

Barley (Yav) a complete therapy for life style disorders: millet literary research

Abstract

Millet is known as a staple diet of current era. If it is being included in day- today life, can save many lives of human beings from untimely morbidity and mortality. In Ayurveda it has a great importance in healthy and unhealthy persons simultaneously. It is the most powerful nutraceutical. Ayurveda clearly explains that foods are nutraceuticals. Foods balance Vaata (air), Pitta (fire) & Kapha (water) Dhatus, to keep the body in a healthy state. These three Dhatus are the main cause of disease formation in body and are denoted by name Dosha when being vitiated. One among the best nutraceuticals is millet known as Yav (Barley), is the food or drug of choice in prognostic as well as diagnostic state of disease as per Ayurveda contexts. More importantly, barley crop can survive in case of drought land, containing sand. It also requires less water for irrigation. It grows faster within 7-10 days. Sunlight is also not a bigger necessity for its growth. So, in indoor places where direct sunlight is not available can be useful for its cultivation.

These days overweight (obese) & underweight (fitness freak) is the biggest problem for everyone. These are well known causes for life style disorders. Because in both cases untimely death can occur if life style cannot be taken into consideration on a long run. If our diet will be added with Yav daily then these health issues can be solved as it contains various healthy chemical compounds. According to Ayurveda, its Rasa (taste properties) has miraculous effects in overall well-being of a person. In Ayurveda it can be used in various forms to keep body in homeostatic state.

Background: No literary research similar to this work has been established still.

Keywords: Ayurveda, barley, life style disorders, millet, staple diet

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Introduction

There is the biggest challenge of malnutrition along with climate instability globally. To cope up with this problem, scientists have to work upon the nutritious food scarcity. Barley is one of the best crops for this problem.¹ One of the earliest cultivated cereals as per the studies is Barley. It was domesticated around 10,000 BC. Now-a-days its rank in global farming is 4th. Malting & brewing was most adopted way of its use in past. But after that it was used as a staple diet for human beings before wheat & rice cultivation introduction. Due to its evergreen growth in all climates, it can be highly recommended in food scarcity areas of world for cultivation. To overcome the problem of malnutrition, it is adapted these days due to its high nutritional value. In areas of draught, it can have sufficient growth & yield. So, crop cultivation scarcity challenging factor can be solved in relation to barley cultivation (Figure 1) (Figure 2).



Figure 1 Grains of barley.



Figure 2 Cultivated barley crop.

Objectives of this study is:

- 1) To evaluate its (barley) efficiency to control life- style disorders as per Ayurveda texts
- 2) To know the uses of barley (Yav) as per Ayurveda literature
- 3) To know the contents of barley.²

Methodology

Search strategy

The review of literature was carried out in two phases using internet and hand search. In hand search, Ayurveda textbooks are referred according to its inclusion & exclusion criteria. Total number of references from both internet and books were 15 (n=15). From them, books referred are 6 (n=6) & internet articles were 9 (n=9). 4 articles & 3 books were finalized for review. This study is of review approach & not of a quantitative approach as used in Meta – analysis. Therefore, no statistical analysis was selected for the study. Figure 3 is a flow chart of the review strategy.

Inclusion and exclusion criteria

Articles published in English language & books published in Hindi & Sanskrit were included in the review with concerned topic. Authentic books were included in the study. The references which do not fall under this category were excluded for this review.

Data extraction

In the first phase of the study, books and articles were identified on the basis of the study objectives. In second phase all the data is pooled together after identification of objective based texts. Then exclusion of non-concerned data by reading titles and materials was done. By the end of this process, the concerned texts meeting the inclusion criteria were included in the study.

