



International Research Journal of Integrated Medicine & Surgery

PHARMACOGNOSTICAL AND PHYTOCHEMICAL STUDY OF YAVA : (HORDEUM VULGARE LINN) W.S.R. TO STHAULYA (OBESITY)

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ABSTRACT:

Yava (Hordeum vulgare) is one of the most ancient cereals in Ayurveda.

Yava is shukadhanya used in indian medicine. In Ayurveda the uses of yava are described for religious ceremony, dietary and different medicinal preparation and as well as pathya diet in various diseases like santarpana janya roga prahema, kushtha and medoroga etc. for lekhana karma, including life style disorders. Obesity is a disorder involving excessive body fat that increase the risk of serious health problems.

Obesity occurs when a person's body mass index is 25 or greater. Sthaulya is catabolic disease. It is a chronic disease prevalent in both the developed and developing countries and affecting children and adults.

Today there is increasing public awareness of the importance of diet for the maintenance and promotion of health. YAVA is described by Acharya Charak while describing treatment of sthaulya. So here by this article is presented to put forth the literature review of yava(hordeum vulgare linn.) from various available ayurvedic and modern classics.

KEYWORDS: Yava, Obesity, Sthaulya, Literature

INTRODUCTION:

According to Upanishadas food is Brahman the Divine reality. The physical body

itself is born of and lives by food. Right diet is the essence of disease prevention and the foundation of a healthy and happy life. A properly selected diet and diet plan plays a critical importance in the management of any disease. Only a well-balanced diet can cure numerous diseases, sometimes even good medicines are unable to cure certain diseases without balanced diet, that's why food is said to be most important medicine. Today there is increasing public awareness of the importance of diet for the maintenance and promotion of health. Yava is a Sanskrit word referring to *Hordeum vulgare* ("barley") from the Poaceae (grasses) family. It is a type of "awned grain" (Sukadhanya), according to Caraka in his Caraka samhita sutrasthan (chapter 27), a classical Ayurvedic work. The plant Yava is part of the Sukadhanyavarga group of medicinal plants, referring to the "group of awned grains". Caraka defined such groups

(vargas) based on the dietic value of the plant. Yava is rough, cold, non-heavy and sweet in character. It produces abundance of flatus and faeces, promotes stability, is slightly astringent. It is also a tonic and alleviates disorders of kapha.

AIM AND OBJECTIVE:

- 1) To study the pharmacology of Yava
- 2) To study the phytochemistry of Yava
- 3) To study Literature review of yava (*Hordeum vulgare* linn.) in sthaulya (obesity).



YAVA (HORDEUM VULGARE LINN.)





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MATERIALS AND METHODS:

Classical ayurvedic texts, commentaries, various articles, previously conducted research studies thoroughly reviewed and analysed.

REVIEW OF YAVA:

Botanical name – *Hordeum vulgare* Linn.

Family: Gramineae

Rasa- Madhura, Tikta, Kashaya
Guna- Ruksha, Pichhala, Mṛidu,
Anabhisyandi, Sara ,
Virya- Sheeta
Vipaka- Katu

Doṣagnata- Kaphapittahara, Vatakara

Mala prabhava- Bahupuriṣakara, Mutra dosha hara

Karma- Lekhana, Medovatahara, Medha vardhaka, Vṛiṣya, Balya, Sthairyakṛta, Varṇya, Swarya, Agni/agnidipana, Kasa-swas-pinasa har, Kanṭha roghara, Trushnahara Twaka roga hara, Vraṇepathyam and Urusthambahara.

Botanical Description –

Yava, *Hordeum vulgare* Linn. is an annual, erect, stout and tufted grass, reaching a height of about 0.5-1.2 m. Roots are fibrous, 0.5 to 0.1 cm thick, cylindrical, glabrous and grayish brown in colour; a clasping leaf is developed at each node. Leaves are

few, linear- lanceolate in shape about 15 to 25cm long, yellowish- grey in colour, upper one is close to the spikes and its sheath is striate and ligules are short and membranous.

