

International Journal of Research in Indian Medicine

Understanding the role of Flaxseed as a Nutraceutical in Obesity

Rachana Kashyap ^{1*}, D. V. Kulkarni ²

1. PG Scholar,

2. Professor and Head of Department,

Dravyaguna, Government Ayurveda College,

Osmanabad, Maharashtra, India 413501

***Corresponding author:* email-rkashyap16@gmail.com

Abstract

More than 5% of the total population of young India is suffering from morbid obesity and unless this is not treated properly, we are unable to control the diseases like Diabetes Mellitus, Hypertension and Heart disorders. Maintaining the ratio of good and bad cholesterol is one of the prime target, in obesity. As cholesterol itself is not evil and is actually essential for many physiological activities, only decreasing the cholesterol level for the management of obesity, is not logical as per Ayurvedic perceptive. Several studies have revealed that, Flaxseed (*Linum Usitatissimum*), being rich in, omega-3 fatty acids, and dietary fibres, is used as dietary supplement in obesity since ages. Though, Bhava Prakash has described the attributes of atasi as madhura, tikta

and snigdha and guru, atasi is found as a good nutraceutical in the management of obesity. How the diverse combinations and permutations of pṛthvi and jala mahābhūta, cause different shades of snigdha and madhura qualities, resulting in an increase in the good cholesterol and their ability to boost the HDL along with reduction in LDL and triglycerides, is discussed in this paper. The role of proteins, found in Flaxseeds, relatively high in arginine, aspartic acid and glutamic acid are also discussed in this paper. Dietary fibres present in flax seeds exhibit positive effect to reduce constipation, to keep better bowel movement and acts as a hypocholestermic agent. In conclusion, Flaxseed, an easily available, cost effective, is an emerging nutraceutical in the treatment of Obesity.

Keywords: Flaxseeds, Obesity, Nutraceutical, panch mahābhuta, hypocholestermic agent

Introduction-

Obesity is most common metabolic disorder affecting people in all age groups. Obesity is not a single disease but a syndrome with many causes including genetic, nutritional and sociological factors. Despite of continuing efforts to find solutions it has reached epidemic proportions in many countries. India is a country where morbid obesity is affecting 5% of the country's population. The causative factors for obesity include excessive food energy intake, lack of physical activity, genetic susceptibility, endocrine disorders, medications or psychiatric illness. WHO estimates that at least 500 million adults are obese in 2008, with higher rates among women than men, and the rate of obesity also increases with age. ^[1] Major causes of the increasing prevalence of obesity include behavioural and environmental factors, such as excessive consumption of energy-dense foods and a sedentary lifestyle. A person is considered as obese when his or her weight is 20% over the normal bodyweight for height and age, and the Body Mass Index (BMI) measures 30 or more. In the puberty phase and adolescent, hormonal changes

cause more fat to accumulate in body particularly in females therefore women are more prone to be obese than men. The peoples living in developed countries are suffering more than the peoples of developing countries. The lack of physical exercise, increased energy intake and decreased energy output leads to obesity in urban population. Obesity is related with various disorders like hypertension, diabetes mellitus, cardiovascular diseases due to different risk factors such as high LDL cholesterol, plasma triglycerides; low HDL cholesterol elevated blood glucose and insulin level.

The three main factors involved in the pathogenesis of obesity such as excessive lipid deposition, diminished lipid mobilization and diminished lipid utilization.

A waxy, fat like substance that occurs naturally in all parts of the body is known as cholesterol and the body uses it to help build cells and produce hormones. Too much cholesterol in blood which builds up inside arteries is known as plaque. Maintaining the ratio of good and bad cholesterol is one of the significant goal in the management of obesity.

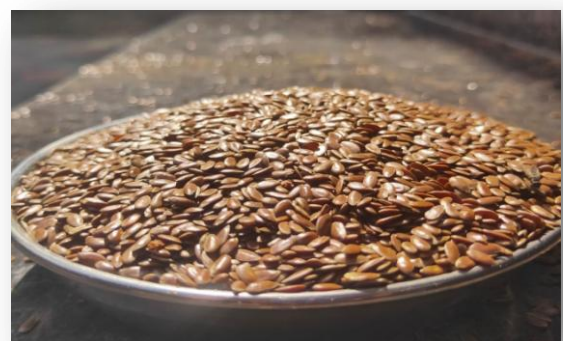
Technically and chemically, Cholesterol is a “steroid alcohol”, namely $C_{27}H_{45}OH$, and it is responsible for moving fluid

across cell membranes, and participating in various metabolic functions in the body. For example triglycerides, a type of fat, that body uses to store energy in muscles. Chances of having heart disease may increase due to high triglyceride level along with high LDL cholesterol levels.

