ISSN: 2581 – 3633
PubMed - National Library of Medicine - ID: 101745081

International Journal of Medical Science and Advanced Clinical Research (IJMACR)

Available Online at: www.ijmacr.com

Volume – 3, Issue – 3, May – June - 2020, Page No. : 133 - 137

Pharmacological Evaluation of Sedative Effect of Chloroform Extract of Solanum Nigrum in Swiss Albino Mice

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Insomnia is one of the common diseases which can see in humans. Reduced sleep can lead to develop of various disorders. The present study aimed to evaluate the sedative effect of chloroform extract of Solanum nigrum in Swiss Albino Mice.

Materials and Methods: The present study was done in department of Pharmacology, Sree Mookambika Institute of Medical Sciences. Total 4 groups are used in the study. G-I (0.9% normal saline), G-II (Diazepam 5 mg/kg), G-III (Solanmum nigram 100mg/kg) and G-IV (Solanmum nigram 200 mg/kg). All the groups are given phenobarbitone after 30 min and observed the induction of sleep and duration of sleep. SPSS (16.0) version used for analysis.

Results: Group-I showed significant difference sleep induction and duration compared to other groups. Group-II showed decreased induction time and increased sleep duration compared to other groups. Group-IV and group-II showed similar results.

Conclusion: Chloroform extract of Solanum Nigrum showed significant sedative effect as similar to diazepam.

Keywords: Diazepam, Phenobarbitone, Solanum nigrum, Mice, sedative, sleep duration

Introduction

Solanum nigrum Linn is commonly used in the various Ayurvedic preparations. It is commonly known as black night shade. The plant comes under Solanaceae family. There are various subtypes of this family plants are used commonly to treat the health problems. According to literature S. nigrum (Solanum nigrum) is used worldwide to treat insomnia, anxiety inflammation, pain and fever. Pharmacological studies on different parts of this plant have shown its significant antiproliferative, antioxidant, anti-inflammatory, antiseizure, hepatoprotective and antimicrobial effects[1-7]. Sleep disorders are more common in worldwide. There are majorly two problems are observed in insomnia patients. They may either suffering with increased sleep latency or decreased sleep duration. These two problems can be treated by sedative drugs. But due to health issues warranting the use of sedative drugs (anxiety, agitation, and insomnia) have become a common problem worldwide[8,9]. They are associated with addiction and serious adverse drug reactions. To overcome this herbal drugs are best choice because they associated with less adverse drug reactions. Herbal drugs have proven to be a potential remedy and source of bioactive compounds for the treatment of various central nervous system disorders in humans in the past[10]. The approach to new

drugs through natural products has been proven to be a successful strategy for the discovery of newer drugs. In the present study leaves of Solanum nigrum Linn an herbal plant used to explore its potential sedative effects by using its chloroform extract in selected experimental animal models.

Materials and Methods

Study settings : The present study was conducted in the Department of Pharmacology, Sree Mookambika Institute of Medical Science, Kulasekharam, Tamil Nadu for the period of 3 months. The study was approved by Institutional Research Committee (IRC) and Institutional Animal Ethics Committee (IAEC).

Animals : Healthy adult Swiss Albino mice of either sex weighing between 20-30 g were procured from the central animal house, Sree Mookambika Institute of Medical College. A total of 24 Swiss Albino mice were used for the study purpose. After the procurement of the animals they were transferred to the experimental room of the central animal house for a period of 4-5 hrs per day for a total of 7 days for acclimatization under standard husbandry conditions as (Room temperature : 26 ± 2oC, Relative humidity : 70 – 80% and Light: dark cycle : 12: 12hrs). All animals were fed with standard laboratory food pellets and water ad libitum. The animals that were assigned to receive drugs orally were fasted overnight in order to avoid food-drug interaction and to facilitate absorption. All the experiments were conducted during the day time between 10.00 AM and 3.00 PM to prevent the errors in the analysis of data obtained.

