

A Novel Strategy For Minimising The Negative Effects Of The Keto Diet And Obtaining A High-Fat, Moderate-Protein Eating Plan Through Ayurveda

Name of the First Author: Dr. Ruddri A. Raval

Affiliations (current and primarily carried out):

Dr. Ruddri Ashishbhai Raval; Final Year P.G. Scholar, Dept of P.G. Studies in Swasthavritta

KAHER'S Shri B.M.K Ayurveda Mahavidyalaya, Post-Graduation Studies & Research

Centre Shahapur, Belagavi-Karnataka – 590003

E mail address : ayurruddri28@gmail.com

Name of the Second Author: Dr. Ashok Patil

Affiliations (current and primarily carried out):

Dr. Ashok Patil M.D., Ph.D(Ayu), Professor and H.O.D., Dept. of P.G. Studies in Swasthavritta

KAHER'S Shri B.M.K Ayurveda Mahavidyalaya, Post-Graduation Studies & Research

Centre Shahapur, Belagavi-Karnataka - 590003

In light of WHO's declaration that obesity is a global epidemic, the term "globosity" was coined. Obesity encourages a series of secondary illnesses, such as metabolic syndrome, hyperlipidemia, inflammation, thrombosis, hypertension, and diabetes. Modern medicine treats obesity with synthetic pharmaceuticals, bariatric procedures, various fasting techniques, the ketogenic diet, etc., many of which have long-term side effects. As a result, it is unable to treat obesity without causing any negative side effects. Particularly, the Keto diet has been demonstrated to effectively reduce weight, but it also has adverse effects. In Ayurveda, a variety of approaches and enough attention have been focused on managing Sthaulya (obesity) in the form of dietary guidelines, diverse Aharvarga (food groups), Pathya-apathya, etc. One of them Mamsa varga (meat and its preparation), Gorasa varga (milk and its preparation), and Shimbi dhanya varga (classification of

pulses) are some of the foods that are crucial in reducing the negative effects of the keto diet and improving the results of a high-fat, moderate-protein diet protocol.

Key words: Keto diet, Mamsa varga, Shimbi dhanya varga, Gorasa varga

INTRODUCTION

Let food be your first medicine and kitchen be your first pharmacy. In the modern era, controlling one's diet and way of life is crucial to preventing metabolic disorders including obesity, diabetes mellitus, hypothyroidism, etc. The effectiveness of different types of diets based on different macronutrient restrictions for the prevention of non-communicable diseases has been a topic of debate for the past few years. Particularly, the Keto diet has been demonstrated to effectively reduce weight, but it also has adverse effects. The "keto flu," which includes symptoms including exhaustion, headaches, dizziness, nausea, vomiting, constipation, and a reduced capacity for exercise, is a phrase for typical short-term adverse effects coming from the beginning of KD. ^[1]One of the three pillars that Ayurveda views as sustaining is Ahara (food). Since the Vedic era, food has been accorded top priority. The Upanishad refers to it as Brahma. It is given the name "Mahabhaisajya" by Acharaya Kashyapa. This is what drives Ojas' expansion, improvement, and progress. Numerous Ahara-related regulations can be found in several ayurvedic texts. Along with these regulations, the classification of ahara, known as Ahara Varga, is carried out in all three bruhatravees. Mamsa varga (meat and its preparation), Gorasa varga (milk and its preparation), and Shimbi dhanya varga (classification of pulses) are a few of the foods that are crucial in minimising the negative effects of the keto diet and achieving better results in the prevention of non-communicable illnesses.

AIM and OBJECTIVE

- 1) To study the Mamsa varga, Gorasa varga, Shimbi dhanya varga, and its utility.
- 2) Amicable application of this ahara varga to reduce the side effect of keto diet.

MATERIALS AND METHODS

- 1) Bruhatrayee with their commentaries.
- 2) Supportive texts of contemporary science.
- 3) Reference from internet and journals.

