Pharmacological Screening of Anti Lice and Antidandruff Activity of Ethanolic Extract of Leaves of *Datura metel*

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**ABSTRACT**

It should be noticed that there is no drugs is available to treat lice and dandruff both are very great public health concern. So it is necessary to screen a drug especially of herbal origin to treat the both head lice and dandruff without affecting eyes. In the present study, *Datura metel* leaf extracts was evaluated for their insecticidal properties using head lice as an insect model. The study was conducted from November 2019 to March 2020. Plant sample (leaf) of *Datura metel* was collected from anantapur, Andhra Pradesh, India in November 2019. The various concentration of ethanolic extract of leaves of *Datura metel* was prepared by using distilled water. 20%, 40%, 60% were used. A colony of Phumansus capitis was collected by combing the hair of 20-25 infected children at the age group of 10-15. Head lice were reared in the glass vessels covered with nylon mesh containing tufts of hairs. The hair tufts was impregnated with appropriate doses for the screening. Pure culture of M.furfur (MTCC: 1374) was obtained from institute of Microbial type of culture collection, Chandigarh, India. The culture was maintained in SDA medium. The current study afford scientific basis for the ethnomedical use of this plant as antilice application. It is concluded that it can be optimistic that the present work proved *Datura metel* of dual therapeutic advantage to be a potential phytochemical target in the design of a drug for the treatment of both lice and dandruff.

**Key words:** Anti dandruff, Anti lice, *Datura metel*, Ethnomedical use, Pharmacological Screening.

**INTRODUCTION**

Nearly 50% drugs used in medicine are of plant origin.1 It is desirable to have a “need based” approach to research on medicinal plants including screening of plants for biological activity. Research interest for many infections & infestations are not much focused by researcher. One among those conditions is for head lice infestation and the fungal infection dandruff etc. Lice Infestation are common, found worldwide and affect between 6 to 20 Million people every year it is very common and mainly affect children 3 & 12 years.2 The treatment of head lice is now complicated by the emergence of resistance to pediculicides.3 The management of human head lice worldwide depends primarily on the continued applications of carbamate, pyrethrin, pyrethroid, organochlorine, organophosphorus, and avermectin, insecticides. Their repeated use has often resulted in the development of resistance and increasing levels of resistance to the most commonly used pediculicides have caused multiple and excessive treatments, fostering serious human health concerns. These problems have highlighted the need for the development of selective p.humanus capitis control alternatives.4

Dandruff is a major cosmetic problem that possesses very great public health concern both in developed and developing countries. Pityrosorum ovale, a yeast like lipophilic basidiomycetous fungus is considered to be the chief cause of the problem. Presently accessible treatment options for the management of dandruff include therapeutic use of zinc pyrithione, salicylic acid immidazole derivatives, glycolic acid.5 However, these agents have certain limitations either due to poor clinical efficacy or due to compliance issues. Furthermore, these drugs are unable to prevent recurrence which is the commonest problem. It should be noticed that there is no drugs is available to treat lice and dandruff both are very great public health concern.6 Moreover the drugs used may affects the eyes during their application. So, it is necessary to screen a drug especially of herbal origin to treat both lice and dandruff without affecting eyes. As per available literature, Annona squamosa, *Datura metel* have been reported to have insecticidal properties and their efficacy has been reported against different insect models.7 In the present study, *Datura metel* leaf extracts was evaluated for their insecticidal properties using head lice as an insect model.

**MATERIALS AND METHODS**

**Plant extracts**

The study was conducted from November 2019 to March 2020. Plant sample (leaf) of *Datura metel* was collected from anantapur, Andhra Pradesh, India in November 2019. Herbaria of these plants were authenticated from Department of Botany, Sri Krishnadevaraya University, Anantapur and...
authentication numbers of the herbaria for *Datura metel* Linn. Auth08-72 respectively. Collected plant were washed, shade dried, powdered, sieved through an 85-mesh (BSS) sieve and stored in an airtight container at 25 ± 5°C to prevent the growth of microorganisms. Plant powders prepared thus, were used for efficacy studies.

**Continuous hot extraction**

The various concentration of ethanolic extract of leaves of *Datura metel* was prepared by using distilled water. 20%, 40%, 60% were used.

**Head lice**

A colony of *P. humanus capitis* was collected by combing the hair of 20-25 infected children at the age group of 10-15. Head lice were reared in the glass vessels covered with nylon mesh containing tufts of hairs.

**Feeding of head lice**

To feed head lice with blood meals they were kept on the lower leg of the human beings and maintain there for 30 minutes. Microscopy examination of the mid-gut confirmed blood ingestion.

**Bio assay**

The hair tufts was impregnated with appropriate doses for the screening. Control hair tufts receiving the vehicle were also maintained, marketed sample were used as a standard. Batches of 20 adult *P. humanus capitis* given a human blood meal before the bioassay were placed on each vessel containing few strands of human hair and it was covered with the nylon mesh. Treated and control and standard were held at 37°C in darkness. Each concentration was maintained at triplicate and number of mortality was recorded for every 30 minutes. Death was defined as lack of movement of limbs and guts and failure to respond when the legs were stroked with forceps and the results were tabulated.