In Ayurvedic classics obesity can be considered analogous with term *Sthaulya*, also *Atisthauya* is the terminology well explained by *aacharya charaka* in *sutrasthan Ashtauninditiya adhyaya*. In Ayurveda *sthauya roga* is due to disorder of *meda* and *kaphaja* dosha. *Medas* is body tissue predominant in *Prithvi* and *Jala Mahabhutas* similar to *Kapha* dosha. It is characterized by *Snigdha* (Unctous), *Guru* (Heavy), *sthula* (space occupying), *picchila* (slimy), *mridu* (tender/ soft) and *Sandra* (dense) *guna* (qualities). According to *charaka*, when a person does not exercises, sleeps at daytime, eats fatty food articles then *Ahararasa* becomes *Madhur* and *Snigdha* and increases *Meda*. Due to increased *Meda*, *strotas* are blocked and the further *dhatu* are not nourished which results in continuous increase of *Meda*. In *Sthauya* as channels are obstructed by vitiated *meda dhatu*, *vata dosha* moves about abundantly in umbilical region and thus stimulates *Agni* and absorbs food.

Hence, the person digests the food early and starts desiring for more food. This *meda* starts accumulating in blood vessels and other body parts. . [2] *Sthauya* is notorious disease which disturbs the total metabolic system of the body. [3]

Flax plant (*Linum usitatissimum*) has been used since ages as industrial oil and fibre crop in India. The plant is widely distributed throughout India. In Ayurveda *Atasi* (*Linum usitatissimum*) has been explained by *Bhavaprakasha* in *Dhanya varga*, having the properties like *madhura*, *tikta rasa*, *katu vipaka*, *Ushna veerya* and *Tridoshshamaka*. [4]. By means of these properties *Atasi* helps to breakdown the pathophysiology of *sthauya*, also *Bhathena* et al. 2003 has demonstrated that there is a significant reduction in blood cholesterol levels.



LATIN NAME - *Linum usitatissimum* Linn.

Family – Linaceae

अतसि मधुरा तिक्ता स्निग्धा पाके कटूगुरुः। उष्णा दृक्शुक्रवातघ्नि कफपित्तविनाशिनी॥

Bhavprakash nighantu states the synonyms of *Atasi* as *Nilpushpi*, *Parvati*, *Uma* and *Kshuma*.

- **Rasa :** *Madhur and Tikta Rasa*
- **Vipaka :** *KatuVipaka*
- **Veerya :** *UshnaVirya*.
- **Guna :** *Snigdha, Guru, Picchil*

Flaxseed contains good amount of α -Linolenic Acid (ALA), a omega-3 fatty acid, lignan, 41% fat, 20% protein, 28% total dietary fibre, 7.7% moisture and 3.4% ash, which is the mineral-rich residue left after samples are burned. ALA and Linoleic acid constitutes 57% and 16.0 % of total fatty acids respectively in flax making the richest source of ALA.^[6] Madhusudhan and Singh stated that Khategaon cultivars grown in India had a protein content of 21.9%. Secoisolariciresinoldiglucoside (SDG) is the predominant lignin which is present in flaxseed with minor amount of pinoresinol and matairesinol (MAT). Hall and Shultz, 2001 explained that SDG was found 2653 mg/100 g of non de-fatted flaxseed extract. Flaxseed proteins are relatively high in arginine, aspartic acid and glutamic acid whereas lysine, methionine and cystine are limiting amino acid.

DISCUSSION-

Yang *et al.*, 2005 had explained that a lower omega-6 to omega-3 fatty acid ratio decreased atherosclerosis in comparison to a higher ratio in Apo lipoprotein E, in LDL receptor double knockout mice. Feeding Golden Syrian hamsters 20 g/d ALA for 6 weeks reduced serum cholesterol by 17-21%.^[7]

Pascos *et al.* 2007; Pellizzon *et al.* 2007 had experimentally proved that the hypocholesterolemic effect of flaxseed mucilage is attributed to the fact that the mucilage is changed into short chain fatty acids in the colon, which in turn inhibits liver cholesterol synthesis, thereby, increasing the clearance of LDL from the body. In vitro and in vivo studies done in animal models suggest that the flaxseed and flaxseed oil have the ability to lower blood cholesterol level.^[8]

Cunane *et al.* 1993 and 1995; Mitra 2002 had explained that regarding the consumption of the flax seed, and its oil supplements are well tolerated with negligible side effects.^[9] Pellizzon *et al.* 2007; Cintra *et al.* 2006 reported that whole ground flaxseed had been used to reduce the plasma and hepatic cholesterol in suitable mice models. This reduction in the cholesterol level has been attributed to the reduced absorption

of cholesterol and/or bile acid reabsorption. ^[10]

Saxena S, Katare C. evaluated a highly significant reduction in total cholesterol, triglycerides, low density lipoprotein-cholesterol (LDL-C) and low density lipoprotein cholesterol (VLDL-C) levels were observed.

Ganorkar, P. M. and Jain had explained that flax seed proteins are relatively high in arginine, aspartic acid and glutamic acid whereas lysine, methionine and cysteine are limiting amino acid. Dietary fibres present in it exhibit positive effect to reduce constipation, to keep better bowel movement and acts as hypocholesterolemic agent. ^[11]

High amount of dietary fibre adds bulk to waste products in the gut and which increases the gastrointestinal movement. It exhibits natural laxative effect of dietary fibres. - ^[11]

Omega 3 fatty acid reduces body fat by 2 mechanisms – the first mechanism is through an enhancement of post prandial satiety which might lead to reduce food intake.