RESULTS

Review of the ahara classificationThe Charak Samhita describes a total of 12 vargas. Shuka Dhanya, Shami Dhanya, Mansa, Shaka, Phala, Harit, Madya, Ambu, Gorasa, Ikshu, Krutanna, and Ahara Yogi are among them.^[2] Liquid and solid are distinguished in Sushrut Samhita and mentioned in two separate adhyaya in sutra sthana. The following vargas are described in Sushrut Samhita sutra sthana: mutra vargas, jala vargas, ksheer vargas, dadhi vargas, takra

vargas, ghrut vargas, taila vargas, madhu vargas, ikshu vargas, and madya vargas. Following vargas are listed in Sushrut Samhita Annapanavidhi adhyaya: shali vargas, kudhanya vargas, mansa vargas, phala vargas, shaka vargas, pushpa vargas, kanda vargas, lavan vargas, krutanna vargas, bhakshya vargas, and anupan vargas. As a result, these two adhyayas describe a total of 21. As a result, ahara categorization is more elaborative in Sushrut Samhita than Charak Samhita.^[3] They are divided into the categories of drava and anna in Ashtang Hrudaya as well, and are discussed in the passages titled dravadravavidnyaniya and annaswarupavidnyaneeya, respectively. The names of these are: Jala Varga, Ksheer Varga, Ikshu Varga, Taila Varga, and Madya Varga.^[4] Moreover, shukadhanya, shimbidhanya, shakavarga, phala varga, and oushadha varga are also included. Ten vargas in total are thus mentioned.^[5] They are described in two different adhyaya in Ashtang Sanghara, dravadravavidnyaniya and annaswarupavidnyaniya. As a result, the Ashtang Sangraha describes a total of 11 vargas.^[6]

Different types of *Mamsa* preparation:

Different preparation of mamsa is described in ayurvedic classics such As Mamsa Rasa, Parishuka Mamsa, Paridagdha mamsa, Ullupta mamsa, Bharjita mamsa, Pishta mamsa, Pratapta mamsa, Sauraba, Khaniska and Vesvara.

Mamsa rasa:

Types of Mamsa rasa: Mamsa rasa is of two types:

- Krita Mamsa rasa
- Akrita Mamsa rasa

According to acharya Charaka^[7] *Mamsa rasa* enhance contentment to all living being, is best for heart (mind). It is nector to those who are dry, relieved of disease or recently emaciated, having loss of semen, who are desirous of good strength and colour, it mitigates disease greatly. It is good for voice, bestows strength, and keeps up the age, intelligence, sense organs and life span. Those persons who indulge in physical exercise, copulation and wine daily will not suffer from disease, nor from debility if they take *meat* soup daily in their food.

Parishushka Mamsa:

According to Dalhan Acharya Parishushka Mamsa is prepared as mamsa is fried with more quantity of Ghee, sprinkled with hot water often, made soft and then processed with *Jiraka* etc. This solid piece of mamsa is known as Parishushka Mamsa.^[11] It is hard, unctuous, pleasing, nourishing, bestows taste, increase strength, intelligence, digestive power, growth of muscle, Ojas, and semen.^[8]

Paridigdha Mamsa: According to acarya Sushruta Mamsa rasa thickened with milk curd and clarified butter and cooked with aromatic condiments (as black pepper, asafoetida etc) is named as Paridigdha mamsa. It tends to increase the Pitta and Kapha, so why it acts as a good appetizing and constructive tonic.^[8]

Ullupta Mamsa:

When the Parisushka Mamsa minced and made into cakes is named as Ullupta Mamsa. It resembles the Parishuska mamsa in its properties, but it is lighter than the Parishuska mamsa owing to its having been cooked over the charcoal fire. ^[8]

Bharjita Mamsa:

Mamsa first fried in ghrita and then it is grinded and mixed with curd, condiments etc and made into small bowl is called Bharjita mamsa. ^[8]

Pratpta Mamsa:

According to Dalhan Acharya mamsa which is prepared with ghee, cumin, common salt, pepper and cooked on burning coal is named as Pratapta mamsa. ^[8]

Kandu Pachita Mamsa:

Mamsa smeared with paste of fragrant substance, roasted on a pan, till it assumes the colour of Honey and then smeared with the paste of mustard and consumed is named as kandu pachita. ^[8]

Sauraba:

Sauraba is clear portion of mamsa rasa situated on top of the pame is called Sauraba. According to Sushruta this preparation is nourishing for all living beings especially for those having dryness of mouth; relieves hunger, thirst, is sweet in taste and best for health. ^[8]

Vesavara:

According to Sushruta mamsa which is devoid of bone, cooked by steam, made into paste, adding Pippali, Shunthi, Maricha, Guda And Sarpi mixed well and cooked together; this is known as *Veshavara*. It is unctuous and strengthening and curing disease of Vata origin. ^[8] According to Caraka Acharya Vesavara is unctuous, enhances strength and physique.

Property of Shulya mamsa depending upon the substance used for the processing:

Shulya mamsa, those which are boiled with oil should be considered as ushna in potency, heavy of digestion and generating Pitta. While those, which have been fried with clarified butter, should be regarded as light, appetising, agreeable, relishing, beneficial to the eyes, and cooling in their potency (sheeta virya). They also subdue the Pitta and are pleasant to the taste.

Few meat preparation from Ayurveda classics:-

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|----|--|
| 1. | Harisa meat preparation^[9] |
| 2. | Praleha meat preparation^[9] |
| 3. | Dhananjay praleha preparation^[9] |
| 4. | Purana meat preparation^[9] |
| 5. | Madhura mamsa paka^[9] |

HARISA MEAT PREPARATION

Boneless piece of meat that is covered with wheat and is fried in ghee along with spices as harisa. This harisa meat preparation provides strength, alleviates vata (anilahara), laxative, produces semen (shukraprada), good for heart(hridaya), and re-aligning broken tissue(sandhankarini).

PRALEHA MEAT PREPARATION

After having cut large pieces of meat and having washed them with water, dip them in hot oil and cook by repeatedly turning with a ladle. Then cook it by adding salt and little water. Till the meat makes a sizzling noise (patapata). After that pour pomegranate essence and cook again. When the meatballs are ready, add dry ginger, and cumin seeds. After having removed the meatballs, separate them from the broth. After having strained the broth through a cloth, one should place it in a different container and spice it up by sprinkling asafoetida mixed with ghee.

DHANANJAY PRALEHA PREPARATION

By adopting the method described above for preparing broths, one should cook a mixture of meat, ash gourd, banana and ginger. The result is a broth called "DHANANJAY". This dish is considered as good appetizer, alleviates vata and kapha.

PURANA MEAT PREPARATION

Meat that is cut into small pieces is boiled in water containing asafoetida and coriander. Asafoetida, cumin seeds, wet ginger, citron, cardamom and rock salt are then added to it. It is fried in ghee and spiced up to prepare the meat fillings. This Meat fillings stimulate appetite, are nutritious, good for the heart, impart strength, alleviate vata, pitta and kapha and cure weakened digestive fire.

MADHURA MAMSA PAKA

One should add powdered dry ginger to meat that has been boiled in water along with ghee. Then add milk mixed with sugar and fragrant substances to it.

SHIMBI DHANYA VARGA AND METABOLIC DISORDER

The pulses when consumed in whole grain form are Guru and Ruksha hence Pathya in obesity. Study suggest person consuming whole grains, beans, and legumes, had the lower BMI, small waist circumference (WC), and the small mean annual increase in BMI^[10] Pulses like green gram and horse gram are Kaphahara, hence Pathya in diabetes. A substantial increase in dietary intake of legumes as replacement food for more rapidly digested carbohydrate might therefore be expected to improve glycaemic control and thus reduce incident diabetes.^[11] Mung bean (*Vigna radiata*) is an excellent source of vitamins, minerals and protein with its essential amino acid profile comparable to that of soybean and kidney bean making it an attractive option for diabetic patients.^[12] It is also well documented that certain proteins in green gram exert both antifungal and antibacterial activity.^[13] So For reducing complain of constipation during keto diet one should take Green gram, Horse gram, Masura or black gram which also contain good amount of mineral and trace elements so why it will maintain the digestion process.