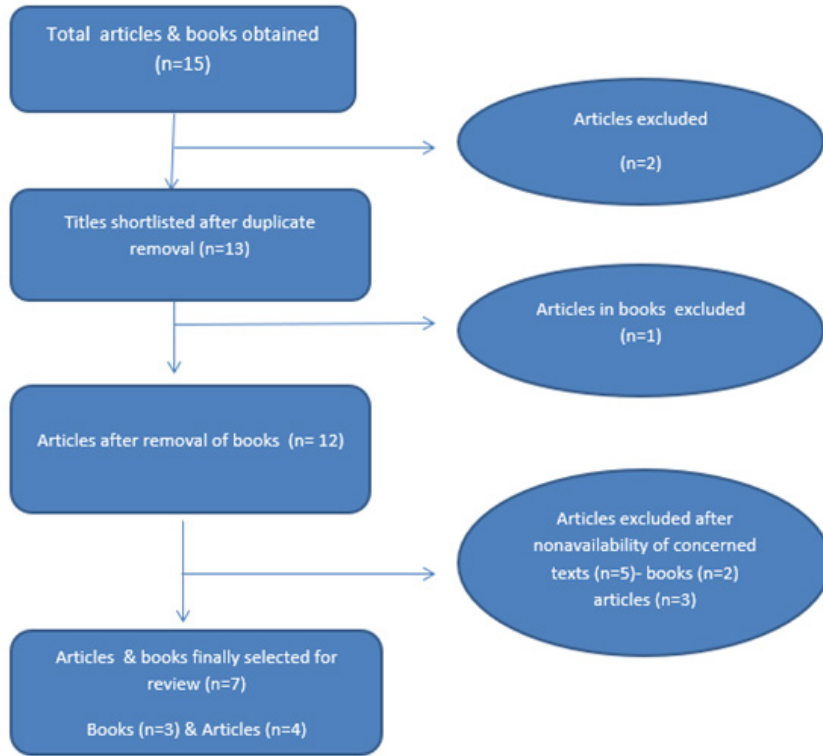


Figure 3 The selection of books & articles for review.

Yav (Barley)

Botanical name-Hordeum vulgare Linn.

Ayurveda Explains about barley in different texts as follows: -

उत्पने त्
शलिजतुगुगुलुगोमूत्रत्रफिलालोहरजोरसंजनमधुयवमुद्गकोरदुष्कश्यामकुदा
अलकादीन।मवर्षिक्षांचछेदनीयनं द्रव्यनं | वधिविदुपयोगो व्यायामो
लेख्नबस्त्यौपयोगशति॥

(Utpnetushilajatugugulugomutrtriplalohrjorsanjanmadhuyavmudgkordushkkashyaamkudaalkaadeenaamvirukshanchhedniyanaam dravyanaam vidhivadupyogo vyayamo lekhnbstyaupyogshiti ||)

Obesity

Yav can be given in obesity due to its drying (Aamshoshan) and extractive (Chhedniye) nature, when there is blockage of Rasadivaha Strotas (All Channels) by Kapha & Meda Dhatu.³

उत्पन्ने तु पयस्याश्वगन्धवदिरगिन्धाष्टवरबिलतबिलानागब्लानाम्
मधुरनामन्यसां चौषधनिमुपयोगः,
क्षीरदधघृतमान्सशालषिष्टकियवगोधूमानं च,
दविस्वपनर्हमचर्याव्यामबृहनबस्त्यउपयोगश्चति॥

(Utpne tu paisyashwagandhavidarigandhashtavariblatiblanaagblanaam madhurnaamanyasaam chaushadhinaamupyogah , sheerdadhigritmaansshaalishastkiyavgodhumanaam ch, divaswapanbrahmchryavyayaambrihnbastyaupyogshchiti ||)

Thin

In lean persons (due to increased Vaata Dosha, there is blockage of strotas {channels} all over body and because there will be vacuole formation instead of normal cell structures hence body is unable to get nutrition from food), in these cases, Yav has good effects due to its sweet taste (Madhura Rasa). Madhura Rasa has high concentration of earth (Prithvi) & water (Jal) Mahabhuta (cosmic) so it pacifies excess Vaata in body.⁴

Guru Guna (heavy) has more Prithvi Mahabhoot (earth as gross element) and Jal Mahabhoot (water) as well, so it gives feeling of satiety.

