Proceeding S.Z.P.G.M.I. vol: 22(2): pp. 69-72, 2008.

Evaluation of Analgesic activity of *Mucuna pruriens* Linn. Seeds

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ABSTRACT

Pain is one of the most common symptom though having protective role, but usually unpleasant. So far medicines available for its management are not only partly effective but having significant adverse effects. **Purpose of study:** To evaluate the analgesic activity of *Mucuna pruriens* Linn. seed powder. **Materials and Methods:** This study has been carried out in five groups of albino mice, having 8 animals each. Three different doses of *Mucuna pruriens* Linn seed powder has been given to three groups and analgesic activity has been compared with the other two groups, standard and control. Formalin paw licking test has been used to evaluate the analgesic activity and decrease in the number of lickings in 30 minutes after formalin injection has been interpreted as analgesic activity. **Results:** *Mucuna pruriens* Linn Seeds showed significant analgesic activity as depicted by decrease in number of lickings in 30 minutes period i.e, seeds in 1gm/kg group, 32.625 ± 6.13 and group receiving seeds 2gm/kg 24.25 ± 6.64. Group receiving 3gm/kg seed powder is 21.0 ± 8.48 which is significantly less than the control which is 44.125 ± 5.88 ($p < 0.05$). **Conclusion:** *Mucuna pruriens* seeds powder showed significant analgesic activity in all three groups and activity increases with increasing the dose of the seed powder.

Key words: *Mucuna pruriens* Linn., Analgesics, Formalin paw licking test

INTRODUCTION

Pain differs from other sensations in that it sounds a warning that something is wrong, it preempts other signals and it has been associated with an unpleasant effect[1]. It is one of the most common symptoms and more often than not is accompanied by inflammation[2]. High prevalence of pain (53.7%) has been found and has shown a clear association with occupational activity indicating considerable socio-economic costs[3].

Coming towards the pharmacological management of pain, non-steroidal anti-inflammatory drugs (NSAIDS) and opioids are the mainstay[4]. Pain arising from the inflammatory conditions is often treated with agents that inhibit the immune response, such as corticosteroids or modulators of inflammatory cascade, such as NSAIDS. These drugs are associated with substantial adverse effects and risks with long term use, ranging from gastrointestinal insult to opportunistic infections and osteoporosis. While opioid receptor agonists have limited or more likely poorly understood anti-inflammatory action, they remain useful effective analgesic agents in these conditions[5]. But their use has been associated with constipation, sedation, nausea and vomiting, cognitive impairment and respiratory depression[6,7].

Current analgesia inducing drugs such as opioids and NSAIDS cannot be used in all cases because of their side effects and potency. As a result, search for other alternatives seems necessary[8]. Many medicines of plant origin have been used since long time without any adverse effects. It is therefore essential that efforts should be made to introduce new medicinal plants to develop cheaper drugs[9]. The research into plants with alleged folkloric use as pain relievers should

therefore be viewed as a fruitful and logical strategy in the search for new analgesic drugs[10].

Many plants have been evaluated for their analgesic activity so far. *Mucuna pruriens* Linn is a plant of family Leguminoseae[11] and has been found to be used in the treatment of dysmenorrhea, fever and joint inflammations[12]; but no study has been documented so far. So to evaluate is role as an analgesic agent, the present study has been conducted.

Purpose of the study

To evaluate the analgesic activity of the *Mucuna pruriens* Linn. Seeds.

MATERIALS AND METHODS

Materials required

a. Seeds of *Mucuna pruriens* Linn. have been purchased from a herbal dealer in Faisalabad. The plant seeds have been identified and authenticated from the Herbarium maintained by the department of Botany, University of Agriculture, Faisalabad. They have been kept at normal room temperature.
b. Aspirin (Manufactured by RECKITT BENCKISER, Pakistan Ltd.) purchased from local pharmacy.
c. Formalin (Formaldehyde solution 37% manufactured by Merck, Germany) purchased from local pharmacy.

