J. Sci. I. R. Iran

Vol. 5 No. 1, 2
Winter & Spring 1994

A STUDY OF THE ANTHELMINTIC ACTIVITY OF AQUEOUS EXTRACT OF *PLEUROTUS ERYNGII* ON *SYPHACIA OBVELATA* AND *HYMENOLEPIS NANA*

H. Samsam Shariat, H. Farid and M. Kavianpour

Department of Pharmacognosy, Faculty of Pharmacy, Isfahan University of Medicinal Sciences, Isfahan, Islamic Republic of Iran

Abstract

Pleurotus eryngii is a mushroom growing in the Bakhtiari province of Iran and is known as a mountain fungus. The fresh fungus is used as a food, and when dried its powder has been used as an anthelmintic drug. We decided to study the anthelmintic activity of *P. eryngii* on *Hymenolepis nana* (cestode) and *Syphacia obvelata* (nematode), using experimental animals. Water extract of *P. eryngii* was prepared by the maceration method. White mice (Suri) laboratory bred were infected with *H. nana* worms. Four concentrations of aqueous extract of the fungus (484.5, 800, 900 and 1500 mg fungus/ml) were fed three times to the infected mice. The anthelmintic effects of the aqueous extract of the fungus on *S. obvelata* were also studied in the infected animals using the same procedure. The results of the study indicated that the highest anthelmintic effects of the fungus on *H. nana* and *S. obvelata* were 89% and 95%, respectively.

Introduction

Medicinal plants play an important role in the treatment of parasitic infections. Because synthetic drugs usually have side effects and some parasites are immune to these drugs, the search must continue for new antiparasitic drugs.

Pleurotus eryngii is a fungus which is introduced as a mushroom (Fig. 1) [1]. Saccard (1887) has noted that this fungus grows on the dead root of a plant named *Eryngium compestris* and the fungus is usually found in France and the Netherlands [1].

A new variety of the *Eryngia* species has also been introduced by Saccard (1887) as *Pleurotus eryngii ferulactanzi* [2]. The fungus has been reported as *P. eryngii* in Iran by Petrack in 1971 [3]. *P. eryngii* usually appears in the spring. The fresh fungus is used as a food and its dried powder as an anthelmintic drug by the people of the region. The fungus was collected from the Kohrang area and after examination it was confirmed as being *P. eryngii*.

Keywords: *Pleurotus eryngii*; Anthelmintic; *Syphacia obvelata; Hymenolepis nana*; Medicinal plants

Materials and Methods

P. eryngii was collected from the Kohrang area and was dried at room temperature in the shade. The dried fungus (100g) was milled to a coarse powder and extracted with ionized water (maceration for 24 h) at room temperature. The water was removed under reduced pressure (vacuum) and the residue kept in the refrigerator until used for survey [3]. Two hundred and fifty mice (Suri) were chosen ($1/2$F, $1/2$M, 12-15 weeks old and 30 g weight). They were examined for *H. fraterna* which is a cestode in the intestine of mice.

