*CIBTech Journal of Zoology ISSN: 2319–3883*
*An Online International Journal, Available at http://www.cibtech.org/cjz.htm*
*2025 Vol.14, pp.226-231/Sanket et al.*
***Research Article***

# BATRISU VASANU, A POLYHERBAL GALACTAGOGUE, DECREASES THE FOOD EFFICIENCY RATIO WHILE INCREASING FAECAL BULKING IN FEMALE WISTAR RATS

**Sanket Charola[1*], Susy Albert[1], Maya Chaudhary[2], B. Suresh[3], Sirimavo Nair[4]**
*[1]Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India*
*[2]Department of Microbiology and Biotechnology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India*
*[3]Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India*
*[4]Department of Foods and Nutrition, Faculty of Family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India*
**Author for Correspondence: sanket.charola-botany@msubaroda.ac.in*

## ABSTRACT
New mothers are supplemented with nutraceuticals to improve their health postpartum, and to aid milk production. Among many known galactagogue herbal compounds, Batrisu vasanu is quite popular in western India. To investigate its nutraceutical potential, nulliparous female Wistar rats were given two different doses. Treated 1 and Treated 2 were given 1 g/day human equivalent and 10 g/day human equivalent doses in food pellet for three weeks. Animals (n=4 per group) were observed for change in body weight and faecal material over the study period. Despite comparable food and water intake across the groups, distinct physiological response was observed. While the control group showed steady weight gain (19.75 ± 4.14 g), Treated 1 exhibited a non-significant increase (15.75 ± 4.21 g). Notably, Treated 2 displayed a significant weight reduction (-6.0 ± 1.5 g, $p \leq 0.001$) despite comparable food intake across groups (Control: 874 ± 5.6 g; Treated 1: 830 ± 7.2 g; Treated 2: 847 ± 8.4 g). Food efficiency ratio (FER) was significantly lower in Treated 2 (-0.71 ± 0.01) compared to Control (2.26 ± 0.5) and Treated 1 (1.89 ± 0.3), suggesting impaired nutrient absorption. Additionally, Treated 2 had elevated faecal output (182 ± 4.2 g vs. Control: 145.1 ± 4.2 g, $p \leq 0.001$), indicating altered gut physiology. These findings suggest that Batrisu vasanu may influence weight regulation through mechanisms affecting nutrient assimilation and may exert a laxative-like effect while attenuating weight gain.

***Keywords:*** *Polyherbal, Galactagogue, Laxative, Food efficiency ratio, gut health*

## INTRODUCTION
Maternal health postpartum is a key milestone for ensuring recovery, hormonal balance, and sustained lactation. Traditionally many galactagogues to increase breast milk secretion are used among new mothers namely *Trigonella foenum-graceum* L., *Anethum graveolens* L. and *Foeniculum vulgare* Mill. (Buntuchai *et al.,* 2017; Chao *et al.,* 2021). A widely practiced polyherbal galactagogue is reported from western India, popular with names, Batrisu vasanu, katlu, and battisa with varied herbal composition (Charola *et al.,* 2021). It is a mixture of around 32 herbs and is ethnically prescribed postpartum as wheat flour based sweet delicacy. It is believed to improve maternal health and also boost growth of infants due to its galactagogue property. However, consuming such sweets during this period also is associated with weight gain, diabetes, and other metabolic disorders (Ravi & Joseph, 2020). The global rising prevalence of obesity has intensified the search for natural nutraceuticals with weight-regulating properties (Daniels *et al.,* 2005). Herbal nutraceuticals may exert effect on appetite suppression, lipid metabolism modulation, and altered nutrient absorption (Hasani-Ranjbar *et al.,* 2009; Payab *et al.,* 2018). Study on *Garcinia cambogia* and

*Morinda citrifolia*, have demonstrated weight-modulating effects via inhibition of lipogenesis and enhanced faecal fat excretion (Rakha *et al.,* 2008). The effect is due to bioactive compounds like saponins and polyphenols which reduce dietary fat absorption and hence altered food efficiency ratio (Birari & Bhutani, 2007).

In the present study, we explored the nutraceutical effects of Batrisu vasanu on body weight, food and water intake, and faecal excretion in nulliparous female Wistar rats. Given the lack of prior research on this polyherbal nutraceutical, our findings aim to provide preliminary evidence on its potential as a nutraceutical postpartum.

## MATERIALS AND METHODS

### *Animal ethics*

The study protocol and number of animals to be used was duly passed through Institutional Animal Ethics Committee wide No. MSU-Z/ IAEC04/ 16-2020 (revalidation), of The Maharaja Sayajirao University of Baroda.

### *Maintenance of animals*

Nulliparous, 12 Wistar female rats ranging from 180 to 220 g weight were housed in Animal house facility, Department of Zoology, The Maharaja Sayajirao University of Baroda as per guidelines of animal ethics. The animals were housed in a well-ventilated environment, provided with 12 hour light and 12 hour dark (12:12 L:D) cycle and ambient temperature. The animals were allowed for one week of acquaintance before intervention and were provided food and water access ad libitum.

### *Dosage and treatment of animals*

Four animals each were then randomly assigned to three groups – Control group (n=4), Treatment group 1 (n=4) and Treatment group 2 (n=4). Batrisu vasanu was prepared as described previously (Charola *et al.,* 2021) and was added to standard chow diet, 1 g per day human equivalent for Treatment group 1 and 10 g per day human equivalent for Treatment group 2 (Tsoukalas *et al.,* 2021). The chow diet was powdered and mixed with Batrisu vasanu and was formulated as pellets. Animals were provided with 200 g food pellets of respective treatments every day in the cage. Daily leftover food pellets were weighed and topped up again to 200 g. Water was also filled in bottle as 200 ml per day and every day intake was measured by measuring the leftover. Every third day body weight, food intake, and water consumption were noted group-wise. The treatments were carried out for three weeks. Faecal material from the cages were collected intermittently and its weight was recorded regularly.

$$Food\ efficiency\ ratio\ (FER) = \frac{Weight\ change\ (g)}{food\ intake\ (g)}\ X\ 100\ \%$$

### *Data collection*

Data was collected group-wise and were managed using Microsoft excel software. The data were calculated for Mean ± SEM for each group. The treated groups were compared for the effect to that of control group. Graphical representation of the data was done using R Studio open-source platform.