Animals required

Wister albino mice of either sex weighing 20-25 gm have been used. Total 40 animals have been used. They have been housed in standard polypropylene cages and kept under controlled room temperature (25 + 10C; relative humidity 60-70%) and fed with standard laboratory diet with water ad libitum.

Grouping and drug administration

Forty animals have been divided in 5 groups. Group I (control) received gum tragacanth solution (1 ml/kg/p.o.). Group II (standard) got Aspirin 100mg/kg/p.o. Group III, IV and V received 1, 2 and 3 gm seed powder per kg/p.o.

Analgesic activity

Formalin induced paw-licking test

Three different doses of seed powder have been given to the Group III, IV and V and animals of group I got gum tragacanth solution while of group II have got Aspirin. One hour later, the analgesic activity has been determined by using formalin test[13]. Fifty microlitres of 2.5% formalin has been injected into the dorsal surface on the left hind paw of mice. The mice have been observed for 30 minutes after injection of formalin, and the number of lickings during the 30 minutes observation period has been recorded. The results have been recorded as number of lickings.

Adverse effects

he animals have been observed for any change in their dietary intake, motor activity and any change in awareness for a period of a week. Further more, blood samples of the animals receiving seed powder have been sent for mutagenicity testing by Comet Assay.

RESULTS

To determine the analgesic activity, the number of lickings has been recorded in all the five groups of animals and are given in Table 1.

Table 1: Number of lickings in all groups of mice

No. of animal	Group I Control	Group II Standard	Group III Seeds 1g/kg	Group IV Seeds 2g/kg	Group V Seeds 3g/kg
1	40	12	25	24	18
2	53	22	27	16	38
3	50	24	35	19	11
4	36	16	29	30	20
5	44	15	39	20	27
6	47	19	33	36	23
7	45	21	30	21	14
8	38	13	43	28	17

Data has been analyzed by using ANOVA and analgesic activity of the groups has been shown in the Table 2.

Group III, IV and V all have shown significant analgesic activity and activity is more

significant in group IV and V as shown by statistical analysis ($p < 0.05$).

Table 2: Analgesic activity of all groups of mice

Group	Mean no. of lickings ± S.D*	Comparison
I (Control)	44.125 ± 5.88	a
III (Seeds 1g/kg)	32.625 ± 6.13	b
IV (Seeds2g/kg)	24.25 ± 6.64	c
V (Seeds 3g/kg)	21 ± 8.48	c
II (Standard)	17.75 ± 4.39	c

Standard error (SE) = 2.82
*Standard deviation
*The mean values showing same letters are statistically similar
$P < 0.05$

Figure 1 showing mean number of lickings in all groups of mice depicting analgesic activity of the seeds in increasing doses

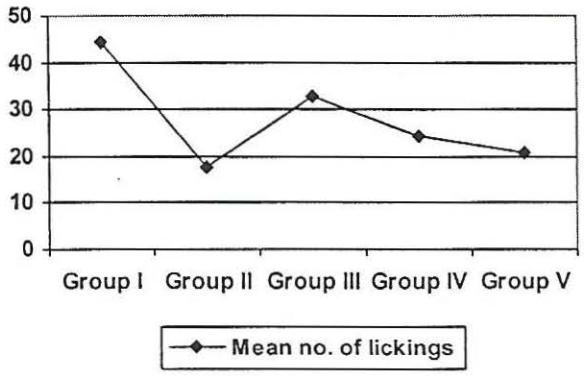

Fig. 1. Showing mean number of lickings in all groups of mice.

No adverse effects have been observed in any animal and the blood samples sent for Comet assay have shown negative result for any DNA damage or alteration by the plant.

DISCUSSION

Pain is associated with pathophysiology of various clinical conditions like arthritis, muscular pain, cancer and vascular diseases. A number of natural products are being used to treat relief of symptoms from pain. The plant has been used in the past for the treatment of dysmenorrhea, fever, spasms and muscular pains and so tested for its analgesic activity and to investigate the traditional use of the plant for pain and fever.

