Biochemical changes in serum protein profile in albino rats after alcoholic fruit extract of Momordica cochinchinensis

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Abstract: The present investigation was carried out to evaluate the effect of alcoholic fruit extract of Momordica cochinchinensis on serum protein profile of albino rat. Alcoholic fruit extract of Momordica cochinchinensis (200 mg kg⁻¹ body weight) has been given orally to albino rats for the period of 7, 15, 30, 45 and 60 days respectively. Results showed a significant (p<0.01) increase in serum total protein, albumin and total globulins and non-significant increase in A/G ratio in rats. Increase in serum protein after the administration of alcoholic extract of Momordica cochinchinensis in albino rates was due to increase in number of m-RNA molecule and their attachment to the ribosome's and thus increase protein anabolism.

Key words: Momordica cochinchinensis, Serum protein profile

Introduction

The world health organization (WHO) estimated 80% of the population of the developing countries relies on traditional medicine. Mostly plant drugs are used for our primary health care. Also, modern pharmacopeia still contain at least 25% of drugs derived from plants and many other which are synthetic analogue but on prototype action of the herbs (Kapoor, 2001). Momordica cochinchinensis (Linn.) belongs to the melon family and commonly known as Indian gourd, ‘kakur’, ‘kantola’, and ‘kakrol’ in Hindi. Momordica cochinchinensis fruit juice and leaves juice is used in treatment of diabetes and useful in burning sensation, skin disease, liver tonic, inflammation, jaundice, leprosy, fever, asthma, and anemia. Effective constituents of Momordica cochinchinensis are charatins, vicine and polypeptide-p; in addition to the alkaloids, glycosides, resins, oleoresins, aromatic and volatile. M. cochinchinensis is used for tumors, wounds, rheumatism; malaria, inflammation, menstrual problems, diabetes, colic, fevers, and worm, to induce abortion and as aphrodisiac. It is also employed topically for skin problems, vaginitis, hemorrhoids, scabies, eczema and leprosy. The leaves extract of bitter fruits have clinically demonstrated broad-spectrum antimicrobial activity. Various water, ethanol and methanol extract of the leaves have demonstrated in vitro, antibacterial activities against E.coli, staphylococcus, pseudomonas, salmonella, streptobacillus and streptococcus. The entire plant shows to have antiprotozoal activity against Entamoeba histolytica. Leaves are nutritious sources of calcium, magnesium, Potassium, phosphorous and iron. Fruit of M.cochinchinensis has been used as both food and medicine throughout Asia as a therapeutic remedy in a variety of illness such as leukemia, diabetes, asthma, insects bites, menstrual cycle problems, stomach problems as well as many other maladies, recent studied have found anti HIV properties (De Shan et al., 2001; Vajpeyi et al., 2007).

The objective of the present investigation is to evaluate the effect of alcoholic fruit extract of Momordica cochinchinensis on serum protein profile in albino rats.

Materials and Methods

Experimental animals: Thirty male albino rats (body weight 120 ± 40 g) were kept in polypropylene cages with controlled temperature at 25-28°C, humidity 30-70% and 12-12 hr circadian rhythms under good laboratory conditions. Animals were acclimatized for one week before starting the experiments. The animals had free access to the normal diet and the water given ad libitum.

Preparation of alcoholic extract: The fruit of Momordica cochinchinensis was collected from the local market during the rainy season (July-Sept, 2007). 250 g macerated fruit was mixed with 500 ml of ethanol and kept at room temperature for 36 hr. The slurry was stirred intermittently for 24 hr and left overnight. The mixture was then filtered and the filtrate was evaporated in rotavapour at 40-50°C to remove alcohol and gummy yellowish residue resulted. The material was stored in freezer when needed a portion was suspended in water and was administrated to the experimental animal at a dose of 200 mg kg⁻¹ body weight. The optimum dose of M.cochinchinensis has not been determined yet. LD₅₀ of oral administration of M. cochinchinensis is 3000 mg kg⁻¹ body weight (Lorke, 1983). In the previous studies, M.cochinchinensis was sometimes administered orally to rat at 200 mg kg⁻¹ body wt. in juice formulation. Fascinate of this research and its effective outcome we were selected the dose 200 mg kg⁻¹ body weight for present investigation (Basch et al., 2003; Shibib et al., 1993).

