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In-vitro phytochemical and anthelmintic activity of *Cocculus hirsutus* Linn. and *Rumex dentatus* Linn.

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Brief Communication

ABSTRACT

It was 1980s when the first therapeutic protein was launched in the market. It was recombinant DNA-derived insulin. Since its inception, within the worldwide pharmaceutical sector, protein therapeutics has been enjoying the fastest growth, notably for the last few years. As a result it is assumed that the treatment methodology with the conventional drug therapy will be shifted towards therapeutic proteins in near future. It made revolution in the treatment of chronic diseases like cancer, diabetes, cardiovascular diseases. The major segments in protein therapeutics are monoclonal antibody, insulin, granulocyte-colony stimulating factor (G-CSF), coagulation factors etc. In this review paper we will discuss the general aspects of protein therapeutics with their advantages over small-molecule drugs, functional classification of therapeutic proteins and their uses. The pharmacokinetics of protein therapeutics, especially from the distribution and elimination characteristics of therapeutic proteins will be discussed in brief with relevant examples. The major challenges and future perspectives will also be presented in short.

Keywords: Therapeutic protein, Monoclonal antibody, Coagulation factors, Growth hormones, Insulin.

INTRODUCTION

The World Health Organization estimates that a staggering two billion people harbour parasitic worm infections. Parasitic worms also infect livestock and crops, affecting food production with a resultant economic impact. Despite this prevalence of parasitic infections, the research on the anthelmintic drug is sparse. According to the WHO, only a few drugs are used in treatment of helminthes in humans. Anthelmintics from natural sources could play a key role in the treatment of these parasite infections (Kumar et al., 2010). In view of this, attempts have been made to study the anthelmintic activity of traditional medicinal plants.

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For our study we used two common plants named Cocculus hirsutus Linn. (Family: Menispermaceae), locally known as 'Jhaljimani' which is used as laxative, demulcent, tonic, diuretic, antipyretic, joint pains and kidney problems (Chopra et al., 1996; Caius, 1986) and Rumex dentatus Linn. (Family: Polygonaceae), locally known as 'Bon Palong' which is used in cutaneous disorders and as antifungal and antibacterial agent (Fatima et al., 2009). The present study was designed to investigate anthelmintic properties of the three different fractions for each of the two plants (petroleum ether, methanol and ethylacetate soluble fractions coded as RDP, CHP, RDM, CHM, RDE and CHE respectively).

All six fractions of two plants were screened for the presence of various phytoconstituents

such as saponin, glycosides, flavonoids, tanin and carbohydrates (Kokate, 1986).

Adult earthworms (Pheretima posthuma) were used to study anthelmintic activity. The earth worms were collected from moist soil and washed with normal saline to remove all fecal matter. Earthworms 3-5 cm in length and 0.1-0.2 cm in width were used for all experimental protocol. Piperazine citrate (GlaxoSmithKline) was used as standard during experimental protocol.

The anthelmintic assay was carried out as per the method of Ajaiyeoba et al. (2001) with minor modifications. The assay was performed on the adult earthworm Pheretima posthuma due to its anatomical and physiological resemblance to the human intestinal roundworm parasite (Vidyarthi, 1967; Chatterjee, 1967). Due to their ready availability, earthworms have been used widely for the initial evaluation of anthelmintic compounds in vitro (Sollmann, 1918; Jain et al., 1972; Dash et al., 2002).

The earthworms were divided into different groups, each group containing six worms. Fifty ml formulations containing two different concentrations of each extracts C. Hirsutus and R. dentatus (25 and 50 mg/ml in distilled water) were prepared. The time of paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. The times of death of the worms were recorded after ascertaining that worms neither moved when shaken vigorously or when dipped in warm water (50°C). Piperazine citrate (10mg/ml) was used as reference standard while saline water served as a control.

By preliminary phytochemical screening it was found that all the two plant extracts

Table 1: Anthelmintic activity of standard drug and sample.

Treatment	**Concentration (mg/ml)**	**Time for paralysis (minutes)**	**Time for death (minutes)**
Control (Saline Water)	10	No paralysis	No death observed
Piperazine Citrate (Standard)	10	24 ± 0.87	38 ± 0.63
CHM	25	67.10	> 90
	50	36.19	> 90
CHE	25	46.11	87.18
	50	15.50	51.33
CHP	25	35.51	> 90
	50	22.12	78.16
RDM	25	77.34	> 90
	50	19.21	39.54
RDE	25	58.30	> 90
	50	38.21	57.38
RDP	25	51.12	> 90
	50	41.38	69.16

contain carbohydrates, whereas all fractions of R. dentatus contains reducing sugar and all fractions of C. hirsutus contain glycoside and saponin.

Anthelmintic activity increased with concentration of the test sample. For Cocculus hirsutus fractions order at which anthelmintic potential of the test samples decreased was as follows: Piperazine citrate > ethyl acetate fraction of Cocculus hirsutus (CHE) > petroleum ether fraction of Cocculus hirsutus (CHP) > methanol fraction of Cocculus hirsutus (CHM). For Rumex dentatus fractions order at which anthelmintic potential of the test samples decreased was as follows: Methanol fraction of Rumex dentatus (RDM) > ethyl acetate fraction of Rumex dentatus (RDE) > petroleum ether fraction of Rumex dentatus (RDP) (Table 1).

The anthelmintic activity of all six fractions of C. hirsutus and R. dentatus may be due to the presence of polyphenolic compounds (Bate-Smith, 1962). The wormicidal activity of these two plants as described herein against earthworms suggests that it could be effective against parasitic infections of humans.

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