Stem is Cylindrical, 0.4 to 0.6 cm thick, slightly flattened and smooth. It is hollow between nodes and develops five to seven nodes below head. Nodes are short and bearing sheath. Internodes are long and shining yellowish in colour ; spike is terminal, linear-oblong, compressed; 5-6cm long and densely flowered. Glumes are two, small, narrow; short awned and enclosing three spikelets. The grains are tightly enclosed and adhering the lemma and palea. Flowering and fruiting is during February-April

TYPES/CLASSIFICATION:

Shankar nighantu classified 3 types-

- 1) Yava – Grain with shooka
- 2) Ati yava- Grain without shooka Krishna aruna varna
- 3) Stokya- Grain without shooka harita varna



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- Chemical composition

Seeds- Cyanogenic glycoside characterized as 2-β-D-glucopyranosyloxy-methyl-(2R)-butyronitrile, ubiquinones, proanthocyanidins, glycosides of hordatins A & B, procyanidin B3, trimer of procyanidin C2, prodelphinidin, chrysoeriol, hordeumin, pangamic acid, protein, carbohydrates, calcium, phosphorus, iron.

- **MACROSCOPIC**

Root - Fibrous, 0.5 to 1 cm thick; cylindrical, glabrous, greyish-brown.

Stem - Cylindrical, 0.4 to 0.6 cm thick; hollow, slightly flattened, smooth; internode long, shining yellow; node short, bearing sheath; fracture, fibrous.

Leaf - Linear-lanceolate, 15 to 25 cm long, upper one dose to the spike; sheath smooth, striate; yellowish-grey. Inflorescence - Spike, terminal, linear-oblong, compressed spikelet sessile, 6 to 8 cm long, 6-rowed type; dark cream.

Fruit - A caryopsis, elliptic, oblong, ovoid and tapering at both ends; smooth, about 1 cm long and 0.2 to 0.3 cm wide; dorsally compressed and flattened on the sides with a

shallow longitudinal furrow; 3 to 5 ridged having shallow depression between them; 165 grains tightly enclosed and adhering to the lemma and palea; a long awn present on the palea; pale greenish-yellow; taste, sweetish acid.

RESULTS AND DISCUSSION

Microscopic characteristics

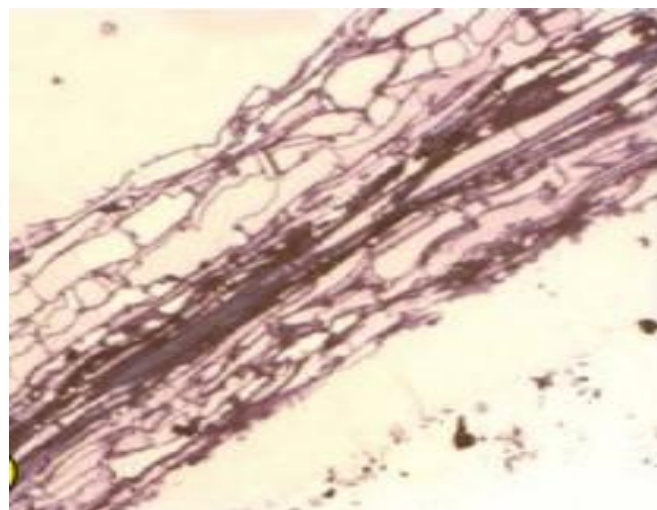
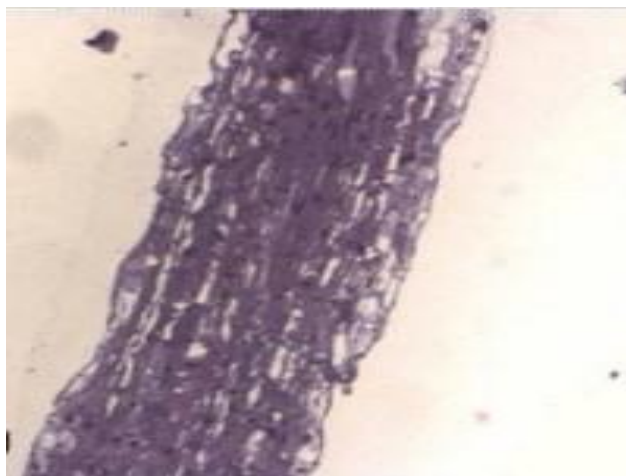
T.S. OF YAVA

