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ANALGESIC ACTIVITY OF SALVADORA PERSICA IN MICE

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ABSTRACT:

Objective: Higher plants have served human kind as sources of medicinal agents since its earliest beginning. Today, natural products represent more than 50% of the available medicinal agents in use. Traditional medicinal plants are helping mankind since long. These plants have been identified as the means for curing inflammation and subsiding pain because of their low side effect profile and easy availability. This study on Salvadora persica was done to assess its analgesic activity.

Method & Settings: The analgesic activity of Salvadora persica was assessed in mice in the doses of 300, 500 & 700 mg / Kg body weight of tested animals. Animals were divided into three groups, each comprising of seven animals. One group was taken as control, second for the drug to be tested and third one serves as a comparison group with the standard (aspirin).

Results: After 210 minutes of testing, results showed the drug to be effective at 500 and 700 mg/ kg body weight in reducing pain sensation.

Conclusion: The above conducted activity showed that the tested plant has analgesic activity at the concentration 500 and 700 mg / kg body weight. Further studies are required for the purpose of isolating the individual compound having analgesic activity and to identify the concentration required for analgesia in humans.

Key Words: Analgesic, Miswak, Salvadora Persica

INTRODUCTION:

Pain is described by the American society for pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. The response to nocioception is properly labeled pain. Pain is generated in the spinal cord and brain by nocioceptive input. Injuries to the peripheral nervous system, spinal cord or brain can lead to the report of pain, even in the absence of noxious stimulus [1]. Herbal plants have proven as a remedy for curing pain since long. Salvadora persica or miswak can be one such example, which has proven itself as a mean to reduce oral and dental pain since decades.

The use of chewing stick; Salvadora persica (miswak) can be a good alternative to the tooth brush for preventing oral and dental diseases. It is suitable for cleaning all the teeth, it costs little, possesses various medicinal properties, is available in most rural areas of developing countries and requires no expertise or special sources for its production. The use of the chewing stick (Salvadora persica) conforms to the notion of primary health care and has long established association with certain cultural and religious beliefs. It has been addressed in various Hadiths as well

a) It has been narrated on the authority of Anas (may God be pleased with him) said; I admonish you to cleanse your teeth with siwak (Sahi Bukhari).
b) [We have on] the authority of Aisha (may God be pleased) that the Apostle of God (May the Benedictions of God be ever upon him) said that, the tooth stick is a means of purifying the mouth, and is a means of acquiring Gods pleasure [(Nisai),

transmitted by shafai in sahih without an isnad] [2].

Chewing sticks clean not only the teeth but also the tongue. The juice extracted by the chewing process is reputed to have anti-bacterial effects. Chewing sticks are of value as jaw exercisers, notably following injuries to the temporomandibular joint and in reflex induction of copious saliva which is beneficial for both oral and general health[3].

In the last few decades, there is renewed interest in using herbal medicines. There are several reasons for this development, including the perception that pharmaceutical medications are expensive, over-prescribed, and possibly dangerous. Alternatively, herbal medicine is often considered safe because it is being perceived as 'natural'. Herbal remedies are becoming increasingly popular among patients as a complementary treatment for difficult medical problems like arthritis, depression, diabetes, menstrual irregularities, cancer, allergy, eczema, insomnia and pulmonary complaints. [4]

Keeping in mind these benefits of herbal medication and the religious significance of salvadora persica, this study was carried out to search for a less expensive and less toxic analgesic.

MATERIALS AND METHODS:

Study subjects and Protocol: This study was conducted at department of pharmacology, faculty of pharmacy, University of Karachi to detect the analgesic activity of salvadora persica. The animals used were mice, both male and female of the species (albino wistar) on an average weighing 26 gm each. Three groups were made, each group contained seven mice.[5, 6] One group served as control, second was used to test the drug and the third for comparing with standard drug aspirin.

Method: In mouse, analgesia was measured by the latency to withdraw its tail clearly out of water at 51 degree centigrade from water bath[7]. Analgesia was defined as a loss of sensitivity to noxious stimuli without a loss of conscious awareness of the environment or the loss of ability to respond[5] in experimental animals various types of noxious stimuli were used to produce pain, such as, thermal, electrical, chemical

Analytical Method: Mice were held in a restrainer with tail extending out. Then one third of the tail was immersed in a water bath thermostatically maintained at 51 degree centigrade. The time in seconds taken to withdraw the tail clearly out of water was noted as the reaction time. Mice of either sex weighing between 24 – 30 gm were used, and divided into three groups of seven each. The cut off time for tail flick was 180 seconds to avoid injury to the tail tissue.

1.5% saline (control), plant extract (prepared by cutting fresh cleaned plant material into small pieces. The chopped material was macerated with ethanol for 15 days (2 times) at room temperature. The ethanolic extract was then filtered and evaporated under reduced pressure in rotary evaporator to yield a dark brown residue) in doses of 300 mg / kg, 500 mg/kg and 700 mg/kg were given orally by means of a stomach tube. The first reading was taken just before the administration of drug and the later readings were taken after 60, 90, 120, 150, 180 and 210 minutes after drug administration. Total of three readings were taken for each animal at each point, mean was taken and the mean increase in latency was calculated after drug administration.

