Assessment of anti-depressant activity of ethanolic extract of wheatgrass

Deepak K. Birla*, Arun Patidar, Deepshikha Kukde

BM College of Pharmaceutical Education & Research, Indore, M.P., India

ABSTRACT

Objective: This study was undertaken to evaluate the possible antidepressant effect of Ethanolic extract of Wheatgrass using Chronic models (14 day study) of Tail suspension test (TST) and Forced Swim Test (FST) in Swiss Albino rats.

Methods: Wheat grass were collected and extraction of dried wheat grass was carried out using a Soxhlet apparatus to obtain Ethanolic extract. The extract of Wheatgrass showed the significant antidepressant activity comparable to the standard drug. Wheatgrass extract at doses 100 mg/kg & 200 mg/kg respectively as comparable to that of standard drugs.

Results: Preliminary Phytochemical investigation of ethanolic extract of Wheatgrass shows presence of flavonoids, alkaloids, saponins, tannins, terpenoids, sterols etc. The results of the present study indicate the potential for use of Wheatgrass as an adjuvant in the treatment of depression.

Conclusions: The ethanolic extract of wheatgrass was found to be antidepressant effect.

Keywords: Wheatgrass, Tail suspension test, Forced swim test, Antidepressant

Introduction

According to the World Health report, approximately 450 million people suffer from a mental or behavioral disorder. This amounts to 2.3% of the global burden of disease, and will rise to 15% by 2020. Psychiatric illness is also often associated with suicide and there are between 10 and 20 million suicide attempts every year. The use of plant products for the treatment of human ailments has been a natural approach to health care since the beginning of civilization. In the search for new therapeutic products for the treatment of neurological disorders, medicinal plant research, worldwide, has progressed constantly, demonstrating the pharmacological effectiveness of different plant species. Depression is the most prevalent mental disorder and depression is recognized to be symptomatic ally, psychologically and biologically.

The disorder was characterized by loss of energy, retardation of thinking and activity, as well as profound despair and suicidal ideation. Wheatgrass has a multitude of positive aspects ranging from its ability to assist the body fight serious illnesses to making your skin look good healthy and rejuvenated. Depression is a
heterogeneous disorder that affects a person’s mood, physical health and behaviour. Anti-depressant drugs such as tricyclic anti-depressants and selective serotonin re uptake inhibitors (SSRI) are used to treat depression showing various side effects and thus, the search for a new anti-depressant without side effects is deemed important.

Wheatgrass hosts a lot of beneficial nutrients including enzymes and vitamins and a range of mineral deposits that are essential to right functioning of our bodily systems. Particularly wheatgrass will be loaded with a substance called chlorophyll. Some say the item represents the blood of the plant. Seemingly it is very comparable to the human beings blood protein hemoglobin along with our bodies are able to change chlorophyll into hemoglobin easily therefore chlorophyll improves blood matter. It also bolsters our own immune sy stem and has a huge role in detoxifying techniques in our bodies.\textsuperscript{3,4}

Materials and Methods

Phytochemical analysis

The Ethanolic extract of wheat grass was subjected to qualitative phytochemical analysis for flavonoids, alkaloids, saponins, tannins, terpenoids, sterols and others using standard procedures.\textsuperscript{5}

Experimental methods

1. Preparation of extract

Collection of wheat grass from local region and fresh juice of wheat grass was prepared by Continuous hot percolation method in Soxhlet apparatus. The extract was concentrated under pressure and then dried in air.

2. Animals

Adult male Swiss Albino rats, weighing approximately 200-250g were used and all the procedures in the study were performed in accordance with the Institutional animal ethics committee as per the guidelines laid by CPCSEA.

3. Grouping:

Animals were divided into 4 groups, each group consisting of 6 rats

GROUP 1: Received no treatment and served as control, 1% gum acacia (10 ml/kg).

GROUP 2: Received test drug Wheatgrass (100 mg/kg) per orally.