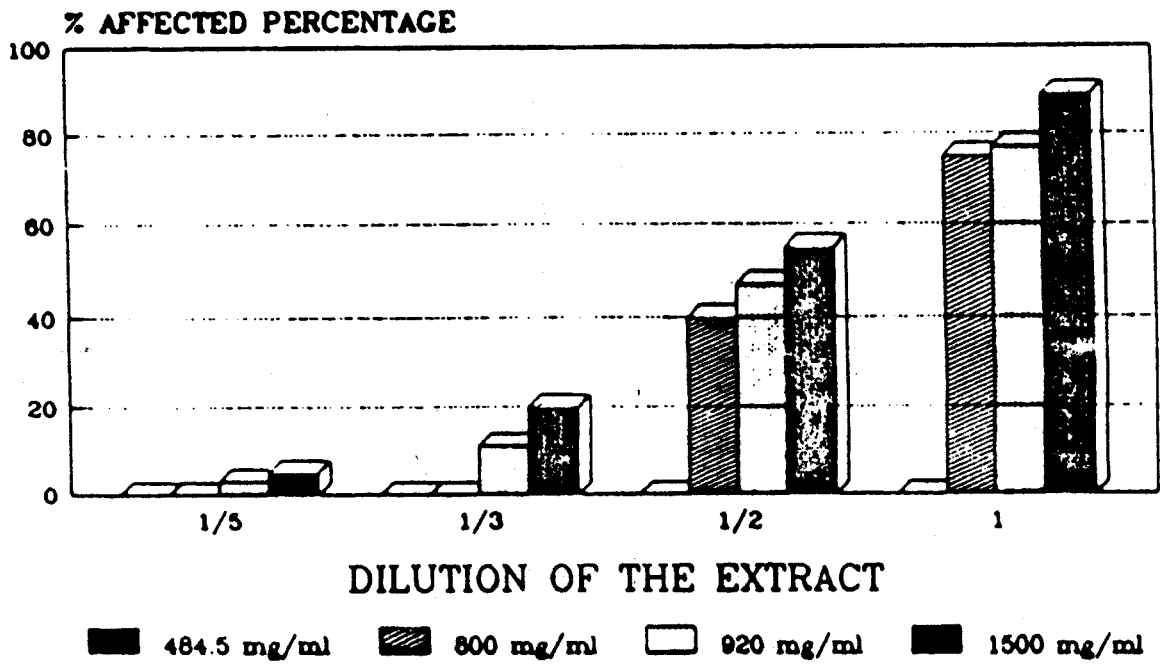

Diagram 1. Effect of water extract of *Pleurotus eryngii* on mature *H. nana* worms

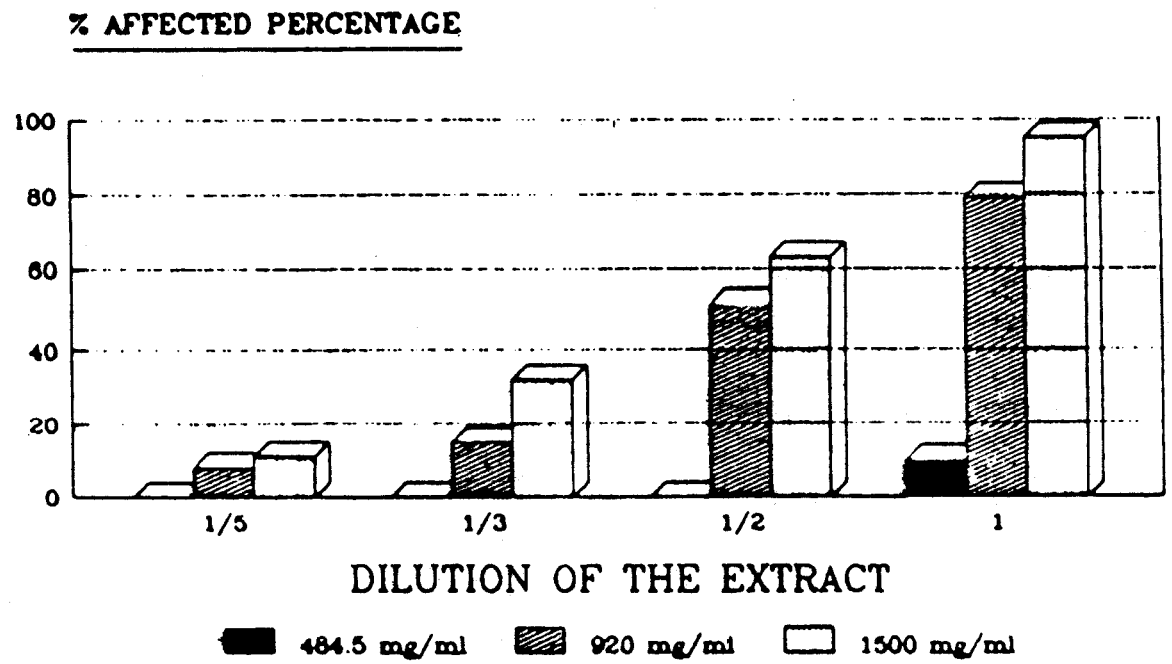

Diagram 2. Effect of water extract of *Pleurotus eryngii* on mature *Syphacia obvelata* worms