Mudga (Green gram/Vigna radiata Linn.)

The word Mudga in Sanskrit means “that which brings joy, delight and gladness”.^[14] Mudga has been explained to be that as Madhura (sweet), Kashaya (astringent) in taste, Laghu (light for digestion), Ruksha (dry), Sheetvirya (cold in potency), Katu Vipaka (post digestive transformation into pungency) and it exhibits Kaphapittahara Vatakarat (pacifies kapha and pitta whereas aggravates vata) property^[15]. It is known to be Drustiprasadaka (improves quality of vision).^[15] Mudga (green gram) is the best among Shimbhi Dhanya. Moong dal is a dieter friendly dal rich in iron (3.9 mg/100gm) and potassium (1150mg/100gm)^[17]. Iron helps maintain hemoglobin levels and potassium helps reduce blood pressure, a boon for hypertensive people.

Kulattha (Horse gram, Dolichos biflours Linn.)

Kulattha (horse gram/ Dolichos biflours Linn.) is Ushna (hot in potency), Kashaya (astringent), Amlapaka (sour at the end of digestion). It reduces semen and alleviates the vitiated Kapha as well as Vata. The scientific studies have recently shown to prevent atherosclerosis in rats and may be a potential functional food for the prevention of hyper lipidaemic atherosclerosis. An α -amylase inhibitor from horse gram seeds has recently been shown to have anti hyperglycemic potential. Extracts from horse gram plants have shown potential for treating several human infections.^[18]

Masura (lentil, Lens culinaris Medic)

Masura is laghu, ruksha, madhura rasa, madhura vipaka, shita, vatal, kaphapitta shamak, raktapittahara, javaraghan and grahi.^[19] Masoor dal helps to reduce blood sugar levels in especially controlling the blood sugar that spikes after a meal, controls hypertension, prevents anemia and lowers cholesterol.

Masha (Black gram/Phaseolus mungo-Linn.)

Black gram is Snigdha (unctuous), Balya (increases strength), increases Kapha and Pitta, Malakara (increases bulk of faeces), Sara (laxative), Guru (not easily digestible), Ushna (hot in potency), Vatahara (mitigate Vata), Madhura (sweet in taste), and Shukra Vriddhikara, Virekakrut (increases semen and promotes ejaculation strength). It is store house of calcium, potassium, iron, magnesium, copper, manganese etc. It contains vitamins and dietary fibers. Due to high potassium content it acts as an aphrodisiac. It produces excreta in large quantity and semen instantaneously and heavy to digest and increases the moistness of body tissues. Black gram contains plenty of potassium. This helps to balance sodium potassium level and reduce hypertension or high blood pressure. There is a strong link between hypertension or high blood pressure and erectile dysfunction. As potassium helps to reduce high blood pressure, it also helps in erectile dysfunction.

Masha brings about moistness along with increase in bulk of the faeces, hence it is recommended in conditions like constipation and piles.

GORASA VARGA [Different types of Milk and its preparation like Dadhi(curd), Takra(buttermilk), Navneet(butter), Santanika(cream), Ghrita(ghee)]

Here Gorasa plays a key role in managing keto flue which encompasses symptoms including fatigue, headache, dizziness, constipation, and low exercise tolerance. Milk is recommended as a complete food for the growth and development of the human body, because of its protein, fat, carbohydrate, calcium and vitamins and minerals.

