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REVIEW ARTICLE ON THE PLANT *AVENA SATIVA* LINN.

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ABSTRACT

Avena Sativa, sometimes known as oat, is a plant that belongs to the Poaceae family. Third in importance after wheat and corn in the United States, and fourth in importance worldwide. As far as nutrition is concerned, they are one of the most widely produced plants. Moreover, it is commercially nutritious. Soluble dietary fibre can be found in oat grain, oat bran, and oatmeal known as -glucan, which can lower total cholesterol and low–density lipoprotein cholesterol levels in the blood. Lipoprotein cholesterol is also useful for controlling blood sugar levels. Experiments of many kinds Oat has been proven in tests to be a possible agent for preventing the onset and progression of cancer , intestinal malfunction, obesity, celiac disease, and other disorders This examination will *Avena Sativa*'s therapeutic and utilitarian characteristics are discussed. The functional and therapeutic aspects of *Avena Sativa* will be discussed in this review. However, due to the large number of the health benefits they provide, their intake has raised significantly, and they have become more popular come to the foreground immediately.

Keyword: Apoptotic, *Avena Sativa*, Anthranilic acid, B-glucan, Cholesterol

1. INTRODUCTION:

As per today's demand of society "food" how we can treat this like medicine is the common oath for all survivals. To satisfy these words "*Avena Sativa* Linn" is a best choice. It is difficult to find from what period of time *Avena Sativa* has been used medicinally for the betterment of people forums. Probably the generating of this plant is from Asia proxima. The green herb Oats were already proceeds in to cultivation from 4000 years ago. Demanded scientists like "Hippocrates and Plinius" recommended oats for feeding and medicinal properties. In case of antidepressive or thymoleptic disorders, liquid mixtures in proportion of 1:1 in 25% alcohol and tinctures in proportion of 1:5 in 45% alcohol produced a magical effect, as has been suggested by The British Herbal Pharmacopoeia (1976) and Hansel *et al* (1992). The mother tincture of freshly young flower can treat sleeplessness, weakness, hysteria. Fresh tincture of oats preferably used in alcoholism and opiumdetoxification. *Avena Sativa* is high in protein, minerals, lipids, β- glucan, avenanthramides, lipids and sterols. In both of the plat form of therapeutic and non therapeutic consideration it is widely triggered for its significant value. It's extract is having various combination and numerous medicinal properties that's the reason for quantifying the demand for further studies and research work to expose it' s versatile properties **[3]**. The most common use of A.S is livestock feeding. Primary cereal crops such as wheat and barley are usually considered secondary crops, as they are derived from undesirable weeds **[1, 2]**.

Oats is a complete nutritive meal , can used in a variety of pattern like oats cake, cookies, bread, crushed or rolled from to provide subsequent energy boost. In the United Kingdom, it is sometimes used to make beer, and oat meal is harvested for the wort. Thomas Facewtt and Sons Malting produces the uncommon oat meal that was used in Maclay oats Maly stout before Mackay's brewery became an independent brewing company **[4, 5]**.

2. CULTIVATION, COLLECTION, DESCRIPTION:

CULTIVATION: In North, Central and Western parts of the country oat is one of the most important grain fodders during the Rabi season. Crud protein offers soft and appetising feed. Oats is also utilised as a silage or straw hay.

CLIMATE CHANGE REQUIREMENTS: A cooler climate is well suited for oats. A temperature range of 15-25 C is best for its growth. The plant can tolerate frost to an

extent, however due to hot and dry conditions, the crop's fodder yield and quality are reduced.

SOIL: Optimal conditions for growing oat are in soils ranging from loam to clay loam and with adequate drainage. Light or heavy soils that are properly moist produce satisfactory yields. Acidic or saline conditions can also be used for its cultivation. A pH range of 6-7 is recommended for the soil.

SEED COUNT AND PROPAGATING: To achieve an equal stand, seed should be applied at 60-70 kg per hectare. In order to seed, either the pore behind the plow should be used or a seed drill method should be used. It is best to start sowing early in October and continue until late in November. 20-25 tonnes of farmyard manure (FMY), 80 kg N, 40 kg $P_2 O_5$ /ha should be applied.

3. IRRIGATION: Oats required 4-5 irrigation. First irrigation is to be done before seedbed. Then subsequent irrigation needed to be after each cut.

HARVESTING: In single cut oat varieties 50 percent flowering occurs around 50-55 days after emergence. In double cut varieties, the first cut should be taken at 60 days followed by second cut at 50 percent. After cutting, the crop should be allowed for seed production, which should take 60 days to show.

YIELD: Single-cut oat varieties yield 30 to 45 tonnes per hectare, double-cut varieties yield 40 to 40 tonnes, and multi-cut varieties yield 45-60 tonnes per hectare. It is anticipated that the crop will yield 25 tonnes of green fodder per hectare if left to seeds, as well as 2 to 2.5 tonnes of straw per hectare if left to mature.