GROUP 3: Received test drug Wheatgrass (200 mg/kg) per orally

GROUP 4: Received standard drug i.e., Imipramine (10 mg/kg).

Procedures

Forced swim test (FST)

Forced swim test, the most frequently used behavioral model for screening antidepressant-like activity in rodents, was first proposed by Porsolt., et al. The procedure was same as followed previously.

Rats were individually forced to swim in open glass chamber (25 \times 15 \times 25 cm) containing fresh water to a height of 10 cm and maintained at 26\degree \pm 1\degree C. At this height of water animals were not able to support themselves by touching the bottom or the side walls of the chamber with their hindpaws or tail. Water in the chamber was changed after subjecting each animal to FST because “used water” has been shown to alter the behavior.\textsuperscript{6,8}

Tail suspension test (TST)

Tail suspension test commonly employed behavioral model for screening antidepressant-like activity in rats, was first given by Steru, et al. Animals were moved from their housing colony to laboratory in their own cages and allowed to adapt to the laboratory conditions for 1-2 hr. Each rat was individually suspended to the edge of a table, 50 cm above the floor, by adhesive tape placed approximately 1 cm from the tip of the tail. Each animal under test was both acoustically and visually isolated from other animals during the test. Animal was considered to be immobile when it didn’t show any body movement, hung passively and motionless. The
test was conducted in a dim lighted room and each rat was used only once in the test.  

**Results and Discussion**

The present work was subjected to investigation for the evaluation of the antidepressant activity of ethanolic extract of wheat grass. Forced Swim test and Tail Suspension test are the most commonly used preliminary screening tests for characterizing potential antidepressant drugs. Wheatgrass (100 and 200 mg/kg) significantly (p<0.01) and dose dependently decreased the immobility time as compared to control rats (Table 1).

The findings that Wheatgrass significantly decreases the time of immobility in FST and TST and increases the number of rotations in FST with water wheel as compared to vehicle control. The extent at the dose of 200 mg/kg showed the nearly same activity as Imipramine (p<0.01), in decreasing Immobility period. It has been argued that the TST is less stressful than FST and has greater pharmacological sensitivity. Remarkably, TST detects the anti-immobility effects of a wide array of antidepressants TCA, SSRI, MAOI, electro convulsive shock and even atypical antidepressants. Thus, the activity of Wheatgrass could involve one of the mechanisms for the established agents as described above.

**Conclusions**

Hence Wheatgrass extract possesses antidepressant effect in animal models of depression which was comparable to that of Imipramine. From the above study, we conclude that the extract of Wheatgrass show a significant anti-depressant activity in Tail Suspension Test (TST) and Forced Swim Test (FST) models of depression. Thus, we can say that Wheatgrass significantly reduces the Immobility Period in both Tail Suspension Test (TST) and Forced Swim Test (FST).

Funding: No funding sources
Conflict of interest: None declared

**Table 1:** Effect of Wheatgrass on duration of Immobility time in the chronic Study (14 days) of tail suspension test (TST) and forced swim test (FST) using rats.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Group</th>
<th>Dose (mg/kg)</th>
<th>TST Duration of Immobility</th>
<th>FST Duration of Immobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group 1 (1% Gum Acacia)</td>
<td>(10ml/kg)</td>
<td>165.7±3.56</td>
<td>148.7±3.72</td>
</tr>
<tr>
<td>2</td>
<td>Group 2 (Wheatgrass)</td>
<td>100</td>
<td>138.6±1.3**</td>
<td>132.7±1.19*</td>
</tr>
<tr>
<td>3</td>
<td>Group 3 (T Wheatgrass)</td>
<td>200</td>
<td>130.2±0.50**</td>
<td>118.2±0.30**</td>
</tr>
<tr>
<td>4</td>
<td>Group 4 (Imipramine)</td>
<td>10</td>
<td>128.5±5.45**</td>
<td>115.23±0.85**</td>
</tr>
</tbody>
</table>

Values represented: Mean±SEM (n=6), *P<0.05, **P<0.01 vs. control
References