The analgesic activity of the plant has been tested by formalin induced paw licking test and it revealed that *Mucuna pruriens* plant possesses significant analgesic activity as shown in statistical analysis. The activity is dose dependent and it increases by increasing the doses of seed powder starting from 1gm/kg and increasing it upto 3gm/kg body weight. This might result in significant activity as the dose is increased further. It can be possible that by further increasing the dose of the seeds, we can get much better response and much better or even comparable activity to aspirin.

The significant analgesic activity of the plant seeds justify the traditional use of this plant in the treatment of pain and other inflammatory conditions and validate the claim of being used for the said purpose in folklore medicine.

In our study, we did not observe any side effects of the plant which indicates its safety if used as potential future medicine. Plants are also known to possess mutagenic potential like Vinca alkaloids and Texans from the bark of western yew. These drugs are notorious for their number of side effects including inflicting damage to the DNA of the cells. To further establish the safety of the plant, blood samples of the animals receiving the maximum dose of seed powder were submitted for comet assay which did not provide ant evidence of mutagenicity.

These studies are valuable for identifying lead compounds for analgesic drugs, keeping in mind the side effects of non-steroidal anti-inflammatory drugs and corticosteroids like hypertension, gastrointestinal upsets, peptic ulcer, diabetes mellitus etc. Animal data is valuable for developing cost effective and efficacious anti-inflammatory agents. This further supports the correlation of reverse pharmacology with Ayurvedic drug actions.

CONCLUSION

On the basis of our study and statistical analysis, it can be concluded that *Mucuna pruriens*

Linn. seeds possess significant analgesic activity which increases with the increments in the dose of the seed powder. We did not observe any adverse effects including mutagenicity of the seeds. In the light of our study there is a scope of further work on plant with possibility to isolate the pure drug which may be more potent and free of adverse effects.

REFERENCES

1. William F. Ganong. Review of Medical Physiology. 2005; 22:142.
2. David Julius & Allan I. Basbaum. Molecular mechanisms of nociception. Nature 2001; 413: 203-10.
3. Gerdle Bjorn, Henriksson Chris, Bengtsson Ann. Prevalence of current and chronic pain and their influence upon work and health care-seeking: A population study. 2004; 31: 1399-1406.
4. Davidson. Principles and practice of medicine. 2007; 20:275-78.
5. Kumar and Clark. Clinical medicine.2005; 6: 549-50.
6. Howard Fields. State-dependent Opioid control of Pain. Nature review 2004; 5: 565-75.
7. Nicholson B. Responsible prescribing of opioids for the management of chronic pain. Anasthesiol Intensivmed Notfallmed Schmerzther. 2003; 38 (1):14-26.
8. Somnath N Mule, Sandeep B Patil, Nilophar S Naikwade, Chandrakant S Magdum. Evaluation of anti-nociceptive and anti-inflammatory activity of Gynandropsis pentaphylla Linn. Research article 2008; 2: 87-90.
9. Fayyaz Ahmad, Rafeeq A. Khan, Shahid Rasheed. Study of analgesic and anti-inflammatory activity from plant extracts of Lactuca Scariola and Artemisia Absinthium. J Isl Acad Sci, 1992; 5(2):111-14.
10. M. Gupta, UK Azumder, P. Gomathi and V Thamil Selvan. Anti-inflammatory evaluation of leaves of Plumeria acuminate. BMC complementary and Alternative medicine 2006; 6(36).
11. Melvin E. Daxenbichler, Cecil H. VanEtten, Fontaine R. Earle, William H. Tallent. L-Dopa recovery from Mucuna seed. J. Agr. Food. Chem., 1972; 20(5): 1046.
12. Sathiyanarayanan. L and Arulmozhi. S. Mucuna pruriens Linn. A comprehensive Review. Pharmacog. Rev 2007; 1: 157-62.
13. Ghada-Maria Saddi and Frances V. Abbott. The formalin test in the mouse: a parametric analysis of scoring properties. Pain 2000; 89: 53-63.

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