Ksheera Guna: (General Properties of Milk)

Ksheera is madhura (sweet), snigdha (Unctuous), vata pitta hara, sara guna (moving), sadhya shukrakara (instantly increases the semen) sheeta (cold), satmya (conductive), jeevana (gives life), bruumhana (nourishing), balya (strength), medhya (imparts intelligence), vajeekarana (an excellent aphrodisiac), vayasthapana (prevents aging), ayushya (increases the life span), sandhikrut (re-joins the broken tissues) and rasayana (rejuvenating).^[20]

Dadhi Guna: (General Properties of Curd)

Madhura, Amla, Atyamla, Kashaya, Snigdha, Ushna, Cures Peenasa, (Corrhyza), Irregular fever (Vishama jwara), Diarrhoea (Atisara), Aruchi (Tasteless), Dysurea (Mootrakruha), Karshya (Cachexia), Rushya (spermatogenic), Pranakaram (Life giving), Mangalakara (Auspicious).^[21]

Dadhi Malayi Guna: (General Properties of Curd cream)

According to Acharya charak Dadhi Malayi (Curd cream) is Shukra vardhaka^[22] and Acharya Shusruta it is Sara (laxative), Guru, vrushya, Vatagna, and Shukravardhaaka.^[21]

Takra Guna: (General Properties of buttermilk)

Takra from which ghee (Butter) has been taken out completely is good for health, is for digestion especially that from which little amount of ghee (Butter) has been taken out is heavy for digestion, aphrodisiac and increases kapha, that from which ghee (butter) has not been taken out at all is thick in consistence, heavy for digestion, gives nourishment and increases bala and kapha.^[23]

Santanika (Supernatant Fatty Layer of Milk)

According to acharya it is Vataghna, Tarpana (provide nourishment), Vrushya, Balya (Gives strength), Snigdha, Ruchikara, Madhura rasa, Madhura vipaka, Raktapittaghna, and do Prasadana.^[21]

Navneeta guna (Properties of Butter)

According to Shusruta Acharya it is Rich in fat, Madhura, Sheeta veerya, Sukumaryakara, Netrya, Sangrahi, Rakta Pitta vikara nashaka, Prasadana.^[24] According to kaiyadev nighantu it is Chakshushya, Sheetala, Snigdha, Vrushya, Jeevaneeya, Bhrihanam.^[24]

Dugdhoktha Navaneeta (Butter From Milk)

Synonyms are Ksheerodhbhva, Ksheerotta, ksheeranimanthanodhbhva. Butter taken out from milk is good for the eyes (vision), cures bleeding diseases, Aphrodisiac, gives strength is very unctuous, sweat, constipating and cold in potency.^[23,24]

Ghrita guna (Properties of Ghee)

According to Ayurveda Ghrita has Madhura rasa, Madhura vipaka, Sheetaveerya, Pittavataghna, Mrudu Guna, Guru, visha nashaka, netry and balya properties. Ghrita is Rejuvenating, good for eyes (vision), kindles digestive fire, removes poison, inauspiciousness, sorcery, Produces little amount of moisture in the channels, bestows lustre, valour, beauty, good voice and memory, increases intelligence, prolong life, gives strength cures upward movement of gas, inside the abdomen, fever, insanity, abdominal pain, flatulence, ulcers, is unctuous, increases kapha, loss of rakta, herpis and diseases of the blood. Best in sneha.^[21,23,24]

Gavya Ghruta (Ghee from Cows Milk)

Gavya ghruta (cow’s ghee) especially is good for vision. Aphrodisiac, kindles, digestive fire, sweet both in taste and after digestion, cold potency ,mitigates vata pitta,and kapha, bestows intelligence, beauty, brilliance, valour, wards off unauspiciousness sorcery, sings, retards ageing, heavy for digestion, gives strength best in qualities among all kinds all kinds of ghee.^[23]

DISCUSSION

Here, various nutritional information for milk, shimbi dhanya varga, and their products is provided, including macronutrient and micronutrient analyses. Black gramme, horse gramme, and lentil are three of them that have a high protein content. Among milk section buffalo milk, dadhi (curd) contains a good quantity of fat and a high amount of protein; as a result, it can be consumed as a good source of protein to lessen the effects of keto-flu. The key components of a diet that offers high fat and moderate protein sources should be freshly prepared Navaneeta (butter) made from milk and Ghrita (ghee). A special section in the ayurveda classics called Mamsa Varga provides many recipes that can be regarded as sources of high fat and moderate protein. Among them Black gram, Horse gram and lentil have high amount of protein value.