Collection and Preparation of chloroform extract of Solanum nigrum

S. nigrum Linn was identified and collected at a place called Kattakkada in Trivandrum district and the leaves were authenticated by Dr. P.C. Jessykutty (Associate Professor, Department of Plantation Corps and Spices, College of Agriculture, Trivandrum). The plant specimen is kept at the museum of the Pharmacology department of this institute. After separating the leaves, the remaining part of the plant was discarded. The leaves were then allowed to air dry for 2 days. The air dried leaves were powdered and it was then subjected to chloroform extraction using the Soxhlet apparatus. The solvent was then removed under reduced pressure which gave greenish-black coloured residue. It was then filtered using Whatman No: 1 filter paper. The filtrate was then evaporated to dryness and the weight of the crude chloroform extract obtained was measured and it approximately weighed 2gms.The dried extract was diluted in gum acacia (1:50 weight/volume) and considered as the stock solution of dose 200 mg/kg and it was further diluted to 100 mg/kg. The prepared extracts were then subjected to analgesic screening study.

Study groups

Total of 24 Swiss Albino mice were divided into 4 groups. Each group contains 6 mice.

Group-I: Control (0.9% saline/0rally)

Group-II: Diazepam (5 mg/kg/BW/i.p)

Group-III: Chloroform extract of Solanum nigrum (100 mg/kg/BW/i.p)

Group-IV: Chloroform extract of Solanum nigrum (200 mg/kg/BW/i.p)

Procedure

Potentiation of Phenobarbitone induced sleeping time

Swiss Albino mice of either sex weighing 20-30 g were grouped into 4 with 6 mice each. They were then administered with normal saline orally (Control group), diazepam 5 mg/kg intraperitoneally (Standard group) and chloroform extract of Solanum nigrum Linn (test group) in doses 100 mg/kg and 200 mg/kg intraperitoneally. After 30 minutes of administration of the above drugs all the groups received phenobarbitone 25 mg/kg

intraperitoneally. The animals were then placed on their backs leaving sufficient space between them. The parameters measured were the sleep onset (latency time) and the duration of sleep in minutes using a stopwatch. The loss of righting reflex was recorded as the onset of sleep and the time taken to regain the righting reflex was considered as the duration of sleep. The onset and duration of sleep was calculated for each mice and the average values taken and compared among the groups[11-13].

Statistical analysis

The data was expressed in mean and standard deviation. Statistical Package for Social Sciences (SPSS 16.0) version used for analysis. One way ANOVA (Post hoc) followed by Tukeys's test. P value less than 0.05 ($p<0.05$) considered statistically significant at 95% confidence interval.

Results

The time interval between the injection of phenobarbitone sodium and onset of sleep (latency time) was found significantly shortened in group-II, group-III and group-IV when compared to group-I ($p< 0.05$). The time taken to fall into hypnosis was seen shortened in group-III but the effects were statistically lower when compared to group-II and group-IV ($p<0.05$).The latency time was found to be shortened in group-IV with 200 mg/kg (14.47±0.20 min) of CSN and was comparable to group-II with diazepam (15.56±0.29 min). The study showed significant increase in the sleeping time in group-II, group-III and group-IV compared to group-I ($p<0.05$).However increase in the duration of sleeping time in group-III (108.24±.0.53) was significantly lower ($p<0.05$) when compared to group-II (144.33±0.40 min) and group-IV (138 ±0.36 min).No significant difference in the sleeping time were noted between group-II and group -IV. The comparison between group-III and group-IV revealed that the duration of sleep was significantly prolonged in group-IV (Table-1 and Graph-1&2).