अत्यन्तगहितवेताओ सदा स्थूलकृशओ नराओ |
श्रेष्ठो मध्यशरीरस्तु कृशः स्थूलातु पूजतिः ||
(Atyantgrhitavetao sda sthoolkrishhao nrao |

Shreshtho madhysharirastu krishh sthoolaatu poojitah ||)

Barley can be used in both of the above said persons. Obese & thin bodies are emerged life style disorders these days. Levish & sedentary life style causes obesity and to maintain zero figures, lean body is the matter of self- over-cautious behaviour. Both leads to health hazards. In medasvi (obese) patients, which is difficult to treat, if Langhan (fasting, catabolic food) and Brahngnan (anabolic food) is to be adopted, there is possibility that it disturbs Vaata (air) & Agni (digestive fire stimulant HCl) inside body causing raised Vaata & Agni with stable Adipogenesis in case of Langhan (if adopted), but in case of Brahngnan, it suppresses Vaata & Agni, leads to increased Adipogenesis respectively.⁵

So, Barley is the best food due to its property of feeling of fullness of stomach which can help to restrict overeating & under eating or taking non-nutritious foods.

यवः कषायो मधुरः शीतलो लेखनो मृदुः | वर्णेषु तल्लिवत्पथयो रुक्शो मेधागनविर्धनकः||
कटुपकौभष्यिंदस्वरयो बलकरो गुरुः | बहुवत्मलो वर्णसुथैर्यकारिच पचिच्छलिः ||
कण्ठत्वगमयश्लेशम्पतिमेधप्रणाशनः |
पीनुसश्वासस्कासोरुस्तम्भलोहतिरतिपर्णुत ||
अस्मादतवौ न्यूनस्क्योतओ न्यूनतारस्तथ ||

(Yavh kshayo madhurah sheetlo lekhno mriduh | vraneshu tilvatpathyo ruksho medhagnivardhakah ||

Katupakoabhishyandi swaryo balkro guruh | bahuvaatmlo varnsthairykaari ch pichhillh ||

Kanthtwagamayshleshmpittmedhpranashnh |

peenusswaskaasorustambhlohitrtriparnut ||

asmaadtiyvo nyoonstokyo nynootarastath ||)

Barley is astringent, sweet in taste, has cooling effect, has extractive (scraping) properties along with soft in consistency after cooking. It has good effects in case of wound healing by drying it. It is brain tonic & improves digestion.

It has Katu (pungent) potency. Due to the fact that it is Guru (not fastly digestible) in quality so there is no desire of food intake again and again, that helps to reduce excessive Med Dhatu (adipocytes) to be deposited in fat cells. It increases the quantity of Mala (waste materials) also in the body for excretion.⁶

Med Dhatu deposition in body is due to excess Kapha & Vaata in body and it is due to Agnimaandya. Agnimaandya (suppressed digestive fire) is due to Dooshit Pitta (vitiated digestive juices due to disturbed HCl secretion) accumulation owing to bad eating habits, producing Aam Rasa (vitiated fluids). It leads to slow Jatharagni (digestive fire) and Dhatvagni (cellular fire) respectively which causes deposition of Med Dhatu. Excessive Kapha Dhatu with time also enhances Kled (mucus) of body along with Med Dhatu & Mams (muscle) Dhatu. It causes obesity on the long run along with deposition of fibrous tissues when cold inflammations will be more, inside body, due to action of clotting factors, after repeated recovery from internal injuries caused by displacements of tissues.

