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Study of pharmacological effect of Avena sativa: A review

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ABSTRACT

Avena sativa sometimes called the common oatis a species of cereal grain grown for its seed, which is known by the same name (usually in the plural, unlike other cereals and pseudocereals).The aim of this study was to overview its therapeutic effects than its nutritive and industrial effects. This review article was carried out by searching studies in PubMed, Medline, Web of Science, and Iran Medex databases .The initial search strategy identified about 128 references. In this study, 1 13*studies was accepted for further screening and met all our inclusion criteria [in English, full text, therapeutic effects of Avena sativa and dated mainly from the year 1964 to 2015.The search terms were "Avena sativa.", lemon balm, "therapeutic properties", "pharmacological effects". It is commonly used for cognitive function, antioxidant effect, anti-thrombosis effect, anti-inflammatory activities, Pro-apoptotic properties, pharmacology, and hemodialysis. Avena sativa is widely used for therapeutic and non-therapeutic purposes that trigger its significant value. Various combinations and numerous medicinal properties of its extract, oil, and leaves demand further and more studies about the other useful and unknown properties of this multipurpose plant.*

Keywords: Avena sativa, Phytochemicals, Therapeutic effects, Pharmacognosy, Alternative and complementary medicine.

INTRODUCTION

The oat (*Avena sativa*), sometimes called the common oat[1, 2], is a species of cereal grain grown for its seed, which is known by the same name (usually in the plural, unlike other cereals and pseudocereals)[3-5]. While oats are suitable for human consumption as oatmeal and rolled oats, one of the most common uses is as livestock feed. The wild ancestor of *Avena sativa* and the closely related minor crop, *A. byzantina*, is the hexaploid wild oat *A. sterilis*. Genetic evidence shows the ancestral forms of *A. sterilis* grew in the Fertile Crescent of the Near East. Domesticated oats appear relatively late, and far from the Near East, in Bronze Age Europe. Oats, like rye, are usually considered a secondary crop, i.e., derived from a weed of the primary cereal domesticates wheat and barley [6, 7]. As these cereals spread westwards into cooler, wetter areas, this may have favored the oat weed component, and have led to its domestication[8, 9].

Oats have numerous uses in foods; most commonly, they are rolled or crushed into oatmeal, or ground into fine oat flour [10-12]. Oatmeal is chiefly eaten as porridge, but may also be used in a variety of baked goods, such as oatcakes, oatmeal cookies and oat bread. Oats are also an ingredient in many cold cereals, in particular muesli and granola [13, 14]. Oats are also commonly used as feed for horses when extra carbohydrates and the subsequent boost in energy are required. The oat hull may be crushed ("rolled" or "crimped") for the horse to more easily digest the

grainor may be fed whole. They may be given alone or as part of a blended food pellet. Cattle are also fed oats, either whole or ground into a coarse flour using a roller mill, burr mill, or hammer mill [15-18].

Oats are also occasionally used in several different drinks [19-21]. In Britain, they are sometimes used for brewing beer. Oatmeal stout is one variety brewed using a percentage of oats for the wort. The more rarely used oat malt is produced by the Thomas Fawcett & Sons Maltings and was used in the Maclay Oat Malt Stout before Maclays Brewery ceased independent brewing operations [22-24]. A cold, sweet drink called *avena* made of ground oats and milk is a popular refreshment throughout Latin America. Oatmeal caudle, made of ale and oatmeal with spices, was a traditional British drink and a favourite of Oliver Cromwell. Oat extract can also be used to soothe skin conditions[25-27].Oat grass has been used traditionally for medicinal purposes, including to help balance the menstrual cycle, treat dysmenorrhoea and for osteoporosis and urinary tract infections[28-30].

Cognitive function

The effects of single doses of the green-oat extract (GOE) across a broad range of cognitive domains in healthy adults aged 40-65 years who self-reported .Working memory span (Corsi blocks) was also increased, but only on the second occasion that this dose was taken. Discussion These results confirm the acute cognitive effects of GOE seen in previous research, and suggest that the optimal dose lies at or below 800 mg[23].

Antioxidant effect

The impact of lead on growth, metal uptake and antioxidative potential of oat seeds under metal stress was evaluated. The results indicated that even at the lowest concentration tested, a low inhibition of growth was obtained[24].

the relationship between lifespan and mitochondria, including antioxidant systems, ultrastructure, and the hydrogen peroxide and malondialdehyde contents in 4 h imbibed oat (Avena sativa L.) seeds was examined. The scavenging role of mitochondrial superoxide dismutase was inhibited in imbibed oat seeds aged at the early stage. Monodehydroascorbate reductase and dehydroascorbate reductase played more important roles than glutathione reductase in ascorbate regeneration in aged oat seeds during imbibition[25].

Key processes involved in drought tolerance was defined. These changes are likely to maintain plant water status, with any photoinhibitory effect being counteracted by an efficient antioxidant capacity, thereby representing an integrated mechanism of drought tolerance in oats. [26].

The changes of GABA, phytate, natural antioxidants and antioxidant activity of tempeh-like fermented oats was studied. It was demonstrated that oats fermented by generally recognized as safe (GRAS)fungi can be recommended as tempeh-like functional foods with higher GABA, more natural antioxidants and lower phytate compared with native oats[27].

the optimum level of a maize-soybean meal-wheat bran concentrate supplement fed to captive spotted deer fed an oat and berseem fodder-based diet were examined. Animals fed 1 kg of supplementary concentrate received energy in excess of requirements, were consistently gaining body mass and were prone to obesity. Thus, it is a right strategy to supplement forage only diet of captive spotted deer with 0.5 kg of concentrate[28].

Anti-thrombosis effect

The capacity of peptides released from oat, highland barley, and buckwheat proteins after enzymatic digestion to inhibit platelet aggregation in vitro was investigated. antiplatelet peptides from grain hydrolysates and the binding modes at the molecular level were introduced, leading to their possible use as functional food ingredients to prevent thrombosis[15].

Anti-inflammatory activities

The exact mechanism of action for the anti-inflammatory activity of colloidal oatmeal was investigated. The results demonstrate that colloidal oat extracts exhibit direct anti-oxidant and anti-inflammatory activities, which may provide the mechanisms for observed dermatological benefits while using the colloidal oatmeal skin protectant lotion[26].

Pro-apoptotic properties
The growth-inhibitory effect of polysaccharide from Avena sativa L. grains was explored on the human skin melanoma HTB-140 cells in vitro. The result showed preliminary insights into this direction along with perspectives of developing it as an anti-tumor agent[31].

Pharmacology
The pharmacology of Avena sativa has been investigated in laboratory animals following a report that tincture of Avena sativa reduced the craying for cigarettes in man. The aqueous extract prepared from the tincture did not affect the seizure threshold to bemegride or nicotine or the sleeping time induced by barbitonesodium[32].

Hemodialysis
The effects of Avena sativa, diluted vinegar, and hydroxyzine on the reduction of uremic pruritus was studied.Avena sativa lotion significantly decreased the mean scores of pruritus intensity, consequences, and the verbal descriptor, although it did not have a significant effect on the frequency of pruritus and the pruritic surface. Vinegar and hydroxyzine significantly decreased all of the scores. Conclusions. Avena sativa, vinegar, and hydroxyzine were effective in decreasing pruritus. Diluted vinegar and Avena sativa can be used as a complement to hydroxyzine, which is itself a common pharmaceutical therapy[33].

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