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Impact of *Hypnea pannosa* on Lipid Profile

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Abstract

Hypnea pannosa is red marine alga, belong to family Hypneaceae [1]. As it as previously investigated that certain marine algaepossess interesting hypocholesterolemic effect. The study of algae is called Phycology and its history is quit old. Hykos is Greek word which means seaweed or algae and is available in Chinese, Roman and Greek literature.This study was undertaken in rabbits to assess the safety profile of an algae *H. pannosa*. It was tested for the period of 20 days on two groups of rabbits.Each group comprises of seven rabbits of either sex.Biochemical tests were performed at the completion of dosing using standard reagent kit. The result shows that *H. pannosa* revealed significant decrease in triglycerides and HDL ($p < 0.05$)and insignificant decrease in LDL in comparison to control animals at completion of dosing.

Introduction

The marine biosphere includes abundance of organism about 500,000 species in 30 phyla. Seaweeds have been used as a source drugs over a long period of time in folk medicine. The earliest particulars on sea weed utilization originate from Chinese materia medica of Shen-nung written in 2700 B.C. The medicinal importance of seaweed is increasing day by day and is expected to play a major role in health of human race, since is known as an excellent source of vitamins and minerals, especially sodium and iodine [2].

H. pannosa belongs to genus *Hypnea* Family Hypneaceae [3]. It is characterized by a terete to compressed, much branched thallus with short lateral branchlets, globular cystocarps, and zonate tetrasporangia on short laterals [4].

No systemic account on the genus *Hypnea* is available from Indo Pakistan subcontinent. However, this specie has already been reported for India and Srilanka [5]. The red seaweed, *H. pannosa*, rises as cushions of interwoven filaments adhered to rocks near the lower mark of the marine littoral zone and near Karachi.

Hypnea is easily distinguishable from other species by its characteristic habit of forming low dense matted tufted cushion [6]. This cushion making habit of *H. pannosa* is unique among the species of *Hypnea*.

Several species of genus *Hypnea* have been investigated for a variety of chemical constituents such as fatty acids [7] sterols [8,9], Carbohydrates [10], Protien and carrageenans [11,12], but there are no-account of halogenated derivatives. Six fatty acids had been identified from the extract of *H. pannosa* such as Methyl myristate, Methyl palmitate, Methyl margarate, Methyl oleate, Methyl Stearate. Four sterol and three Brominated sesquiterpenes have been identified from the extract of *H. pannosa* by the mass and H-MNR [13].

H. pannosa showed the presence of cholesterol, 22- dehydro cholesterol and desmosterol [14] *H. pannosa* showed lethal effect on root knot nematode Meloidogyne javanica [15]. The extract of *H. pannosa* was effective to nematodes and second instar larvae. Therefore, the seaweed might be a potential source for developing ecological significant bioactive compound including biodegradable pesticides and biopharmaceuticals [16].

Material and Methods

Preparation of extract

H. pannosa was collected from coastal area of Karachi and dried under shade, the dried algae was crushed and soaked in ethanol for ten days, after which ethanol was evaporated and a dried extract was obtained.

Animals selection

This study was done on 14 healthy white rabbits of either sex weighing 1000-1500g. All animals were divided in two groups and housed individually in a separate cage, under controlled condition of temperature (22±2 °C) and humidity (50-60%). Standard diet and water was provided ad libitum.

Dosing

One group of animals received 50mg/kg ethanol extract of *H. pannosa* and served as treated group, while other group served as control and received saline in volume equivalent to respective dose according to their body weight.

Sample collection

Blood sample of 5ml were collected from the ear vein twice, first sample after 10 days administration of *H. pannosa* andsecond at the end of dosing period of *H. pannosa* i.e. 20 days. Blood samples were collected in gel tube to determine lipid profile.

Gross toxicities

Apparent health of animals was monitored during the experiment period at every one weak interval under the laboratory experiment. Gross toxicities specifically Average weight variation, skin ulceration, loss of interest in food, change in activity, Hematuria, Vomiting and aggressive behavior was observed.

Mortality rate

Mortality rate of rabbits under investigation was observed during the total period of experimentation.

Lipid profile

Serum were instantly separated out by centrifuging blood sample at 4000rpm for about 15 minutes and Cholesterol, triglycerides, HDL and LDL was analyzed within 3 hours on Humalyzer 3000, a semi-automatic chemistry analyzer, Model Number 16700 (Human Germany) using standard kits supplied by Human.