Properties of Kashaya rasa

कषायो रसः संशमनः समग्राही संधारणः पीडनो रोपनः शोषणः
स्तम्भनः - श्लेषम पतित-रक्त-प्रशमनः शरीरक्लेदस्याउपयोक्ता, रुक्शः
शीतो गुरुश्च |

(Kshayo Rasah samshamnah samgrahi sandhaaranah peedno ropanah shoshanah

stambhanah shlesham- pitt- rakt- parshamanah shareerkledasyaupyokta, rukshah

sheetogurusch |)

Kshaya Rasa is Kled Shaamak (decreases mucus), Deepan (Appetizer), Paachan (carminatives) collaborately called as Grahi in nature. It assimilates Aam Rasa (undigested juices) and improves digestion. It is Ruksh (dry, act against Aam Rasa & dries it up), Sheeta (cold, act against vitiated Pitta Dosha and pacifies it), Guru (slow to digest), so it gives feeling of fullness & pacifies Laghu (light weight) Guna (properties) of Vayu.⁷

Properties of Madhur rasa

तत्र मधुरो रसः स्निग्धः शीतो गुरुश्च |

(Tatr Madhuro rasah Snigdha sheeto gurusch |)

Madhur Rasa is Sheeta, Snigdha (oily) & Guru.⁸

Due to these properties, increased Pitta Dosha, Guna (Ushana & Teekshana) can be pacified, which makes VaataDhatu, Rukhsha and Ushana (warm) more prominently. Due to Rukshanta and Ushanta of Vaat Dhatu, it dries up Kapha Dhatu hence Med, Kled & Mams Dhatu get pacified. So, it is clear from it that Yav has tendency to control both obesity and thinness in human beings. Regular use of Yav can help to retain body in normal healthy state. Mechanism of action of Yav is due to its Rasa (Taste) only which is Kshaya & Madhura.

Role of barley in faeces production

यवः कषायो मधुरः शीतलो लेखनो मृदुः । वरणेषु तल्वत्पथ्यो रुक्षो मेधाग्नविर्धनकः॥

कटुपिकौभषियंदीस्वरयो बलकरो गुरुः । बहुवत्मलो वर्णस्थैर्यकारिच पचिच्छलिः ॥

कण्ठत्वगमयश्लेशम्पतिमेधप्रणाशनः ।

पीनुसश्वासस्कासोरुस्तम्भलोहतिरतिपर्णुत ॥

अस्मादतवि न्यूनस्क्योतओ न्यूनतारस्तथ ॥

(Yavh kshayo madhurah sheetlo lekhnno mriduh | vraneshu tilvatpathyo ruksho medhagnivardhakah ||

Katupakoabhishyandi swaryo balkro guruh | bahuvaatmlo varnsthairykaari ch pichhilh ||

Kanhtwagamayshleshmpittmedhpranashnh | peenusswaskaasorustambhlohitrparnut ||

asmaadtiyvo nyoonstokyo nynootarastath ||)

If our faeces are not produced properly and there is constipation, then it denotes exaggeration of Doshas in body. Apan Vayu is not working properly and shows Pratilom Gati (movement in opposite direction). Because without proper functioning of Apan Vayu (Large intestine's air), body can not differentiate Ahaar Rasa (nutritional juice) from Mala i.e. faeces (in case of). In this case, Yav plays a very important role in digestion owing to its Kshaya (astringent) & Madhur (sweet) Rasa.⁹

यवः पुरीशजननाम् ।

(Yavah pureeshjannanaam |)

Yav helps in production of Faeces.¹⁰

Homeostasis property of foods

अन्नं वृत्तकिरानाम् श्रेष्ठम् ।

(Annam vritikaarnanaam shreshtham |)

Food is the best method to be in healthy state of body (in required quantity).¹¹

Nutritional evaluation of Yava as per modern parameters denoted in Table 1 & Table 2:

