

ORIGINAL RESEARCH ARTICLE

Anorectic Activity of *Dolichos Biflorus* (Horsegram) Compared to 5HT in Albino Rats

Bhuvaneshwari S^{1*}, Manoj P², Geetha V. Shastri³, Alice Kuruvilla⁴

¹Professor, Department of Pharmacology, ²Former MBBS Student, ³Former Professor, Department of Pharmacology, ³Former Professor and HOD, Department of Pharmacology, PSG IMS &R, Peelamedu, Coimbatore, 641004, Tamilnadu, India

Received 26 Oct 2013; Revised 09 Jan 2014; Accepted 21 Jan 2014

ABSTRACT

Since obesity is associated with an imbalance between food intake and energy expenditure, a long-term lifestyle change including healthy diet and exercise in conjunction with effective weight management supplements may present a cost-effective intervention for obesity. In Andhra Pradesh, *horse gram* is prescribed for persons suffering from jaundice or water retention, and as part of a weight loss diet. So we have planned this study to prove the anorectic potential of *Horse gram* Extract compared to 5HT in albino rats. After obtaining animal ethics committee approval this study was carried out. Albino rats were divided to five groups (six in each group). Aqueous extract of *horse gram* seed was prepared. It was given in low dose, moderate dose and high dose. Then anorectic activity was compared with groups treated with 5HT and control group. *Horse gram* had anorectic activity comparable with 5HT. Effect of *horse gram* was more in low dose group compared to other groups. Low dose group of *horse gram* had quicker onset of action compared to other groups.

Key words: *Dolichos biflorus* seed extract, *horse gram*, anorectic activity, albino rats, 5HT

INTRODUCTION

Since obesity is associated with an imbalance between food intake and energy expenditure, a long-term lifestyle change including healthy diet and exercise in conjunction with effective weight management supplements may present a cost-effective intervention for obesity [1-4]. In fact, informed consumers are increasingly seeking dietary supplements which have been shown to be efficacious and safe in promoting weight loss [5].

Macrotyloma uniflorum (*horse gram*, kulthi bean, hurali, Madras gram) is one of the lesser known beans. The whole seeds of *horse gram* are generally utilized as cattle feed. However, it is consumed as a whole seed, as sprouts, or as whole meal in India, popular especially in southern Indian states. Medical uses of these legumes have been discussed.

Horse gram and moth bean are legumes of the tropics and subtropics, grown mostly under dry-land agriculture. The chemical composition is comparable with more commonly cultivated legumes. Like other legumes, these are

deficient in methionine and tryptophan, though *horse gram* is an excellent source of iron and molybdenum [6]. Comparatively, *horse gram* seeds have higher trypsin inhibitor and hemagglutinin activities and natural phenols than most bean seeds. Natural phenols are mostly phenolic acids, namely, 3,4-dihydroxybenzoic, 4-hydroxybenzoic, vanillic, caffeic, *p*-coumaric, ferulic, syringic and sinapic acids [7].

In Andhra Pradesh, *horse gram* (Ulava (singular) Ulavalu (plural)) is prescribed for persons suffering from jaundice or water retention, and as part of a weight loss diet. In Tamil Nadu, *horse gram* (Kollu in Tamil), in the southern districts it is called Kaanam) is commonly used in Tamil dishes, including kollu chutney, kollu porial, kollu avial, kollu sambar, and kollu rasam. In traditional siddha cuisine, *horse gram* is considered a food with medicinal qualities. In Gharwal region, another more elaborate dish is "phanu" which is made in a kadhai with roughly ground gahat

(previously soaked overnight) boiled over several hours. Phnau is somewhat heavy to digest; it's quite possible to go through the whole day without feeling in the least bit hungry, after having a big phanu meal in the morning. Similar Botanical name of horse gram/*Gahat* or *Kulath*/KULTHI IS *Dolichos biflorus* from the Leguminiaceae family. The seed has the ability to reduce post-prandial hyperglycemia by slowing down carbohydrate digestion and reduce insulin resistance by inhibiting protein-tyrosine phosphatase 1 beta enzyme^[8].

