Charaka Samhita*<sup>42</sup> *Manusha Dugdha* is Cures *Vata-Pitta-Rakta Vikaras, Abhighata, Netra Rogas* and according to *Shushruta Samhita*<sup>43</sup> *Stree Dugdha* is *Jeevana, Brimhana, Satmya, Snigdha*. Cures *Raktapitta* in the form of *Nasya, Chakshu Shoola*. Human breast milk contains adequate amounts of most vitamins to support normal infant growth, except for vitamins D and K. These infants are at the risk for vitamin D deficiency, inadequate bone mineralization and conditions such as rickets<sup>44</sup>. Human milk oligosaccharides (HMOs) possess anti-infective properties by flooding the infant gastrointestinal tract with prevents binding of pathogens and keep them off the intestinal wall<sup>44</sup>. Sunlight exposure and vitamin D supplementation are recommended for breastfed infant<sup>45</sup>. Breastfeeding associated with a reduction in the risk of acute otitis media, nonspecific

gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma (young children), obesity, type 1 and 2 diabetes, childhood leukemia, and sudden infant death syndrome<sup>46</sup>. TABLE 1

## DISCUSSION

Total solids, Proteins, Ash, Energy are maximum in sheep milk, Casein/whey ratio are maximum in cow milk, fat are maximum in buffalo milk, Lactose are maximum in human milk (Table-1). Goat milk or sheep milk can be given to children allergic to cow milk. *Aja Dugha* (Goat milk) is similar to *Go dugdha* (Cow milk) and used in *Rajyakshma*. Cow milk acts as *Rasayana*, *Oja Vardhak*, it is best among the *Jivaniya Padarthas*. Early introduction of cow's milk may lead to iron deficiency anemia in children. *Mahishi Dugdha* (Buffalo milk) is *Atyanta Abhishyandi*, *Vanhi Nashanam*. Higher taurine content in buffalo milk beneficial for infant because of its beneficial role in the absorption of fat. *Ushtri Dugdha* cures *Shotha*, *Gulma*, *Udara Roga*, *Arsha*, *Krimi*, *Kustha*, *Visha*. Camel milk uptake shows improvement in autistic behaviour, diabetes. *Hastini Dugdha* is *Balya*, *Guru*, *Sthairyakara*. Glucosamine GlcN content of the elephant's milk is more. GS (glucosamine sulfate) has shown positive effects on symptomatic and structural outcomes of knee OA (osteoarthritis)<sup>49</sup>. Total oligosaccharide concentration is more in elephant milk compared to human milk. Mare's milk has a composition similar to human milk. It is well digested so it is a perfect alternative for cow's milk in the feeding of children or elderly people. Human breast milk contains adequate amounts of most vitamins to support normal infant growth, except for vitamins D and K. Early introduction of whole cow's milk may lead to iron deficiency anemia.

## CONCLUSION

*Ashtavidha Ksheera* is a good nutritional source for human nutrition. There are some differences in nutrition level of different milk as compared to human milk. These variations can help to choose the best food for human nutrition in the context of human diet insufficiency. As a part of food, milk provides an excellent nutritional profile in the children diet. Human and equine milk are similar in terms of sugar supply (lactose and galactose), proteins and minerals, but they differ in fat content, which is markedly higher in human breastmilk. Goat milk could be very good source of energy because of the high content of fat. Equine milk stands out for its similarity to breastmilk in

compositional aspects considering the quality of the protein and lipid fractions, and due to the presence of important bioactive compounds. Here a small attempt is made to explore the hidden knowledge of the milk which were using by our *Acharya*. So the further scope of study is to evaluate such activity by animal experimentation and clinical trials and bring them into market with an affordable price.

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**TABLE 1**

Parameters	Human	Horse	Cow	Sheep	Goat	Buffalo	Camel
Total solids%	10.7-12.9	9.3-11.6	11.8-13.0	18.1-20.0	11.9-16.30	15.7-17.2	11.9-15.0
Proteins%	0.9-1.9	1.4-3.2	3.0-3.9	4.5-7.0	3.0-5.2	2.7-4.7	2.4-4.2
Casein/whey ratio	0.4-0.5	1.1	4.7	3.1	3.5	4.6	2.7-3.2
Fat%	2.1-4.0	0.3-4.2	3.3-5.4	5.0-9.0	3.0-7.2	5.3-9.0	2.0-6.0
Lactose%	6.3-7.0	5.6-7.2	4.4-5.6	4.1-5.9	3.2-5.0	3.2-4.9	3.5-5.1
Ash%	0.2-0.3	0.3-0.5	0.7-0.8	0.8-1.0	0.7-0.9	0.8-0.9	0.6-0.9
Energy (kJ l <sup>-1</sup> )	2843	1936-2050	2709-2843	4038-4439	2802-2894	4244-4779	2410-3286

\* *Source*: Claeys, W. L., Verraes, C., Cardoen, S., De Block, J., Huyghebaert, A., Raes, K., Dewettinck, K. and Herman, L. (2014). Consumption of raw or heated milk from different species: An evaluation of the nutritional and potential health benefits. *Food Control* 42, 188-201.