Table 1 Chemical composition of barley

Sr. no.	Contents	Quantity
1	Carbohydrates	77.7 g /100g
2	Sugars	0.8g /100g
3	Dietary fiber	15.6g /100g
4	Fat	1.2g /100g
5	Protein	9.9g /100g
6	Arginine	6 -22 %
7	Histidine	2.2-4.3 %
8	Lysine	0.8-7.9 %
9	Tyrosine	1.5-2.7 %
10	Tryptophan	0.6-1.3 %
11	Phenylalanine	2.1-3.6 %
12	Cystine	0.9-2.6 %
13	Methionine	0.8-1.4 %
14	Threonine	1.9-3.4 %
15	Leucine	4.5-5.8 %
16	Isoleucine	2.2-4.1 %
17	Valine	3.5-5.8 %
18	Glycine	1.7-10.7 %

Table 2 Chemical composition of barley

Sr. no.	Contents
1	Arabinogalacto(4-0-methylglucurono)-xylan
2	Cyanogenic glucoside
3	6''sinapolysaponarin
4	6''feruloyl-saponarin
5	4'-glucosyl- 6''-sinapolysaponarin
6	2''-0-glycosylisovitexin
7	Isoorientin-7-O- glucoside (lutronarin)
8	Isovitexin-7-O-glucoside (lutronarin)
9	Isovitexin-7-O-rutinoside
10	Isoscoparine-7-O-gluco-side
11	Gramine (N, N-dimethylindolemethylamine)
12	Hordenine (N,N – dimethyltriamine)
13	Caffeic acid
14	Chlorogenic acid
15	m-coumaric acid
16	o-coumaric acid

Table 2 Continued...

Sr. no.	Contents
17	p-coumaric acid
18	Coumarins
19	Ferulic acid
20	Hydroxycinnamic acid
21	p-hydroxybenzoic acid
22	5-hydroxyferulic acid
23	Protocatechuic acid
24	Salicylic acid
25	Sinapic acid
26	Syringic acid
27	Trans-cinnamic acid
28	Vanillic acid
29	Apigenin
30	Saponarin
31	Cyanadin
32	Isovitexin
33	Heterodendrin
34	Epiheterodendrin
35	Epidermin
36	Sutherlandin
37	Osmaronin
38	Dihydro osmaronin
39	3-β-D-glucopyranosyloxy-3-methylbutyronitrile
40	1-cyano-3-β-D-glucopyranosyloxy-2-methyl-propene
41	4-D-glucopyranosyloxy-3-hydroxy-3-hydroxymethylbutyronitrile
42	HordatineA&B
43	Putresceine
44	Permidine
45	Spermine
46	p-coumaroylagmatine
47	2,4-dihydroxy-1,4-benzoxazin-3-one
48	2-β-D-glucopyranosyloxy-3-methyl-(2R)
49	Butyronitrile
50	ubiquinones
51	Proanthocyanidins
52	Procyanidin B3
53	Trimer of procyanidin C2
54	Prodelfinidin
55	Chrysoeriol
56	Hordeurnin

Table 2 Continued...

Sr. no.	Contents
57	Pangamic acid
58	Catechin
59	Gluco-cerebroside (23 mol%)
60	Phospholipid (42 mol%)
61	Free sterols (28 mol %)
62	Campesterol (15%)
63	Stigmasterol (23%)
64	Sitosterol (62%)
65	Palmitic fatty acid (16:0)
66	Linoleic fatty acid (18:2)
67	Linolenic fatty acid (18:3)
68	Catalase
69	Cellobiase
70	Diastase
71	Lichenase
72	Mannase
73	Mannobiase
74	Oxidase
75	Peroxidase
76	Phytase with active proteolytic enzymes
77	2-β-D- glucopyranosyl-oxy-3-methyl-(2R)- butyronitrile
78	Tocophenols
79	Tocotrienols
80	4-O-linked beta- D- glucopyranosyl units
81	3-O-glucopyranosyl units
82	3-O-glucopyranosyl units
83	Pyrrolidine
84	Luteolin glycoside
85	Flavones glycosides-orientoside & orientin
86	Cynoglucosides-3-beta-D-glucopyranosyloxy-3-methylbutyroe-I
87	Cyano-3-beta-D-glucopyranosyloxy-2-methylpropene
88	4-beta-D-glucopyranosyloxy-3-hydroxy-3-hydroxymethyl-butyronitrile
89	Gluten
90	β-glucan
91	Lunasin
92	6 C-glycosyl-flavones
93	18 O-glycosyl-C-glycosyl flavones
94	1,3-dihydroxy-5-n-pentacosyl-benzene