Nutrition value of Shimbi dhanya componants:-

Name	Protein	Mg	Na	K	Cu	Mn	Mo	Zn	Cr	S	Cl
Green Gram whole	8 gm	127	28	843	0.39	2.47	0.304	3	0.014	188	12
Green Gram Dal	15.6gm	122	27.2	1150	0.39	1.02	0.446	2.8	0.01	214	25
Horse Gram	22gm	156	11.5	762	1.81	1.57	0.749	2.8	0.024	181	8
Lentil, Whole	12 gm	80	40.1	629	1.87	1.04	0.171	2.8	0.024	104	19
Lentil, Dal	17.9	74	-	-	1.37	0.81	-	3.1	0.020	-	-
Black Gram Whole	23	154	39.8	800	0.93	0.96	0.425	3.0	0.029	174	9
Black Gram Dal	25.21	130	-	-	1.23	0.96	0.222	3.1	0.01	-	-

Properties of Cow milk:-

Wat	Tota	Fat	Soli	Protei	La	Ash	Ca	Mg	Na	K	P	Citrat	Cl
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er	l Soli ds		ds not Fat	n	c							es	
86.0 7	13.9 3	4.9 0	9.43	3.42	4.9 1	0.70	0.12	0.01	0.05	0.15	0.10	0.18	0.1

Properties of buffalo milk:-^[25]

Wat er	Tota l Soli ds	Fat	Soli ds not Fat	Prot ein	Lac	Ash	Ca	Mg	Na	K	P	Citr ates	Cl
82.9 8	17.0 2	7.06	9.96	3.90	5.28	0.78	0.18	0.02	0.05	0.11	0.10	0.18	0.07

Properties of Goat milk:-^[26]

Total Solid s	Ener gy	Lipid	Prote in	Carb	Ash	Ca	Mg	Na	K	P	Zn	Fe
12.9 7 %	69 Kcal	4.14 %	3.56 %	4.45 %	0.82 %	134 mg	14 mg	50 mg	204 mg	111 mg	0.3m g	0.05 mg

Properties of Sheep milk:-^[27]

Water	Total Solids	Fat %	Solids not Fat	Protei n %	Lac %	pH	Ca mg/ 100gm	Mg mg/ 100gm	P mg/ 100gm	Fe mg/ 100gm
82%	18.50	6.99	12.0%	4.50- 6.60	3.90- 4.90	6.51- 6.85	193	18	158	0.08

Properties of Horse milk:-^[28]

Energy	Solids not Fat	Fat %	Sugar	Protein %	Ca	Ash %	Phos	Mg	Zinc
50.6 Kcal/ 100mg	10.2	1.29	6.9 %	1.93	700 mcg	0.32	540 Mcg	43 mcg/g m	1.8 mcg/g m

Properties of Camel milk:-

Water %	Total Solids	Fat %	Solids not Fat	Protein %	Lac %	Ash %	Ig G	Mg	Na	K	Cl
86.50	14%	3.80	10.36 %	3.26	4.30	0.6-0.9	1.64 mg mL ⁻¹	10.5	59	156	114 mg

Properties of Elephant milk:-^[29]

Water	Fat	Protein	Carbohydrates	Ash	Ca	Cl	P
77-85 %	0.63-19.0 gm/100g m	3.4-6.5 gm/100g m	2.42-5.25 gm/100g m	500-800 gm/100g m	93-165 gm/100g m	42-64 gm/100g m	186 -305 gm/100g m