4. DESCRIPTION:

Life Cycle: Annual

Habitat: Part shade, Sun; Moist to Dry soil; Road side; Fields

Fruting Season: June- September

Plant height: 14 to 40 inches

FLOWER: The open panicle measures from 6 inches to 16 inches in length, is more or less upright and pyramidal in shape, the branches widely separated, ascending to spreading to drooping, and contains few to several spikelets (flower clusters) per branch; spikelets are long, narrow, lance-shaped to V-shaped (in outline), somewhat flattened in outline, and may have 2 or 3 florets. At the base of spikelet it is a pair of bracts(glumes), both hairless , thin especially near the tip , 7-9 veined, tapering to a sharply pointed tip, 20-25mm long and longer than the group of florets, the lower glume as long as the upper glume or nearly so. It is thicker than glumes,

hairless, with two veins and a fringe extending from the veins. There are usually no awns or a straight awn between 15 and 30mm in length arising from near the middle of the back of the lemma. Callus and rachilla are usually hairless or sparsely haired on the enlarged base of the floret (pistillate).

LEAVES AND STEMS: The leaf blades are flat and 5 to 16 inches long, and 5 to 16 nm wide (2-3 inches). There are no hairs or rough surfaces on the sheaths. Lunges have ligules that are 2 to 8 mm long and have a straight edge at the point. They have no fringe or hairs. They have smooth nodes. The stems are erect, mostly hairless, and branched from the base. They are a single or a few stems from the base that form a loose cluster.

FRUITS: Typically, flower spikelets remain on a branch until mature, turning straw-colored to slightly brown. Light brown, elliptical, and longitudinally grooved grains (seeds), slightly flattened and elliptic in shape.

TYPES OF OATS CULTIVATED IN INDIA: Brunker-10, NP-2, Weston-11, NP-1, Kent, Palampur-1, OS-6, OS-7, OL-9,HFO-114, UPO-94,Algerian, Bundel, Jai-822, Harita (RO-19), Sabzaar(SKO-7), Haryana Javi-8, Bundle jai 2001-3.

VERNACULAR NAME OF OATS: Oats (English), Jaee (Hindi), Joi (Bengali), Javie or Jawie (Punjabi),Oatarisi (Tamil), Yavalu (Telugu), Oat (Malayalam), TookiGoodhi (Kannada), Saya (Marathi).

Figure 1: ***Avena Sativa*** **Linn**

BINOMIAL HIRACHY:

Kingdom: Plantae- Plant

Subkingdom: Tracheobionta-Vascular Plant

Superdivision: Spermatophyta- Seed Plant

Division: Mangoliophyta- Flowering Plant

Class-: Liliopsida – Monocotyledons

Sub Class: Commelinidae

Order: Cyperales

Family: Poaceae

Genus: Avena

Species: *Avena Sativa* Linn

PHYTOCHEMICAL COMPOSITION:

Whole oats contain fiber, proteins, unsaturated fatty acids, minerals, vitamins, and polychemicals. On the endosperm, *-glucan is present in a significant amount, with an average of the fiber content ranges between 5.5 and 16%Aside from vitamins

and proteins, oat bran contains fats, minerals and fibers that are among other nutrients, oats are high in protein, carbohydrates, fat (8.6%), fiber (between 15-22%), niacin (1.3 mg), magnesium (1.7 mg), iron (6.4 mg), copper (0.17), potassium (441 mg), and *-tocopherol (less than 0.5 mg) **[9]**. *-Glucan is not a single molecule but a form of polysaccharides that exist in different sizes and degrees of solubility and ability to be absorbed in Saccharide molecules that make up the *-glucan are linked by several different mechanisms make up β-glucan **[6]**.

Table 1: Anthrilinic acids are coupled to hydroxycinnamic acids via amide bonds to form AVNs, which are low-molecular-weight phenols

Name	R1	R2	R3	R4	Structure
Avn-A	OH	H	H	H	N-(4'-hydroxycinnamoyl)-5-droxyanthranlic acid
Avn-B	OH	OCH_3	H	H	N-(4'-hydroxy-3'-methoxycinnamoyl)-5-hydroxyanthranilic acid)
Avn-C	OH	OH	H	H	N-(3'-4-dihydroxynamoyl)-5-hydroxyanthanilic acid
Avn-D	H	H	H	H	N-(4'-hydroxycinnamoyl)-hydroxyanthanilic acid
Avn-E	H	OCH_3	H	CH_3	N-(4'-hydroxy-3'methoxycinnamoyl)-hydroxyan-thralinic acid