A combination of *P. betle* leaf extract and *D. biflorus* seed extract in a ratio of 2:3, LI10903F also known as LOWAT demonstrated greater anti-adipogenic as well as lipolytic activities compared to the individual extracts^[9]. So we have planned this study to prove the anorectic potential of *Horse gram* Extract compared to 5HT in albino rats.

AIM AND OBJECTIVES

The aim of this study was to prove the anorectic potential of *Horse gram* Extract compared to 5HT in albino rats.

The objectives are:

1. To isolate *Horse gram* into an aqueous extract.
2. To screen three graded doses for anorectic potential.
3. To compare the effect with 5HT in Albino rats.

MATERIALS AND METHODS

Preparation of aqueous extract of *Horse gram* seed:

- *Horse gram* was boiled for 24 hours in Soxhlet Apparatus
- Then it was filtered and the filtrate was air dried.
- It was dissolved in water to get 100mg/ml, 200mg/ml and 400mg/ml

Grouping and dosing of Animals:

- Inbred Wistar strain Male White albino rats were fasted over 24 hours.
- 30 animals were divided into five groups (6 in each group).
- Group 1: 0.2ml of low dose of *horse gram* 100mg/ml given orally (LD).
- Group 2: 0.2ml of moderate dose of *horse gram* 200mg/ml given orally (MD).
- Group 3: 0.2ml of high dose of *horse gram* 300mg/ml given orally (HD).

- Group 4: 5HT treated at dose of 5mg/kg given intraperitoneally (5HT).
- Group 5: Untreated animals were received 0.2ml of distilled water orally (NC).

Procedure:

- 30 minutes after drug dose, animals were given access to drink 50ml of milk.
- Amount of milk consumption at one hour, two hours and four hours were noted.
- % reduction in milk consumption was calculated using the formula % reduction = $\frac{\text{NC Mean} - \text{Test value}}{\text{NC mean value}} \times 100$.

Analysis of results:

The results were analysed using Anova.

Ethics:

Study was conducted after Institutional Animal Ethics committee approval. And we have adhered to the guidelines of our institution regarding the care and use of laboratory animals.

RESULTS

- Quantity of mean milk intake was more with control group, then with high dose of *horse gram* group, then with low dose group and it lowest with 5HT group (**Figure 1**).
- Rate of intake of milk can be graded as (**Table 1**).

NC group: 1Hr > 4Hr > 2Hr
 5HT group: 4Hr > 2Hr > 1Hr
 LD group: 4Hr > 2Hr > 1Hr
 MD group: 1Hr > 4Hr > 2Hr
 HD group: 1Hr > 4Hr > 2Hr

- Mean % reduction in milk intake can be graded as (**Figure 2**)

p value among the groups

5HT group: 1Hr > 2Hr > 4Hr (p > 0.05)
 LD group: 1Hr > 2Hr > 4Hr (p > 0.05)
 MD group: 4Hr > 2Hr > 1Hr (p < 0.05)
 HD group: 4Hr > 2Hr > 1Hr (p < 0.01)