Figure 1. *Pleurotus eryngii*

Thirty-five specimens of human stools (infected with *H. nana*) that *H. nana* ova were seen, were mixed and washed by normal saline. The ova were then separated by the four layer sucrose method and were fed to the mice by gastric injection. Each white mouse was fed 100 *H. nana* ova per millilitre by a special needle [10].

Observation of Effect of Water Extract of *P. eryngii* on Mice Infected with *H. nana* Worms

The water extract in different dosages (484.5, 800, 900 and 1500 mg fungus/ml) was fed to four groups of mice (16 mice in each group) using the same procedure as above. The control group was given saline solution parallel to the experimental groups. Mice stools, between feeding the extract and after the third dosage, were examined by direct smear, floatation and formal ether concentration methods in order to observe *H. nana* ova. Finally, the small intestines of the mice were examined for the presence of *H. nana* worms.

Observation of Effect of Water Extract of *P. eryngii* on Mice Infected with *S. obvelata* Worms

Five groups of mice were chosen in three stages. The extract was then fed to four groups and saline to the fifth group, following the same procedure.

Results and Discussion

Parasitological studies of the *H. nana* infected mice are given in Diagram 1. After four groups of the mice were treated with four different doses of the fungus extract, the feces and intestine were examined for *H. nana* ova and *H. nana* worms.

The water extract proved to be most effective on *H. nana* worms when the *in vivo* method was used in the fourth stage of the study using 1500 mg fungus/ml and allowing 24 h between dosages. This resulted in 89% effectiveness.

Study of *S. obvelata* Worms Using the *in vivo* Technique

The effects of feeding three concentrations of water extract (484.5, 900 and 1500 mg fungus/ml) on *S. obvelata* was also studied in the infected animals following the same procedure [8]. The results are shown in Diagram 2. Results obtained when different dosages and different time intervals between dosages in the last stage were used, showed 95% effectiveness. This is a good result for some nematodes.

The study of the effect of aqueous extract of *Pleurotus eryngii* on *H. nana* and *S. obvelata* worms showed that the extract was most effective when used in a 1500 mg fungus/ml concentration.

References

1. Shaghaghy, K. A study of chemical constituents of *Pleurotus eryngii*, Ph.D. thesis (1977).
2. Sadeghy, R. Toxic effects and anthelmintic activity of *Pleurotus eryngii*. Ph.D. thesis (1981).
3. Eghbaly, S. A study of the pharmacological effects of *Pleurotus eryngii*. PhD. thesis (1986).
4. Farid, H. and Jalayer, T. *J. of Parasitology*, **64**, 364, (1978).
5. Beaver, P. C. and Jung, R. C. *Chemical Parasitology*.
6. *Hunter's Tropical Medicine*. (6th. Edn) W. B. Sounders Company (1984).
7. Baldawi Al., F. A., Mahdi, N. K. and Abdul-Hafidh, B. A. *Tropical medicine and parasitology. Resistance of mice to infection with the human strain of Hymenolepis nana*. (1989).
8. Tetzlaff, R. O. Anthelmintic control of *H. nana* and *Syphacia*. Helminthological Abstract, **48**, 4, (1979).
9. Sacki, H., Imai, S., Hiyama, M., Fujita, I. and Ishii, I.

Anoxyurid nematode of genus *syphacia* from the laboratory golden hamster. *Japanese Journal of Veterinary Science* (1982).

10. Ito, A. A simple method for collecting infection cysticercoides of *Hymenolepis nana* from the mouse intestine. *Journal of Parasitology*, **63**, 1, (1977).