Fruit -Shows single layered epidermis consisting of crescent-shaped, round to oval

wavy walled cells, followed by 2-3 layers, thick-walled, sclerenchymatous fibres; below the sclerenchyma are present irregular, square or quadrilateral, spongy parenchymatous cells, a few cell walls having silica bodies through which run the fibro-vascular bundles of the ribs, followed by more or less, polygortal inner epidermal cells, a few inner epidermal cells having unicellular claw-shaped hair and stomata; pericarp composed of cells with more or less compressed parenchymatous cells; seed coat appears as a colourless line; perisperm composed of cells with more or less wavy walls having 185 narrow lumens; endosperm divided into two zones, 2-4 cells deep aleurone layers, and the rest starch layers; starch grains simple, round to oval,

measuring 3-30 μ in diameter. Powder - Creamish-white; shows groups of fragments of polygonal, thin-walled flowering glume cells in surface view, sclerenchymatous fibres, scalariform vessels and abundant round to oval, simple starch grains, measuring 3-30 μ in diameter.

Powder - Light creamish-yellow; shows fragments of epidermal cells, parenchyma, groups of tubular, elongated lignified cells, polygonal, thin-walled parenchymatous epidermal cells of palea with intercellular spaces, in surface view, thin-walled, conical trichomes with large lumen, measuring 30 to 180 μ in length and upto 20 μ in width and stomata, sclerenchymatous fibres, scalariform vessels, abundant round to oval, simple starch grains having concentric striations, measuring 3 to 30 μ in dia.



**Fig.1 &2 powder microscopy of
(yava)hordeum vulgare linn.**



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POWDER STUDY

Organoleptic characters

Colour: creamish white

Taste: sweetish-acrid.

Texture: fine powder

Odour: Characteristic

a caryopsis, elliptic, oblong, ovoid and tapering at both ends, smooth, about 1 cm long and 0.2-0.3 cm wide, dorsally compressed and flattened on the sides with a shallow longitudinal furrow, 3-5 ridges having shallow depression between them, grains tightly enclosed and adhering the lemma and palea; pale-greenish-yellow; odour, not distinct; taste, sweetish-acrid.

Physico chemical values of yava beej churna are as follows:

| Sr.no. | Parameters | Values |
|--------|----------------------------|--------------------|
| | | Yava beej |
| 1. | Foreign matter | 2 % |
| 2. | Total ash value | Not more than 4% |
| 3. | Acid insoluble ash | 1.5% |
| 4. | Water soluble extractive | Not less than 2.5% |
| 5. | Alcohol soluble extractive | Not less than 5.5% |



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Phytochemical values of yava beej churna are as follows:

| TEST | AQUEOUS EXTRACT |
|--------------------|-----------------|
| Starch | ++ |
| Alkaloids | -- |
| Steroids | -- |
| Vitexin | ++ |
| Coumarins | -- |
| Flavanoids | ++ |
| Tannins | -- |
| Saponins | -- |
| Orientaliside | ++ |
| Orientin | ++ |
| Glycosides | -- |
| Cardiac glycosides | -- |
| Flavone glycosides | +++ |
| Proteins | ++ |
| Amino acids | -- |
| Mucilage | -- |
| Sugars | + |



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Procedure :

Hordeum vulgare Linn. Seed powder sample for HPTLC fingerprinting were prepared by using optimized conditions for extraction Chemicals

HPTLC fingerprinting.

ResultsPlate 1

Experimental

Sample Preparation:

500mg of samples was weighed and 5ml of Methanol was added. Then this solution was sonicated using sonicator for 30min. Then this solutions were filtered using Whatmman filter paper and the the filtered solution was used for chromatography