Discussion

In our study the the plant preparation exhibited significant sedating properties compared to the control group and a prolonged sleeping time which was comparable to diazepam. The neuropharmacological activity of a similar herb named Solanum pubescens were also studied like Deepika et al.47 using the actophotometer, they recorded the locomotor activities in the control group as well as in the extract and diazepam received animals. The observations made by them were consistent with our study findings. In the above study carried by Deepika et al. the counts measured in the test (97.16) and diazepam (39.67) groups had been significantly lower when compared to the control group (201) indicative of its CNS depressant action. In our study the number of counts recorded with the extract of Solanum nigrum at 200 mg/kg was 133.33 compared to 14.17 in the diazepam group (14.17) and 635 in the control group. In the present study the time taken to fall into sleep was 14.47 min in mice that received 200 mg/kg of the plant and 15.56 min with diazepam and both groups showed statistical significant difference on comparison with control group (26.59 min). Kiranmai et al. also obtained similar results when they compared the sedative effects of the alcohol extract of Solanum pubescens with their standard and control groups. In the above study alcohol extract (300 mg/kg) took 19.67 min to lose the righting reflex. In the present study the duration of sleep observed with the 200 mg/kg of the extract was 138.58 min and was comparable with that of the standard group (144.33 min)[14]. According to Kiranmai et al. the total duration of sleep observed with the extract was 211.06 and it had been found highly significant with the control group. Similar to our study findings the values obtained by Kiranmai et al. had also shown comparable

effects to the standard drug diazepam. In the limelight of these findings it could be postulated that Solanum nigrum Linn possess significant sedative properties and that it can be compared to that of diazepam[15]. The plant extract showed the similar sedative effect like morphine.

Conclusion

Chloroform extract of Solanum nigram showed significant sedative action which similar to diazepam. Further studies required to evaluate the molecular mechanism with active principle which is produced the sedative action.

References

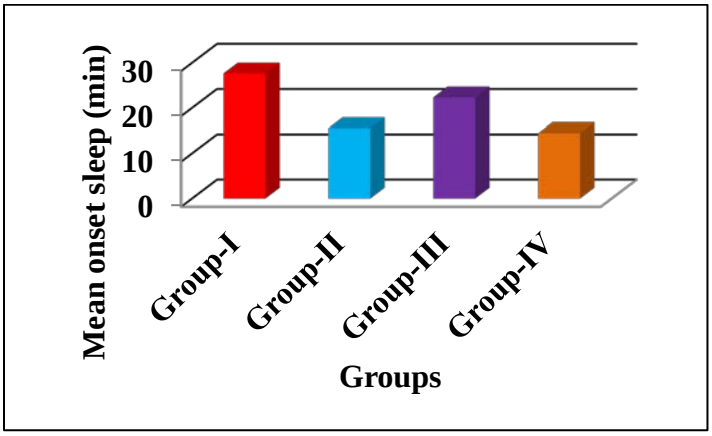
1. Jain R, Sharma A, Gupta S, Sarethy I, Gabrani R. Solanum nigrum. Curr Perspect Ther Prop 2011;16(1):78-85.
2. Nawab A, Yunus M, Mahdi AA, Gupta S. Evaluation of Anticancer Properties of Medicinal Plants from the Indian Sub-Continent .Mol Cell Pharmacol 2011;3(1):21-9.
3. Jainu M , Shyamaladevi CS. Antioxidant effect of methanolic extract of Solanum nigrum berries. Int J Clin Bio 2004;19(1):57-61.
4. Elango V, Oliver C, Raghu PS. Anti-inflammatory activity of the flower extracts of Solanum nigrum in Rats. Hygeia J Med 2012;4(1):59-62.
5. Wannang NN, Anuka JA, Kwanashie HO, Gyang SS, Auta. A . Anti-seizure activity of the aqueous leaf extract of Solanum nigrum linn (solanaceae) in experimental animal. Afr Health Sci 2008;8(2):74-9.
6. Elhag RA, Badwi SM, Bakhiet AO, Galal M. Hepatoprotective activity of Solanum nigrum extracts on chemically induced liver damage in rat. J Vet Med Anim Health 2011;3(4):45-50.
7. Zubaır M, Rızwan K, Rasool N, Afshan N,Shahid M, Ahmed V. Antimicrobial potential of various extract and fractions of leaves of Solanum nigrum. Int J Phyt Med 2011;3:63-71.
8. Gbola O, Otas U, Dayo O. Sedative and anxiolytic effect of extracts of the leaves of Stachytarpheta cayennensis in mice. Afr J Tradit Complement Altern Med 2013;10(6):568-79.
9. Seyedeh A, Mohammad A, Nematollah A. Study of antidepressant and sedative hypnotic hypnotic activity of hydroalcoholic extract of Asperugo procumbens L aerial parts in mice. Iran J Pharm Res 2013;12(3):529-35.
10. Abdul A, Imran AK. Pharmacological evaluation of sedative and hypnotic activates of methanolic extract of Lycopus europaeus in mice. The Journal of Phytopharmacology 2013;2(4):8-12.
11. Vogel HG. Drug discovery and evaluation: Pharmacological assays. 3rd ed. Berlin: Springer; 2008. p. 670-84.
12. Ghosh MN. Fundamentals of experimental pharmacology. 4th ed. Kolkatta: SK Ghosh; 2008. p. 162-4.
13. Medhi B, Prakash A. Practical manual of experimental and clinical pharmacology. 1st ed. New Delhi: Jaypee brothers; 2010. p. 170-86.
14. Deepika R, Hemamalini K, Priya GS, Vasireddy U. CNS activity of the methanolic extract of Solanum pubescens in experimental animal models. J Pharm Bio Sci 2013;5(1):48-51.
15. Kiranmai S, Hemamalini K, Vasireddy U. Anticonvulsant and sedative effects of leaf extract of Solanum pubescens. Int J Pharm Sci Res 2013;4(4):1424-7.