Properties of Human milk:-

Total Solids	Energy	lipid	Protein	Carb	Ash	Ca	Mg	Na	K	P	Zn	Fe
12.5 %	70 Kcal	4.38 %	1.03 %	6.89 %	0.2 %	32 mg	03 mg	17 mg	51 mg	14 mg	0.17 mg	0.03 mg

Properties of milk preparation:-

No	Name	Fat	Protein	Carbs
1	Dadhi Guna: (General Properties of Curd)	23	58.8	18.2
2	Takra Guna: (General Properties of buttermilk)	5.73	34.3	49
3	Santanika (Supernatant Fatty Layer of Milk)	25	2	3.2
4	Navneeta guna (Properties of Butter)	80	0.5	0
5	Ghrita guna (Properties of Ghee)	99.7	0	0

Conclusion:

We may see many various types of diets being used nowadays to combat the serious problem of sthaulya (obesity), including intermittent fasting, protein-rich diets, keto diets, and others. One of

these, the Keto Diet, has been demonstrated to produce effective results, however some Keto-Flu adverse effects have also been reported. Ayurveda, a branch of traditional medicine and science, thus contributes significantly to the principles and regulations of dietetics and offers a wealth of ancient recipes and foods. Mamsa varga (meat and its preparation), Gorasa varga (milk and its preparation), and Shimbi dhanya varga (classification of pulses) are among them, and they all comprise high-fat and moderate-protein foods that are highly beneficial to combat the the negative consequences of the keto diet and to treat metabolic diseases.

Referance:-

1. Batch JT, Lamsal SP, Adkins M, Sultan S, Ramirez MN. Advantages and Disadvantages of the Ketogenic Diet: A Review Article. Cureus. 2020 Aug 10;12(8):e9639. doi: 10.7759/cureus.9639. PMID: 32923239; PMCID: PMC7480775.
2. Charak Samhita with commentary of Chakrapani datta edited by vd. Yadavaji Trikamaji Acharya, chauhamba surabharati prakashan, Varanasi, reprint 2011, sutra sthana, chapter 27, sutra 6-7 , p153
3. Sushrut samhita with commentary of Dalhan edited by vd. Yadavaji Trikamaji Acharya, chauhamba surabharati prakashan, Varanasi, reprint 2010, sutrasthana, chapter 45, p198
4. Ashtang Hridaya with commentary of Arundatta and Hemadri , Pt. Hari Sadashivshastri Paradkar, chauhamba Sanskrit Sanshtan, Varanasi, Reprint 2009,sutra sthana, chapter 5, p
5. Ashtang Hridaya with commentary of Arundatta and Hemadri , Pt. Hari Sadashivshastri Paradkar, chauhamba Sanskrit Sanshtan, Varanasi, Reprint 2009,sutra sthana, chapter 6, p
6. Ashtang Sangraha with commentary of Indu, edited by vd. Anant Athavale,published by Mahesh Athavale, Pune 1980
7. Charaka Samhita of Agnivesha, by Kashinath Shastri, Part – 1, Edition: reprint 2007, chapter 27, Page: 398 – 402, Choukambha Sanskrit, Sanstana, Varanasi, INDIA.
8. Shushruta Samhita of Shushruta, Part – 1, Editor G.D.Singhal, Edition: 2nd, 2007, Chapter 45, Page: 412 – 416, Chaukambha Sanskrit Pratisthan, Delhi,INDIA.
9. Kaiyadeva Nighantu, Pathyapathya Vibhodaka, Edited and Translated by Prof. Priyavrata Sharma, 2nd Edition, 2006, 6th Chapter,Page :124 – 157,Chaukambha Orientalia, VARANASI, INDIA