Raw barley

Nutritional value per 100 gm

- Energy -335kcal
- Carbohydrates -69.4cal.
- Sugars -0.8gm.
- Dietary fiber -3.9gm.
- Fat -1.3gm.
- Protein -11.5gm.
- Thiamine (vitamin B1) -0.20mg.
- Riboflavin (vitamin B2) -0.20mg.
- Niacin (vitamin B3) -4.7mg.
- Vitamin B6 -0.3 mg (23%).
- Calcium -0.03mg.
- Iron -3.7mg.
- Phosphorus -0.23mg.
- Carotene -10mg.
- Moisture -12.5 gm.

Chemical composition of seeds

- Cyanogenic glycoside characterized as 2-β-D-glucopyranosyloxy-methyl -(2R) -butyronitrile,
- Ubiquinones,
- Proanthocyanidins,
- Glycosides of hordatines A & B,
- procyanidin B3,
- Trimer of procyanidinC2,
- Prodelphinidin,
- Chrysoeriol,
- Hordeumin,
- Pangamic acid,
- Protein,
- Carbohydrates,
- Calcium,
- Phosphorus,
- Iron.¹²

Barley contains

Another contents are in Table 2

As per the above shown tables, Yav contains a lot of nutrients in itself.¹³

WHO data for nutritional deficiency¹⁴

As per the above data given by WHO, nutritional deficiency is seen in later stage in persons i.e. above 75 years of age. Here, as

per Ayurveda Vaat Parkop (accumulation of air in body) is highest in this phase of life. Vaat itself causes vacuole formation in body by increasing size of the affected cells of tissues. So, with time, pores of cells close and nutrition deficit cells are formed in the affected areas which ultimately leads to cell apoptosis. It is known as Avarn of Vaat by Kapha in Ayurveda. Here role of calcium is well established in Ayurveda & modernsciences simultaneously in Ritu (seasons) Charya (Hemant Riru) (winters). It will be discussed in details in the next article (Table 3) (Figure 4).

Table 3 Nutritional deficiency

Age group	All	Male	Female	Unknown
0	130	70	60	0
1-4	83	46	37	0
5-14	97	49	48	0
15-24	176	107	69	0
25-34	237	148	89	0
35-54	770	433	337	0
55-74	1869	1041	828	0
75+	7254	3394	3859	1
Unknown	12	11	1	0

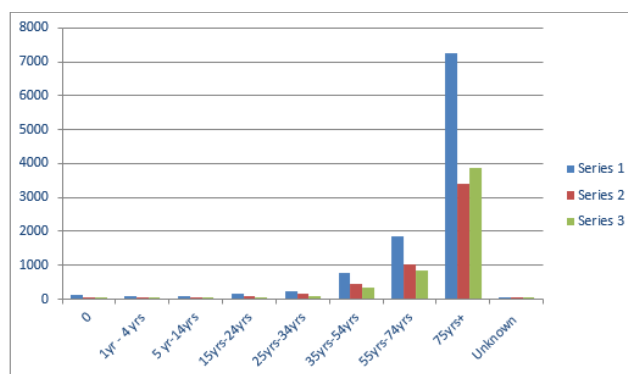


Figure 4 Nutritional deficiency bar chart.

Conclusion

It is evident that Yav (barley) has a lot of nutritional qualities. If, used as a staple meal all over the world, can give better results, in case of life style disorders along with the benefit, in agriculture sector, in case to achieve a better yield with minimum consumption of natural going to be exhausted resources. This study can fill the gap in research for the future generations along with the current ones.

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Conflict of interest

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