Sample application

| | |
|--|---|
| Globals | |
| Syringe size: | 100 μ L |
| Number of tracks: | 6 |
| Band length: | 8.0 mm |
| Positioning | |
| Application position Y: (set manually !) | 8.0 mm |
| First application position X: | 20.0 mm |
| Distance between tracks: | <input checked="" type="radio"/> Automatic <input type="radio"/> Manual 12.0 mm |

| Track | Application position | Application volume | Vial | |
|-------|----------------------|--------------------|------|---------|
| 1 | 20.0 mm | 5.0 μ l | 1 | Extract |
| 2 | 32.0 mm | 5.0 μ l | 1 | Extract |
| 3 | 44.0 mm | 10.0 μ l | 1 | Extract |
| 4 | 56.0 mm | 10.0 μ l | 1 | Extract |
| 5 | 68.0 mm | 15.0 μ l | 1 | Extract |
| 6 | 80.0 mm | 15.0 μ l | 1 | Extract |

Chromatographic Development:Toluene:
Chloroform: Ethanol (4:4:1v/v/v)

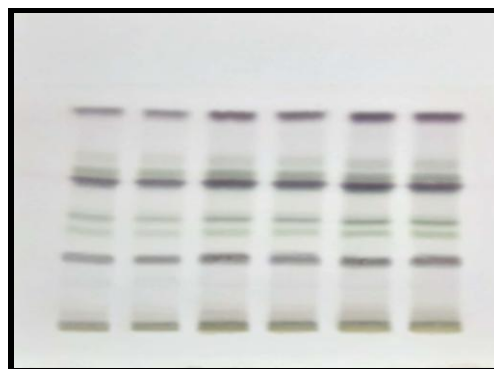
Post Chromatographic Derivatisation

| Reagent Name | Preparation |
|---|---|
| Anisaldehyde Sulphuric acid Reagent | 170ml Chilled Methanol+ 20 ml of Acetic Acid+ 10ml of Sulphuric acid+ 1ml of Anisaldehyde |

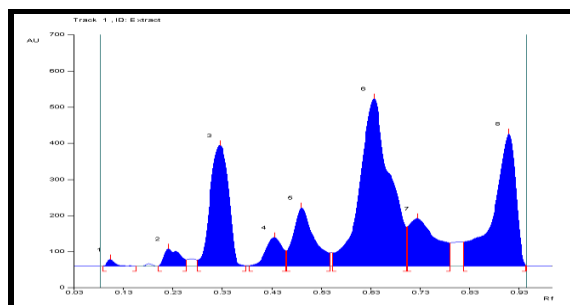
Derivatisation Process: Plate was dipped in the Solution and was heated in 105⁰ C in

Oven and the Plate was observev

Result:



Results: Chromatogram at 540 nm

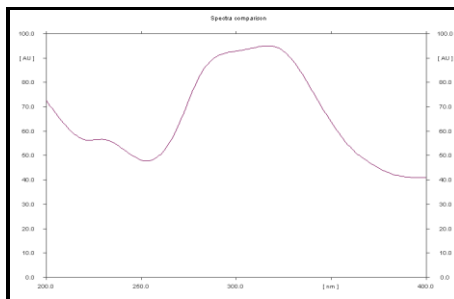




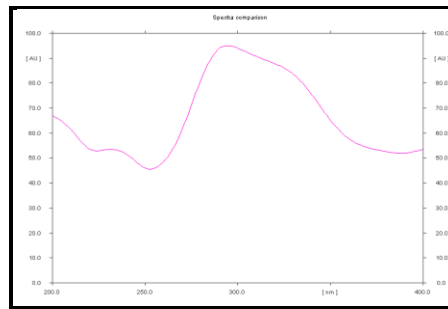
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Spectral data of some bands