The second mechanism is through alteration in the expression of genes involved in the regulation of fat oxidation in adipose, liver, cardiac, intestinal muscles and in the regulation of adipogenesis in adipose tissue. This

effect enhances fat oxidation and reduces fat deposition.

Flax seed contains about 800 times more fibres than other plants. These are phenolic compound which acts as anti-oxidant. Due to this property it helps in lowering cholesterol by scavenging the harmful free oxygen radicals.

100gm of flax seed contains 18gm of protein. Proteins are tough to digest and so, along with dietary fibres this helps to suppress appetite. By this overeating is prevented which leads to weight loss.

Arginine brings healthy weight loss. It reduces fat mass and increases muscle mass. It happens by increasing insulin activity, manipulating genes and hormones involved in fat metabolism.

Atasi composed of *madhur* and *tikta rasa*, *katu vipaka* and *ushna veerya*. Out of these properties *Tikta rasa* is composed of *akash* and *vayu mahabhuta*. *Tikta rasa* produces lightness and has particular effect of relieving *avarodha* in *strotas* by means of its *laghu* ruksha guna. *Tikta rasa* pacifies *pitta* and as such has no *teja mahabhuta*. *Tikta rasa* though belonging to *soumya* group stimulates *agni* by promoting *Samanavayu* and by absorbing the *kapha* (excessive fat) which is responsible for *Mandagni*. ^[12]

The predominance of *Agni*, *Vayu* and *Akash Mahabhuta* causes *katu vipaka*

and is responsible for *medodhatu kshaya*.(reduction in excessive medo dhatu). Moreover it pacifies increase *kapha* due to its *laghu ruksha guna*.

As we have seen earlier in pathophysiology of *medoroga* that due to obstruction in *strotasa* causes alteration in normal pathway of *vayu* in *koshta* stimulates *jatharagni* and increase urge for intake of food which is the main causative factor in obesity. By means of *guru snigdha picchil guna atasi* helps to alleviate *vata dosha* and ultimately reduces the urge for food.

Though *Atasi* posses these *guna like guru, snighda, picchil* which are in predominance with *prithvi* and *aap mahabhuta* , maintains satiety level without increasing *medodhatu*.

CONCLUSION:

After over all discussion, we can conclude that flax seeds contain omega 3 fatty acids, lignans, dietary fibre, proteins, arginine, which makes it a better drug to be used against obesity.

Tikta rasa and *katu vipaka* reduces *strotas avarodha* which helps to maintain *medodhatu*. *Snighda guru* and *picchil guna* posses satiety effect by reducing appetite.

In conclusion, Flax seed , is an easily available, cost effective, an emerging nutraceutical in the treatment of Obesity.

REFERENCE:

1. Kumar S et al., Sch. J. App. Med. Sci., 2014; 2(2C):694-698
2. Agnivesh, Charaka; Charaka Samhita. Charaka Chandrika Hindi Bhashya, Edited by Bramhananda Tripathy, 4th edition, Sutra sthan- 21/20-24, Chaukhamba Subharti Prakashana, Varanasi, 1995: 404.
3. Sushruta; Sushruta Samhita. Ayurveda Tatwasan deepika hindi commentary, edited by Kaviraj Ambikadatta Shastree, Sutra sthana - 15/42, 11th edition, Chaukhamba Sanskrit Bhavan, Varanasi, 1997: 63.
4. Bhava prakash ; commentary by prof. K.C. Chuneekar , chaukhamba bharti academy , Varanasi .
5. Guyton AC, Hall JE; Textbook of Medical Physiology. Chapter 71, 11th edition, 2006.
6. Austin J Nutri Food Sci 2(8): id1045 (2014) - Page - 07
7. Young young shim et al , Flax seeds bioactive compounds and peptide nomenclature , , 2014 ; volume 38 , issue 1 ; 5-20
8. Paschos GK et al, 2007, effects of flax seeds oil supplementation on plasma adipolectin levels in dislipidimic men. Eur J Nutr 46:315-320.

- | | |
|---|--|
| <p>9. Cunnane et al, 1993, high alpha linolenic acid flax seed; some nutritional properties in human. British journal of nutrition 69 (2): 443-453.</p> <p>10. Pellizzon M A et al , 2007 flax seeds reduces plasma cholesterol level in hypercholesterolemic mouse models , 26 : 66-75 .</p> | <p>11. Ganorkar et al , International food research journal, 2013 ; 20[2]:519-525 .</p> <p>12. Introduction to dravyaguna, Prof P V Sharma, 4th edition 2010, chaukhamba orientalia Varanasi : 25-26.</p> |
|---|--|

Cite this article:

Understanding the role of Flaxseed as a Nutraceutical in Obesity

Rachana Kashyap, D. V. Kulkarni

Ayurline: International Journal of Research In Indian Medicine 2020; 4 (1) : 1- 7