10. Haveman-Nies, K. Tucker, L. De Groot, P.W.F. Wilson, W.A. van Staveren. Evaluation of dietary quality in relationship to nutritional and lifestyle factors in elderly people in the US Framingham Heart Study and the European SENECA study. *American Journal of Public Health*. 2003; 93 (2): 318-323.
11. B.J. Venn, J.I. Mann. Cereal grains, legumes and diabetes. *European Journal of Clinical Nutrition* 2004; 58: 1443–1461
12. Mubarak A.E, Nutritional composition and anti-nutritional factors of mung bean seeds (*Phaseolus aureus*) as affected by some home traditional processes. *Journal of Food Chemistry* 2005; 89: 489–495.
13. M. Muzquiz, C. Burbano, G. Ayet, M.M. Pedrosa, C. Cuadrado. The investigation of anti-nutritional factors in *Phaseolus vulgaris*. *Environmental and varietal differences Biotechnologic, Agronomie Society* 1999; 3 Suppl: 210–216
14. Raja Radhakantadev. *Shabdakalpadruma*, 3rd Vol. Delhi, Naga publisher:1967
15. Yadavji trikamji Acharya. *Agniveshakrita Charaka Samhita Chakrapani tika, Sutra sthana 27/23*. Varanasi: Chaukhambha Orientalia: 2011
16. Pandit brahma shankara Mishra. *Bhavprakasha purvadha Shimbidhanya varga/ 4*, 9th edition. Varanasi: Chaukhambha Bharati Academy:2005
17. *Kokate, C.K., Purohit, A.P., Gokhale, S.B. Text Book of Pharmacognosy. Pune: Nirali Prakashan: 2005.*
18. Kadam, S.S., Salunkhe D.K. Nutritional composition, processing, and utilization of horse gram and moth bean. *Crit. Rev.Food Sci. Nutr.* 1985; 22: 1–26.
19. Joint WHO/FAO Committee. Cereals, pulses, legumes and vegetable proteins. 2007. Retrieved from: <ftp://ftp.fao.org/codex/Publications/Books/Cereals/CEREALS>: 2007.
20. Dr Bulusu Sitaram commentator *Bhavaprakasha*, Original book with commentary and translation Vol-I, *Chaukhambha Orientalia Varanasi, Dugdha varga 6/1-2*, Re-print 2015: p.524.
21. *Shushruta Samhita of Shushruta, Part – 1*, Editor G.D.Singhal, Edition: 2nd, 2007, Chapter 45, Page: 379 – 388, Chaukhambha Sanskrit Pratisthan, Delhi,INDIA.
22. *Charaka Samhita of Agnivesha, by Kashinath Shastri, Part – 1*, Edition: reprint 2007, chapter 27, Page: 398 – 402, Chaukhambha Sanskrit, Sanstana, Varanasi, INDIA.

23. Bhavaprakasha, Editor: Bhishagrata Shree Bhrahmashankar Shashtri, Part:1st, Poorvardha, Edition:8th, Dugdhavarga, Page:759 – 777,Choukambha Sanskrit Bhavan, Varanasi, INDIA.
24. Kaiyadeva Nighantu, Pathyapathya Vibhodaka, Edited and Translated by Prof. Priyavrata Sharma, 2nd Edition, 2006, 4th Chapter,Page :352 – 372,Chaukambha Orientalia, VARANASI, INDIA
25. Khedkar C D et. al. Buffalo Milk, Encyclopedia of Food and Health, 2016, Elsevier Volume 1: p. 523.
26. Rewati Raman Bhattarai, the importance of Goat Milk, J. Food Science & Technology, Nepal, Vol-07, 2012, p.107-111
27. Arpita Mohapatra et.al. Sheep Milk: A pertinent functional food, ELSEVIER, October 2019, p.7-9
28. O.T. Oftedal at.al, Lactation in Horse: Milk composition and intake by foals, The Journal of Nutrition, Vol 113, 1983, p.2096-2106
29. Maya Aranovich and Olivier Dufresne, Elephants, Nova Science Publishers, Inc. New York, 2012, p.100