Experimental design: Albino rats were divided into six sub groups of five rats each. The first groups served as control; while the remaining five group were given 200 mg kg⁻¹ body weight of alcoholic fruit extract of Momordica cochinchinensis orally through gavage tube for 7, 15, 30, 45 and 60 days respectively.
Table 1: Biochemical Changes in serum protein profile in albino rats after treatment with alcoholic fruit extract of Momordica cochinchinensis

<table>
<thead>
<tr>
<th>Biochemical profile</th>
<th>Control</th>
<th>Alcoholic treatment</th>
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<tbody>
<tr>
<td></td>
<td>7 days</td>
<td>15 days</td>
</tr>
<tr>
<td>Total protein (g dl^{-1})</td>
<td>5.8±0.070</td>
<td>5.97±0.070*</td>
</tr>
<tr>
<td>Albumin (g dl^{-1})</td>
<td>3.65±0.139</td>
<td>4.14±0.074*</td>
</tr>
<tr>
<td>Total globulin (g dl^{-1})</td>
<td>2.38±0.229</td>
<td>2.68±0.307*</td>
</tr>
<tr>
<td>A/G ratio</td>
<td>1.54±0.040</td>
<td>1.51±0.042*</td>
</tr>
</tbody>
</table>

SEM = Standard error of mean, ns = Non-Significantly (p>0.05); while Significantly different from control group at *p<0.05 and **p<0.01

Collection of serum: A the end of each experimental period and the albino rats were fasted overnight (12 hr). The blood sample was collected from the ventricle of heart using 3.0 ml disposable syringe and 5 s.w.g. Hypodermic needles and stored in sterilized plain vials and centrifuged tubes. When blood clotting was started, the centrifugation was done at 3000 rpm for 30 minutes. The serum sample was separated for biochemical analysis.

Biochemical analysis: Serum total protein was estimated by biuret method (Lubram, 1978), albumin and globulin were measured by Savory and Hammond (1980) method.

Statistical analysis: For each biochemical, parameters a minimum of five replicates were done and the results were statistically analyzed by one-way-ANOVA and followed by Dunnett’s multiple comparison test (DMCT). All data evaluated by computer statistical programmer KpKy plot version 4.0.99.

Results and Discussion

Serum protein, albumin and total globulins levels significantly increase; while A/G ratio increases non-significantly after the treatment of alcoholic fruit extract of Momordica cochinchinensis during 7, 15, 30, 45 and 60 days respectively as compared to control groups (Table 1).

In the present study, an increased total protein in serum after oral administration of fruit extract of Momordica cochinchinensis in albino rats and due to increase in number of m-RNA molecule and their attachment to the ribosome’s and thus increase protein anabolism. Similar finding have been reported in diabetic rats due to anabolic action of Momordica cymbalania on protein anabolism (Rao et al., 1999)

Serum albumin increased after treatment due to stimulate albumin synthesis in response to increased bioavailability of amino acid provided by the portal blood (McPherson et al., 1984). Result was supported by Imaiizumi et al. (1982) in wistar rats due to hepato protective activity of momordin and momordin constituents of Momordica charantia that of promotes liver RNA and protein synthesis; Es trat et al. (2003) in rats due to effect of fruit extract of Coccinia indica on protein metabolism; Total globulins increased due to anabolic action of fruit extract of Momordica cochinchinensis on reticulo-endothelial tissue and immunomodulatory effect of Momordica cochinchinensis fruit extract in albino rat (Oyedapo and Araba, 2001). Vajpeyi et al. (2007) observed in rats after fruit extract of Momordica cochinchinensis stimulates both the secretion and action of insulin as stimulating protein anabolism. In the present study, a non-significant effect on A/G ratio after oral administration of fruit extract of Momordica cochinchinensis in albino rats.

Thus, it was concluded that there is revealed significant increase in serum protein profile in albino rats indicates and anabolic action of fruit extract of Momordica cochinchinensis and the prevent loss of function of various organs of the body occurs due to the wear and tear of body tissue. It increases insulin activity, thus beneficial for diabetes treatment. Application of this study will use in the treatment of diabetes, immune disorder and basic human health.

References