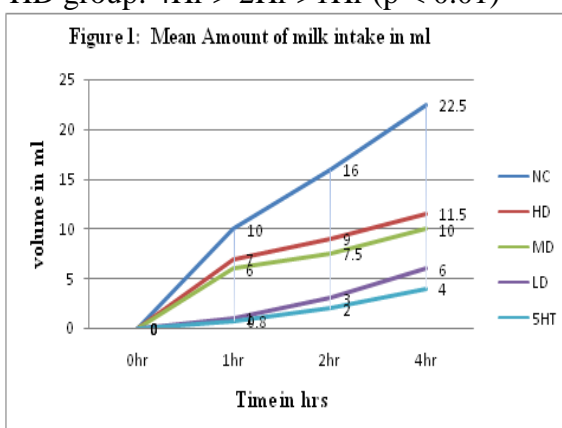


Figure 1: Mean Amount of milk intake in ml

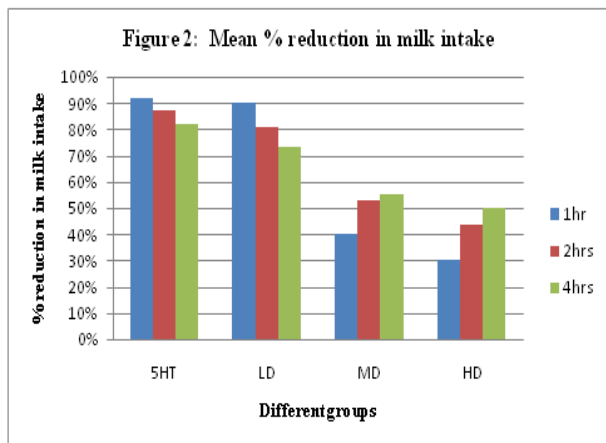


Figure 2: Mean % reduction in milk intake



Figure 3: Time - response relationship

Table 1: Mean Amount of milk intake in ml by different groups

Time in hrs	Mean Amount of milk intake in ml by different groups				
	NC	HD	MD	LD	5HT
1hr	10	7	6	1	0.8
2hr	16	9	7.5	3	2
4hr	22.5	11.5	10	6	4

DISCUSSION

- All the groups when compared to control group showed significant anorectic activity ($p < 0.01$) indicating an anorectic potential for *horse gram* comparable with 5HT.
- Low dose of *horse gram* was equipotent with 5HT since the anorectic activity of 5HT & LD groups were indistinguishable ($p > 0.1$).
- But Moderate and High doses of *horse gram* were comparatively less potent than 5HT ($p < 0.01$).
- That is effect of anorectic activity with 5HT = Low dose > Moderate dose = High dose
- The difference between moderate dose and high dose of *horse gram* group response was not significantly different ($p > 0.01$), indicating increase in dose of *horse gram* does not increase the effect.
- Low dose of *horse gram* produces quick onset of anorectic activity which decreased

with time. But with moderate & high doses of *horse gram* the effect was slow in onset but increased with time (Figure 3).

REFERENCES

1. Ross R, Dagnone D, Jones PJ, Smith H, Paddags A, Hudson R, Janssen I. Reduction in obesity and related comorbid conditions after diet-induced weight loss or exercise-induced weight loss in men. A randomized, controlled trial. *Ann Intern Med.* 2000; 133:92–103.
2. Blackburn GL. Treatment approaches: food first for weight management and health. *Obes Res.* 2001;9(Suppl 4):223S–227S.
3. Hurt RT, Wilson T. Geriatric obesity: evaluating the evidence for the use of flavonoids to promote weight loss. *J Nutr Gerontol Geriatr.* 2012; 31:269–289.
4. Comerford KB, Artiss JD, Catherine Jen KL, Karakas SE. The Beneficial Effects α -Cyclodextrin on Blood Lipids and Weight Loss in Healthy Humans. *Obesity.* 2011; 19:1200–1204.
5. Bailey RL, Gahche JJ, Lentino CV, Dwyer JT, Engel JS, Thomas PR, Betz JM, Sempos CT, Picciano MF. Dietary supplement use in the United States, 2003–2006. *J Nutr.* 2011; 141:261–266.
6. Kadam SS, Salunkhe DK. "Nutritional composition, processing, and utilization of horse gram and moth bean". *Crit Rev Food Sci Nutr.* 1985; 22(1):1-26.
7. Identification and quantification of phenolic acids in *Macrotyloma uniflorum* by reversed phase HPLC. Kawsar, S.M.A., E. Huq, N. Nahar and Y. Ozeki, *Am. J. Plant Physiol* 2008; 3: 165-172
8. <http://www.thehindu.com/sci-tech/health/diet-and-nutrition/raw-horse-gram-good-for-diabetics/article4651090.ec>.
9. Sengupta K¹, Mishra AT, Rao MK, Sarma KV, Krishnaraju AV, Trimurtulu G. Efficacy of an herbal formulation LI10903F containing *Dolichos biflorus* and Piper betle extracts on weight management. *Lipids Health Dis.* 2012 Dec 27; 11:176.