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PHARMACOLOGICAL STUDIES OF *BRASSICA NAPUS* L. COLLECTED FROM JAFFERABAD BALOCHISTAN

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ABSTRACT

Current study was carried out to explore the pharmacological activities of *B. napus*. Plant material was collected from Jafferabad district of Balochistan. Ethanolic extract was tested for analgesic and neurpharmacological activities. Ethanolic extract showed significant analgesic activity in both formalin and acetic acid testat250 and 500 mg/kg. In neurpharmacological activities ethanolic extract showed significant depressant effect in forced swimming, open field, cage crossing, rearing and traction tests. Results showed that the plant extract can be utilized as alternative treatment for analgesic and depressive disorder.

Keywords: *Brassicanapus*, Jafferabad, Balochistan, neurpharmacological activities

INTRODUCTION

Traditional herbal medicine is plant derived substances with minimal or no industrial processing that have been used to treat various ailments for healing purpose [1]. However there are no specific methods for standardization of herbal drugs used in crude

form, the quality control and assurance depend on the providers and dispensers, and their complete solution depends on collaboration with manufacturers and officials to certify reliable standards [2]. Many plants show nutritional and antimicrobial aspects have been studied worldwide for many years [3].

In Pakistan traditional medicines play a vital part in traditional treatment and health care system mostly in rural areas. Nevertheless, proper handling and lack of knowledge and rational utilization is serious issue in our health care system [4].

The highlands area of the Northern part of Balochistan is well known for valuable medicinal and endemic pant. These medicinal plants are mostly used for the treatment of various illnesses in local population. In Balochistan province there is less scientific information regarding medicinal plants use [5].

Brassica napus L. (Cruciferae), is one of the cultivated medicinal food plants in Middle Asia, North Africa and West Europe. In Iranian traditional medicine, the root part of this plant was used for the therapeutic properties i.e. diuretic, anti-scurvy, anti-inflammatory of bladder and anti-gout [6]. In Balochistan (Pakistan) it is used in crude form for the treatment of various disorders. Current investigation was undertaken to explore the analgesic and neuro-pharmacological activities of *B. napus.*

MATERIAL AND METHODS

Plant Material

B. napus (whole plant) was obtained from District Jafferabad, Balochistan, Pakistan, was identified and Voucher Specimen No. MA. 398was deposited in the Pharmacognosy Department, Faculty of Pharmacy and Health Sciences, University of Balochistan, Quetta.

Extraction

Crude extract of plant material was obtained by soaking the plant in methanol and solvent was evaporated by using rotary evaporator.

Experimental Animals

For experiments male and female mice, weighing between 25 - 30 grams purchased from the animal house of Dow University of Health Sciences, Karachi. All the animals were kept in accordance with standard laboratory procedures.

Neuropharmacological activities

Forced swim test (FST)

The test animals were divided into 4 groups, Control (None treated) group, *B. napus* crude ethanolic extract 250 and 500mg/kg treated group and Diazepam (2mg/kg) treated group to distinguish the behavior and the

antidepressant action of mice against the test drug [7].

The mice were put in a forced swim apparatus (containing water) and were allowed to swim for six minutes, while observing the mobility and immobility time. Increase in immobility reveals the antidepressant activity [8, 9, 10].

Rearing test

This test determines the central excitatory behavior of test animal [11, 12, 13]. Number of upward movement of the forelimbs with the beaker walls were observed for ten minutes [14].

Open field test

In this test the locomotion of mice was tested through a plastic made apparatus, in which the number of upward movement of the mice was observed for 10 minutes [15].

Cage crossing test

In a plastic cage the number of crossings from one side to the other was determined for 10minutes [16].

Traction test

In this test, time taken by the mice to cross1 meter long iron rod, any increase or decrease of time in the activity estimated that plant material is sedative or stimulant effect [17].

Analgesic Activity

Formalin Test

The test mice were injected 20 µl of formalin subcutaneously in the dorsal right hind paw. Time spent in licking in first 0-5 minutes was taken first phase, time spent in licking from 15-30 minutes taken second phase [19, 20].