The criterion for analgesia was post drug latency, which is greater than two times to pre drug average latency. The results for analgesic activity of plant extracts were expressed as Mean increase in latency after drug administration S.E.M. (S) or analgesia T.F.L.D. This was the difference between post drug tail flick latency and pre drug latency. T.F.L.D. actually indicates the extent of analgesia produced; it is measured in terms of seconds.

Table 1

ANALGESIC ACTIVITY OF *SALVADORA PERSICA* AT DIFFERENT DOSES

TIME IN MINUTES	300 mg / kg			500 mg / kg			700 mg / kg		
	Control (Saline)	Treated (Extract)	Standard (Aspirin)	Control (Saline)	Treated (Extract)	Standard (Aspirin)	Control (Saline)	Treated (Extract)	Standard (Aspirin)
ZERO	1.45±0.069	1.50±0.073	3.81±0.096**	1.45±0.069	3.45±0.548**	3.13±0.404**	1.45±0.089	4.5±0.968**	3.042±0.542**
30	1.43±0.068	1.52±0.074	3.98±0.146**	1.48±0.060	3.85±0.736**	3.54±0.292**	1.48±0.060	4.15±1.002**	3.51±0.652**
60	1.43±0.068	1.50±0.078	4.28±0.137**	1.43±0.068	4.92±0.522**	3.59±0.281**	1.43±0.068	6.53±1.096**	4.37±1.010**
90	1.51±0.056	1.58±0.070	4.60±0.145**	1.51±0.056	5.70±0.611**	4.05±0.152**	1.51±0.056	6.53±1.096**	4.31±0.55**
120	1.44±0.064	1.58±0.041	4.97±0.147**	1.44±0.064	6.28±0.764**	5.20±0.746**	1.44±0.064	7.01±1.043**	4.72±0.570**
150	1.44±0.099	1.62±0.052*	5.25±0.172**	1.44±0.099	6.60±0.635**	5.60±0.610**	1.44±0.099	6.14±1.13**	4.01±0.316**
180	1.41±0.060	1.57±0.090*	5.26±0.250**	1.41±0.060	6.37±0.831**	5.46±0.654**	1.41±0.060	6.18±1.008**	3.69±0.317**
210	1.43±0.069	1.62±0.10*	4.54±0.254**	1.43±0.069	6.58±0.951**	4.79±0.715**	1.43±0.069	5.44±0.096**	3.34±0.354**

Each reading consist of average ± standard deviation

**P value < 0.5*

*** P value < 0.005*

RESULTS:

Results of analgesic activity are depicted in the following table 1. The result showed a significant increase (about 40-50% on an average) in tail flick time i.e., an increase in the latency period of the extract treated animals as compared to the control group. The findings suggested that extract of Salvadora persica possesses analgesic activity. The crude extract was used in three doses as 300 mg / kg, 500 mg/kg and 700 mg / kg of tested animals. The results of the extract treated animals, when compared with standard (aspirin at same doses respectively) showed their analgesic activity comparable with aspirin. It is important to note that analgesic activity of crude extract and aspirin increased gradually and found to be maximum at 120-150 min (approx 3 hours) and then started to decline.

DISCUSSION

Salvadora persica is a desert plant of salvadoracae family. Its roots & branches are used as a tooth cleaning stick in many countries.[8] The main purpose of carrying out this research is to observe analgesic activity of a plant with a religious value and to identify the pharmacological properties of these constituents.

The results of the present study are quiet encouraging since the crude ethanolic extract of Salvadora persica showed promising analgesic activity. Analgesic activities was not very significant at 300 mg/kg but were significant at 500 mg/kg and 700 mg/kg, which were comparable with the standard drug aspirin.

This finding is in accordance with the findings earlier quoted in the literature. Mansour et al[9] studied the analgesic effect of miswak decoction when injected to mice. They found it to be more effective against thermal stimuli than chemical ones. According to him it's generally accepted that response to thermal stimuli is mediated via skin pain receptors while response to chemical stimuli in writhing reflex test is mediated via visceral receptors.[10]Therefore, it was assumed that miswak is more effective against peripheral pain than visceral pain. This may explain the traditional claim that miswak decoction relieves oral pain by its application to oral mucosa. The underlying mechanism for miswak analgesic action was unclear. However, as the effect of miswak was antagonized by naloxone, it was speculated that the effects could be mediated via interaction with the opiate system. This deduction is consistent with early findings in this laboratory in which miswak decoction lowers the spontaneous locomotor activity in mice.[11]

Dr. M. Gupta et al. studied the effect of powdered extract of Salvadora persica & some other plants and found the same results[12, 13]

CONCLUSION

Our study results have augmented the fact that salvadora persica has analgesic activity which is more potent for thermal stimulus. Further studies are required to identify the active ingredients of miswak and their mechanism of analgesic activity.

ABBREVIATIONS:

TFLD: Tail Flick Latency Duration
SEM: Standard Error Mean
mg / Kg: Miligram per kilogram

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