Statistical Analysis

All values expressed as mean and standard error to the mean (SEM) analyzed using student test. Results with P value less than 0.05 were considered significant and highly significant with P value less than 0.005.All the statistical procedures were performed according to the method of Alcaraz & Jimenez [17].

Results

Gross toxicity

No gross toxicity was observed in any animal group during the total period of experimentation.

Mortality rate

There was no death in any animal group.

Lipid profile

Table 1 & 2 shows results of *H. pannosa* 50mg/kg on lipid profile after 10 and 20 days administration. Data analysis of blood samples in animals fed with *H. pannosa* indicated that dietary consumption of *H. pannosa* decreased total cholesterol, HDL and Triglycerides but effect on LDL was similar to control.

Table 1 & 2 shows the comparison of cholesterol, triglycerides, HDL and LDL levels after 10 and 20 days administration of *H. pannosa* in the dose of 50mg/kg.

Table 1: Effect of *H. Pannosa* on Lipid Profile after 10 Days.

Parameters	Animal Groups	
	Control	*H. pannosa*
Cholesterol (mg/dl)	298.1±18	120±19**
Triglyceride (mg/dl)	238.1±6.9	91.1±16**
HDL (mg/dl)	28.3±1.8	20.1±2.2*
LDL (mg/dl)	81.3±1.2	83.6±0.84

n = 07; Average values±S.E.M; *p<0.05 as compared to control; **p < 0.005 as compared to control.

Table 2: Effect of *H.Pannosaon* Lipid Profile after 20 Days.

Parameters	Animal Groups	
	Control	*H. pannosa*
Cholesterol (mg/dl)	256.1±14	112.4±19**
Triglyceride (mg/dl)	229.1±7.3	82.6±13**
HDL (mg/dl)	26.86±2.0	16.57±1.3**
LDL (mg/dl)	80±1.5	81.71±0.75

n = 07; Average values±S.E.M; **p<0.005 as compared to control.

Animals showed highly significant decrease in cholesteroli.e. 120±19 and 112.4±19mg/dl in comparison to control animals i.e. 298.1±18 and 256.1±14 mg/dl respectively after 10 and 20 days administration of *H. pannosa*, while there was also highly significant decrease in triglycerides i.e. 91.1±16 and 82.6±13mg/dl after 10 and 20 days administration of *H. pannosa* in comparison to control animals i.e. 238.1±6.9 and 229.1±7.3mg/dl respectively. However decrease in HDL was significant after 10 days and highly significant after 20 days in comparison to control animals. The change in LDL levels was almost comparable to results of control animal.

Discussion

The marine biosphere includes abundance of organisms about 500,000 species in 30 phyla. Seaweeds have been used as a source drugs over a long period of time in folk medicine. In China and Japan seaweeds have been used as medicine from the early days. The medicinal importance of seaweed is increasing day by day and is expected to play a major role in health of human race.

The cost of Karachi is inhabited by a variety of marine algae which are yet to be explored. This work has therefore initiated to realize the bio activity and medicinal significance of certain seaweeds from the cost of Pakistan. In spite of all the limitation of facilities and poor availability of existing technology the marine environment positively deserves continual exploration as a source of new drug which may be of considerable valuable in the socio economic growth of nation.

The present work is design to study the hypolipidemic activity of marine algae, *Hypneapannosa* family Hypneaceae, as

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it was previously investigated that certain marine algae possess interesting hypocholesterolemic effect [18,19] shows highly significant decrease in cholesterol, Triglycerides and significant decrease in the level of HDL on 10 days while on 20 day highly significant decrease in the level of HDL is found The daily addition of sea products such as sea weed and fish oil to diet has been suggested for prophylaxis of coronary atherosclerosis [20]. Russian scientists have used marine products and marine algae for lowering the cholesterol level in blood plasma.

Several species of genus Hypnea have been investigated for a variety of chemical constituents such as sterols, protein, carrageenans and polysaccharides. Sterols and polysaccharides have been reported to produce hypolipidemic activity [21] hence hypocholesterolemic activity of hypnea may be due presence of sterols and polysaccharides in marine algae [22]. Red seaweed species containing nontoxic sterols have reported reduce blood cholesterol level and retard the accumulation of fats in liver and heart. Polysaccharides from the red and brown algae have also shown the hypolipidemic activity [23,24]. Carrageenan is the mixture of polysaccharides obtained from the various red sea weeds. Afaq et al. [13] the Hypocholesterolemic and hypolipidemic activity of Carrageenan has been also. However it is suggested that more elaborated studies are required to reach at definite conclusion.

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