Acetic Acid Induced Writhing Test.

Four groups of mice were used in this test. Group I was administered distilled water 1ml/kg, *B. napus* crude ethanolic extract 250 and 500 mg/kg was administered to Group II and III and 50mg/kg Diclofenic sodium (standard drug) was too administered to Group IV. All the doses were administered orally 30 minutes before injecting acetic acid [18].

Statistical analysis

All the data was processed either by ANOVA with significant level 0.05 [21].

RESULTS

Results of swimming test (Table 1) displays results of the mobility time 212.2± 2.42 in control group, with 250 and 500 mg/kg of *B. napus* was 155±1.83 and 142 ±1.22 respectively and with Diazepam was 136 ±1.22.

The immobility time for control was 148.8 sec± 1.83 in control group, with 250 and 500 mg/kg of *B. napus* was 205 sec±1.30 and 218 sec±1.00 respectively and with Diazepam was 224 sec±1.22.

Results of rearing activity (table 3) reflects that activity was 53± 2.88 in control group, with 250 and 500 mg/kg of *B. napus* was 16.8± 2.33and 17.4± 1.07respectively and with Diazepam was 12.8± 3.55.

Results of open field activity (table 3) reflects that open field activity was 146±30.73 in control group, with 250and 500 mg/kg of *B. napus* was 112±10.2and 89± 6.96 respectively and with Diazepam was 59.06 ± 0.51.

Results of cage crossing activity (table 3) displays the results of cage crossing activity was 39±1.92in control animals which were dosed with normal saline, 250 and 500 mg/kg of *B. napus* was 65 ± 6.35 and 38±4.23 respectively of test and 2 mg/kg diazepam was 21±0.68 (standard drug).

Results of traction test activity (table3) in test subjects showed the result of traction test 47.2+2.01 in control animal which was given a dose with normal saline, 250 and 500 mg/kg of *B. napus* was 22.28+2.02 and 20.4±1.03of test drug and 2 mg/kg diazepam was 14.8 ± 2.4 (standard drug).

Analgesic test

Formalin test

In formalin test (table 4) number of licking and biting activity (1st phase) was 25.4±4.53in control group, with 250 and 500 mg/kg of *Brasica napus* was 32±4.43 and 13.5±6.6573 respectively and with Diclofenic sodium was 41.2±3.28.

The number of licking and biting activity (2nd phase) was 52.66±18.12 in control group, with 250 and 500 mg/kg of *Brasica napus* was 24±9.09 and 53.66±15.74 respectively and with Diclofenic sodium was 33.66±2.225 (table 5).

Results of analgesic test (acetic acid induced pain) in control mice (table 6),number of writhes were 54.8±3.45, in control group, with 250 and 500 mg/kg of *B. napus* was 26.04±0.81 and 21.25±1.02 respectively and with Diazepam was 18.8±1.61.

Table 1: Effect of *B. napus* ethanolic extract on force swimming (mobility time) test in mice

Treatment	Dose mg /kg orally	(Mean No. of observations ±S.E.M) (seconds)
None Treated (Control)	0.5ml Saline	212.2± 2.42
Crude extract of *B. napus*	250 mg/kg	155±1.83
	500mg/kg	142 ±1.22
Diazepam	2mg/kg	136 ±1.22

Table 2: Effect of *B. napus* ethanolic extract on force swimming test in mice (immobility time)

Treatment	Dose mg /kg orally	(Mean No. of observations ±S.E.M) (seconds)
None Treated (Control)	0.5ml Saline	148.8 ± 1.83
Crude extract of *B. napus*	250 mg /kg	205±1.30
	500 mg /kg	218±1.00
Diazepam	2mg /kg	224±1.22