Since the isolated fraction were less quantity, if was not possible to carry out the experiment in triplicate. So the percentage mortality after 60 min and 90 minutes were tabulated.

**Method**

Disc diffusion method

| S.No | Lice released | Text Drug | Conc. g/10mls | Mean± SEM % mortality 60 min | Mean± SEM % mortality 90 min |
|------|---------------|-----------|---------------|-------------------------------|-------------------------------|
| 1    | N = 20        | Aqueous paste | 2             | -                            | 3.333 ± 1.667                |
| 2    | N = 20        | EEDC       | 4             | 13.333 ± 1.667               | 23.333 ± 1.667               |
| 3    | N = 20        | EEDC       | 6             | 23.333 ± 1.667               | 43.333 ± 1.667               |
| 4    | N = 20        | EEDC       | 2             | 3.333 ± 1.667               | 16.666 ± 1.667               |
| 5    | N = 20        | EEDC       | 4             | 23.333 ± 1.667               | 45.000 ± 2.887               |
| 6    | N = 20        | EEDC       | 6             | 61.666 ± 2.887              | 98.33 ± 1.667                |
| 7    | N = 20        | EEDC + Coconut Oil | 2          | 23.333 ± 1.667               | 47.61 ± 1.002                |
| 8    | N = 20        | EEDC + Coconut Oil | 4          | 41.666 ± 3.333              | 65.32 ± 2.112               |
| 9    | N = 20        | EEDC + Coconut Oil | 6          | 98.333 ± 1.667              | -                            |
| 10   | N = 20        | EEDC + gingelly oil | 2          | 8.333 ± 1.667              | 18.333 ± 1.667               |
| 11   | N = 20        | EEDC + gingelly oil | 4          | 28.333 ± 1.667              | 48.333 ± 1.667               |
| 12   | N = 20        | EEDC + Castor oil      | 6          | 68.333 ± 1.667              | 98.333 ± 1.667               |
| 13   | N = 20        | EEDC + Castor oil      | 2          | 3.333 ± 1.667               | 21.666 ± 1.667               |
| 14   | N = 20        | EEDC + Castor oil      | 4          | 23.333 ± 1.667              | 53.333 ± 1.667               |
| 15   | N = 20        | EEDC + Castor oil      | 6          | 65.24 ± 1.667              | 98.333 ± 1.667               |
| 16   | N = 20        | Standard marketed sample | 10ml   | 98.666 ± 0.5774              | -                            |

**DISCUSSION**

Though all of the pediculicidal agents act efficiently against *P. humanus capitis*, some of them are neuro toxic. Moreover, the continued use...
of these products induces resistance. Non toxic alternative options are hence needed for head lice treatments which prompted us this study invivo anti lice activities of and aqueous paste, ethanolic extract and along with the fixed oil as carrier and isolated fractions of leaves of Datura metel were studied. It was observed that after 90 minutes in the percentage mortality observed for the concentration 2.46 g/10ml were 3.33 ± 1.667 23.33 ± 43.33 ± 1.66, 16.66 ± 1.66, 45 ± 2.88, 98.33 ± 1.66 for aqueous paste, EEDC respectively. For EEDC + Coconut oil mortality was significant in an 60 minutes which was 98.33 ± 1.66. All the readings are mean ± SEM for triplicate values. From the above it is clear that the decrease in percentage of mortality is in the following order after 60 minutes. EEDC + coconut oil > EEDC + gingelly oil >EEDC+ castor oil >EEDC > aqueous paste, at the concentration of 6 gms/10ml which is comparable to the standard. The ethanolic extract of leaves of Datura metel mixed in coconut oil as carrier possesses significant antilice activity. (p<0.05) Since the isolated fraction were in less quantity, it was not possible to carry out the experiment in triplicate. It was observed that the decrease in mortality in the biologically active isolated fractions where as follows at 5% concentration. F-9 >F-16>F-8>F-4 showed moderate activity and it can be assumed that no single fraction has shown significant mortality. So this study revealed that the activity may be synergistic by the presence of various Phytoconstituents. We were also able to demonstrate invitro moderate anti dandruff activity of the ethanolic extract leaves of Datura metel against M. furfur. The current study provided scientific basis for the ethnomedical use of this plant as antillice application. It is concluded that it can be optimistic that the present work proved Datura metel of dual therapeutic advantage to be a potential phytochemical target in the design of a drug for the treatment of both lice and dandruff without causing any adverse influences on eyes, to alleviate the suffering the affected individuals. The above study require further investigation for the exact mechanism of action, to develop safe herbal formulation which can result in complementary to those existing pediculocidal agent, which are though acts efficiently they are neurotoxic and induced resistance. So, this provides nontoxic alternative options for both head lice and dandruff activities.

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**GRAPHICAL ABSTRACT**

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Cite this article: Sreedhar V, Mastanaiah J, Chakrapani B, Narayana DV, Babu BN, et al. Pharmacological Screening of Anti Lice and Antidandruff Activity of Ethanolic Extract of Leaves of Datura metel. Pharmacogn J. 2020;12(6)Suppl:1653-7.