Table1: Effect of chloroform extract of Solanum nigrum Linn on phenobarbitone induced sleep onset and duration

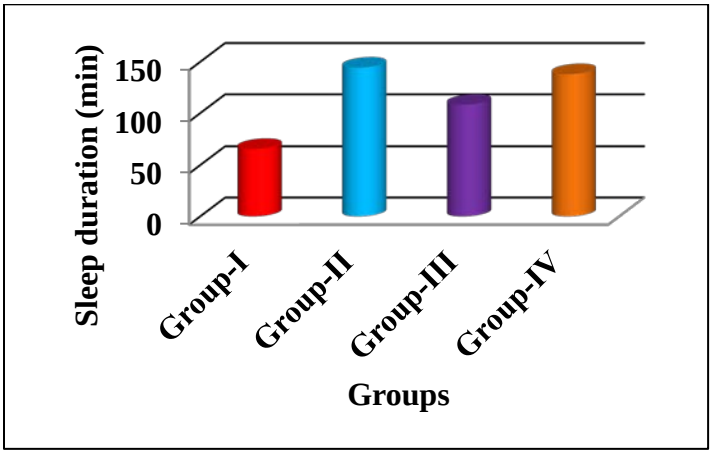
Groups	Sleep on set (min) (MEAN±SD)	Sleep duration (min) (MEAN±SD)
Group-I	27.65±0.67	65.67±0.45
Group-II	15.56±0.29*	144.33±0.40*
Group-III	22.34±0.45*,#	108.24±0.53*,#
Group-IV	14.47±0.20*,#,$	138.00±0.36*,$

(*p<0.05 significant compared Group-I with other groups, #p<0.05 significant compared group-II with other groups, $p<0.05 significant compared Group-III with groups)

Graph-1: Effect of chloroform extract of Solanum nigrum Linn on phenobarbitone induced onset sleep



Graph 2: Effect of chloroform extract of Solanum nigrum Linn on phenobarbitone induced sleep duration



How to citation this article: Parvathy RL, Madhavrao C, "Pharmacological Evaluation of Sedative Effect of Chloroform Extract of Solanum Nigrum in Swiss Albino Mice", IJMACR- May- June - 2020, Vol – 3, Issue -3, P. No. 133 – 137.