Table 3: Neuropharmacological activities of *B. napus* ethanolic extract

Treatment	Dose mg /kg orally	(Mean No. of observations ±S.E.M)			
		Open field	Gage Crossing	Traction	Rearing
None Treated (Control)	0.5ml Saline	146 ± 30.73	39+1.92	47.2+2.01	53+ 2.88
Crude extract of *B. napus*	250 mg/kg	112±10.2	65 + 6.35	22.28+2.02	16.8+ 2.33
	500mg/kg	89.+6.95	38+4.23	20.4+ 1.03	17.4+ 1.07
Diazepam	2mg/kg	59.6±051	21+0.68	14.8 + 2.4	12.8+ 3.55

Table 4: Formalin test (phase 1) of *B. napus* ethanolic on mice

Treatment	Dose mg /kg orally	First Phase (Mean No. of observations ±S.E.M)
		Number of Licking & Biting
None Treated (Control)	0.5ml Distill water	25.4±4.53
Crude extract of *B. napus*	250 mg /kg	32±4.43
	500mg/kg	13.5±6.65
Diclofenic sodium	50mg/kg	41.2±3.28

Table 5: Formalin test (phase 1) of *B. napus* ethanolic on mice

Treatment	Dose mg /kg orally	Second Phase (Mean No. of observations ±S.E.M)
		Number of Licking & Biting
None Treated (Control)	0.5ml Distill water	52.66±18.12
Crude extract of *B. napus*	250 mg /kg	24.±9.09
	500 mg /kg	53.66±15.74
Diclofenic sodium	50mg /kg	33.66±2.225

Table 6: Effect of *B napus* ethanolic extract on acetic acid induced writhing test on mice

Treatment	Dose mg /kg orally	(Mean No. of observations ±S.E.M)
Non Treated (Control)	0.5 ml Distil Water	54.8±3.45
Crude extract *B. napus*	250 mg/kg	26.04±0.81
	500 mg/kg	21.25 ±1.02
Diclofenic Sodium	50 mg/kg	18.8±1.61

DISCUSSION

In Open field activity crude extract of the test drug decreases the locomotion. Locomotive property is a sign of alertness or watchfulness and reduction locomotion is a sign of softness and peaceful i.e. Condensed CNS nervousness [22, 23, 24]. *B. napus* extract decreased the number of Open field, cage

crossing, rearing and traction time afterward influenced the locomotor activity and results were comparable with standard drug Diazepam. Diazepam belongs to benzodiazepine group is a CNS management agent addressing sleep ailments like insomnia. It has a binding site on GABA receptor type that is ionophore complex [25]. The neuronal inhibition increase through GABA leads sedation (less of motor activity) which is intervened by α1 GABA receptors [26] it is hypothesized crude extract of *B. napus* may act like benzodiazepines

In forced swimming test the ethanol extract of *B. napus showed* decrease in mobility time, thus, the antidepressant like activity shows decline in the immobility time by animals in swimming test. Anti-depressant activity caused by inhibitors (monoamine oxidase, selective 5-HT reuptake, tricyclics and atypicals) produces change in behavior. Therefore, outcomes advised profile from *B. napus* which is antidepressant in nature [27].

In forced swimming test the ethanol extract of *B. napus showed* decrease in mobility time, findings of current study suggest that the anti-depressant effects of *B. napus* in this test may be related to the inhibitory activity of MAO.

Ethanol extract of *B. napus* showed significant analgesic results in writhing and formalin test which indicates *B. napus* contains pharmacologically active constituents. Analgesic agents can block/release endogenous substances liable for exciting the nerve endings [28, 29]. The efficacy of peripheral analgesia of *B. napus* was comparable to Diclofenic (10 mg/kg) with important dissimilarity noticed in protection from acetic acid persuaded writhing, whereas the formalin prompted nociception is bi-phasic which is advocate of direct stimulation in the first stage which is related with sensory nerve fibers releasing discomfort of neuropathic nature [30].

CONCLUSION

The current study was carried out on pharmacological activities of *B.napus* ethanolic extract.

Further studies are also required to isolate the active chemical constituents to find out compound responsible for pharmacological activity.

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