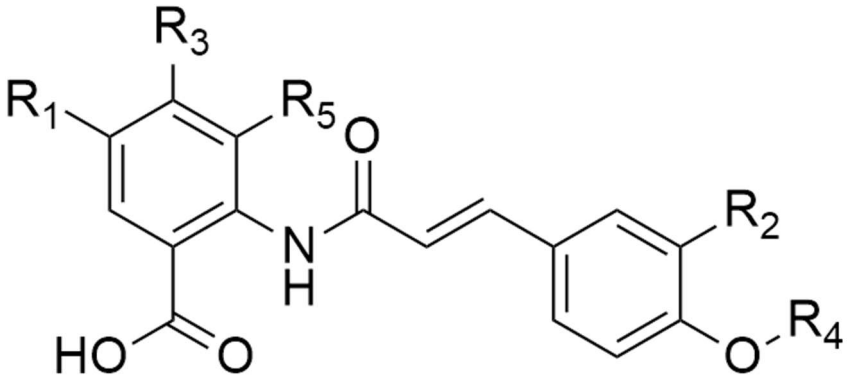

Figure 2: Anthranilic acid and Cinnamic acid

4. THERAPEUTIC POTENTIAL OF *AVENA SATIVA*:

OATS AND CANCER: Chronic inflammation has been linked to an increased risk of cancer. Inflammatory processes can produce free radicals and aldehydes that may cause mutations in genes. Oats contains hundreds of phytochemical like phytoestrogen, ligans, which are responsible for curation of breast cancer **[9, 10]**. In hormone related cancer like ovarian cancer, prostate cancer oats performed well in decreasing the no of cancerous cell **[29, 30]**. High intake of dietary fiber can cause lowering of circulating oestrogen level so attested with low risk of breast cancer. Insoluable fibers can easily manage the carcinogens in GI tract **[31, 32, 33]**.

OATS AND BLOOD PRESSURE: (DASH) dietary planning is well

recommended for reducing blood pressure and effect like blood lipid, insulin sensitivity **[11]**. "DASH" Diet is composed of fruit, vegetable, low fat dairy product and gives attentation of consumption of whole grain. By including oat in daily meal it is observed that it has significant improvisation on endothelial function with Vit.C. As side wise it minimises the medication therapy used of BP **[22, 23, 24]**.

OATS AND OBESITY: Whole grain diets are connected with a lower incidence of weight gain and obesity. When oats are being digested forms a gel, &causes the viscosity of stomach and small intestine to be increased **[12]**. Americans Scientific Advisory Committee, which concluded 3 serving per day. Children with a meal of oat /day having 50% less activity for overweight **[25, 26]**.

OATS AND ANTI-OXIDANT: Antioxidant action is found associated with vitamin E, flavonoids, and phenolic chemicals, as well as phytic acid. Antioxidants help to keep processed oat products stable and protect them from rancidity. Antioxidant molecules help to keep cells young, protect LDL from damage, and reduce the risk of cardiovascular disease **[13, 14]**. In 4h imbibed oat seeds, the relationship between longevity and mitochondria, antioxidant system, ultra structure, hydrogen peroxide, and malondialdehyde was investigated **[34, 35]**. In imbibed oat seeds aged at an early stage, the scavenging role of mitochondria superoxide dismutase was suppressed **[36, 37, 38]**.

OATS AND CONTAMINATION: The polysaccharides β-glucans found in cell walls play a significant role in cellular functionality **[39, 40]**. Oat can simulate the immune system, modulating anti body and cell mediated immunity **[15]**. β-glucan not only helps neutrophils, it enhances their activity to eliminate the bacteria and also helps to increase self defence immunity power **[41, 42, 43, 44]**.

OATS AND SKIN DISORDER: It also contains soluable phenolic compounds called avenanthramides. These are antipathogens, sometimes oats also used in poison treatment for eg: ivy, sunburn, eczema, psoriasis, avenanthramides proves himself as anti-histamine and anti- irritation activity. The anti –inflammatory of oat meal has also been evaluated which provides us dermatological benefits **[16, 17]**.

OATS AND PRO-APOPTOTIC PROPERTIES: In *Avena Sativa* Linn growth inhibitory effect of polysaccharides grains was experimented in skin melanoma

HTB-140 cells in vitro. Also it develops as an anti-tumour agent **[18, 46, 47]**.

OATS AND POSTMENOPAUSE: The toxicity of some types of bile acids is reduced by the soluable fibres in oat meal, which lessens the risk of several types of cancer. According to the findings of a prospective study, postmenopausal women have a 35 percent decline in these activities **[19, 48, 49, 50, 51]**.

5.CONCLUSION:

Medication and therapy which are based on natural system plays an vital role in handling several diseases like cancer, postmanopose, cardiovascular disease, diabetics , various infections, blood pressure, immanent products with large molecular diversity and unique biological function without any side effect gets a first choice for drug development in cancer and several disease. In case of tumour or cancer normal cell growth, differentiation behaviour is lost, and occurs in alteration in regulation of cell cycle. As a potential tumorigenic cell inhibitor, Avns block the continuous proliferation of tumor causing cells by binding to their receptors. Oats are high in B vitamins, proteins, fats, minerals, and the heart-healthy soluble fibre, glucan. It also comprises in controlling of diabetics and lipid profile. Oats is having legume protein avenalin for about (80%) **[20]**. Hence it provides benefits to biological activity. Mainly it is adopted for crash over weight. In comparison to other pulses and wheat it is having high protein and fiber portion. Oats also contributes nutritional stability, as well as safeguarding against potential flaws.

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