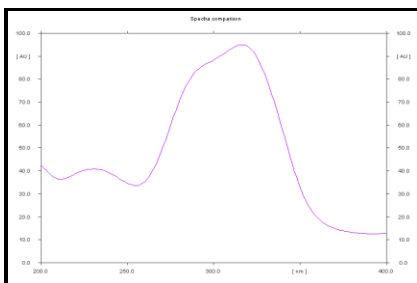
Rf 0.11



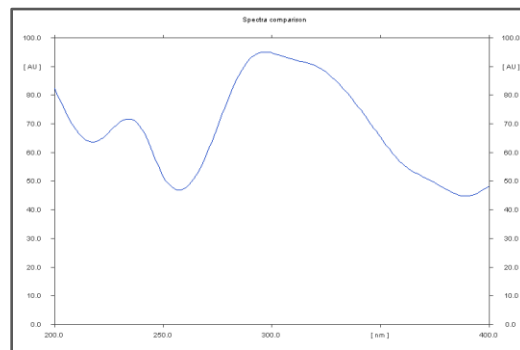
Rf 0.16



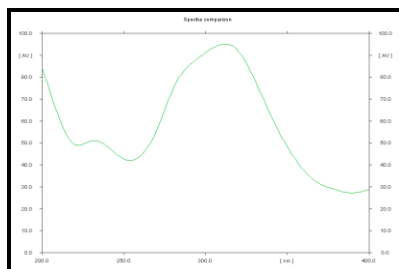
Rf 0.26



Rf 0.31



Rf 0.49



Findings:

1. Image

The Plate was then Derivatized in ASR and image was taken in White Light After the image, we can see good separation and a good Fingerprint of the given plant sample was developed.

2. Scan and Spectral

- a. The scanning of the plate was done after derivatization at 540 nm, 8-9 bands was detected in these scanning, the chromatogram and the peak table obtained is reported above
- b. The Spectral data of some of the band visible in 254 nm was taken in the range of 200-400nm was is reported above.

Conclusion- The proposed HPTLC method can be used to develop a fingerprint for the identification of hordeum vulgare Linn. Seed powder. The Rf values tabulated in Tables can be considered as analytical or bio-marker for identification of plants.

STANDARDIZATION OF DRUG

Standardization of drug was carried out in standard pharmacy. Analytical reports are follows-

Sample–Yava seed

CERTIFICATE OF ANALYSIS

ANALYTICAL REPORT: YAVA (Hordeum vulgare)

| <u>TEST</u> | <u>SPECIFICATIONS</u> | <u>RESULT</u> |
|------------------|-----------------------|-----------------|
| APPEARANCE | Dry Seeds | Dry Seeds, Hard |
| COLOUR | Pale Yellow | White |
| ODOUR | Characteristic | characteristic |
| TASTE | Sweetish -acid | Sweetish -acid |
| FOREIGN MATTER | NMT 2 % | NIL |
| MOISTURE CONTENT | NMT 5 % | 3.5 % |
| A S H | NMT 4 % | 3.52 % |
| A I A | NMT 1.5 % | 0.71 % |
| W S A | NMT 4 % | 1.32 % |
| A S E | NLT 2.5 % | 4.24 % |
| W S E | NLT 5.5 % | 7.30 % |

MACROSCOPY



The sample complies with the standards as per Ayurvedic pharmacopoeia Part I Volume II page 175.





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PARTS USED: Root, leaf, seed

Therapeutic uses *Hordeum vulgare* Linn.

Action Barley- nutritive and demulcent during convalescence and in cases of bowel inflammation and diarrhoea. Protects immune system.

The Ayurvedic Pharmacopoeia of India recommends barley in urinary dis-orders, muscular rigidity, chronic sinusitis, cough, asthma, lipid disorder and obesity.

Juice of young barley leaves—7 times richer in vitamin C than oranges, 5 times richer in iron than spinach, 25 times richer in potassium than wheat; high in SOD (superoxide dismutase), an enzyme that slows ageing of cells. The nutritional quality of the barley depends on beta-glucan fraction of the grain. Beta-glucan-enriched fraction produced cholesterol-lowering effect in hamsters. Naked barley extracts have been found to selectively inhibit cyclohexanase activity and may be useful as a therapeutic drug for treating thrombosis and atherosclerosis. Ethanol extract of young green leaves exhibits antioxidant activity attributed to a flavonoid-O-glucosyl-isovitexin.

It also exhibits anti-inflammatory and antiallergic activities. The leaves contain an indole alkaloid, gramine, which exhibits antibacterial properties.

Dosage- 10-20gm.

CONCLUSION: Standardization of herbal drugs is very much crucial because they are produced from miscellaneous sources which could result in variations. These kind of variations can cause spurious results in various pharmacological and phytochemical studies. The current study might be beneficial for the identification, authentication and standardization of yava (*hordeum vulgare*) linn.

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