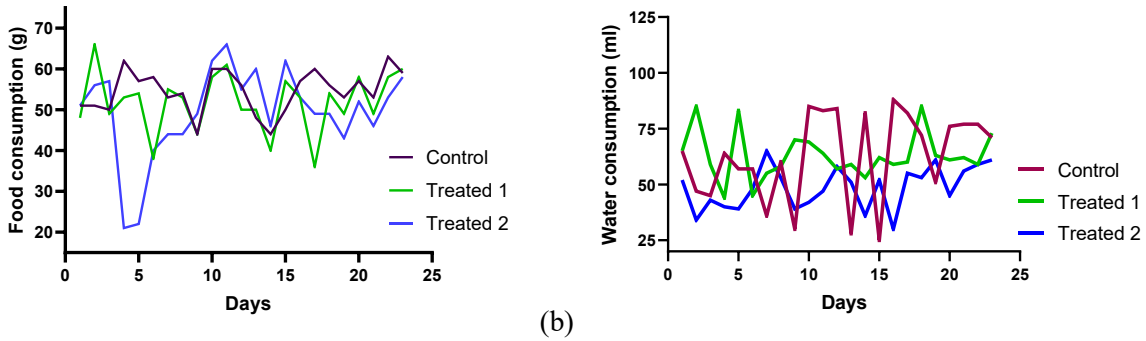
## RESULTS AND DISCUSSION

### *Food and water consumption*

For each group, food and water intake was monitored daily for each three groups, control, treated -1 and treated -2. The trend of the food consumption by each group is presented in Figure 1. It can be observed that throughout the study period, food consumption (g) was found to have no significant changes. It is apparent that food consumption was same in all groups of animals. Similarly, the water intake (ml) was also unchanged among control, treated -1 and treated -2 groups.

The changes in food and water intake indicates potential shift in metabolic regulation or appetite modulation. It further indicates the effect of bioactive constituents in altered energy balance of animals. However, during this study non-significant change in food and water consumption indicated that the

physiology of animals were normal throughout the study period (LEPKOVSKY *et al.,* 1957). Further, the unchanged physiology also indicates that the Batrisu vasanu was safe at the doses tested for animals.




(a) (b)

**Figure 1. Food and water consumption in rats after dosing with Batrisu vasanu. (a) Food pellet consumed in grams per group (n=4); (b) Consumption of water in ml per group (n=4).**

***Body weight and Food efficiency ratio (FER)***

To analyze the nutraceutical effect of Batrisu vasanu, nulliparous female Wistar Rats were divided into three groups as Control, Treated 1 and Treated 2 as briefed in the methodology section. Rats in groups of four animals were treated for three weeks, and their body parameters were measured as discussed here.

As presented in Table 1, Initial body weight of control group was 209.75±11.35 g which after three weeks increased to 229.5±15.5 g with 19.75±4.14 g of weight gain. Similarly, there was non-significant weight gain in treated 1 animal group of 15.75±4.21 g.

| ***Parameters*** | ***Control*** | ***Treated 1*** | ***Treated 2*** |
|---|---|---|---|
| *Initial weight (g)* | 209.75 ± 11.35 | 198.5 ± 15.42 | 213 ± 3.24 |
| *Final weight (g)* | 229.5 ± 15.50 | 214.25 ± 19.62 | 207 ± 4.74 |
| *Weight gain (g)* | 19.75 ± 4.14 | 15.75 ± 4.21 | -6.0 ± 1.50 |
| *Total food intake (g)* | 874 ± 5.6 | 830 ± 7.2 | 847 ± 8.4 |
| *Total faecal content (g)* | 145.1 ± 4.2 | 137.1 ± 5.6 | 182 ± 4.2 |
| *Food efficiency ratio (%)* | 2.26 ± 0.5 | 1.89 ± 0.3 | -0.71 ± 0.01 |

**Table 1: Body weight, food intake and Food efficiency ratio of rats fed with chow diet (Control), chow diet with Batrisu vasanu as treated 1 and treated 2.**

However, for treated 2 group, there was a significant ($p \leq 0.001$) reduction in weight gain after three weeks of treatment. It was 6.0±1.5 g of reduction compared to both control and treated 1 animal groups. The same can be observed in Figure 2 (b). The trend of change in body weight from initial weight (g) to final weight (g) can be observed in Figure 2 (a). It can be noted that control group animals showed steady increase in weight over study period, while treated 1 and treated 2 had maintained a flat increase.

As shown in Table 1, total food intake was observed to be 874±5.6 g, 830±7.2 g and 847±8.4 g for control, treated 1 and treated 2 respectively. However, there was no significant change in total food intake among all the groups.

Additionally total faecal content and food efficiency ratio is also displayed in the table. Figure 2 (c) presents the Food efficiency ratio, calculated as percentage of body weight gain for total food consumed during

study period. FER was significantly negative for treated 2 compared to control and treated 1 ($p \leq 0.001$). The said results can be equated to decreased body weight over treatment period but steady food consumption. Total faecal material (g) was also found to be significantly ($p \leq 0.001$) increased in treated 2 compared to control and treated 1 group as shown in Figure 2 (d).

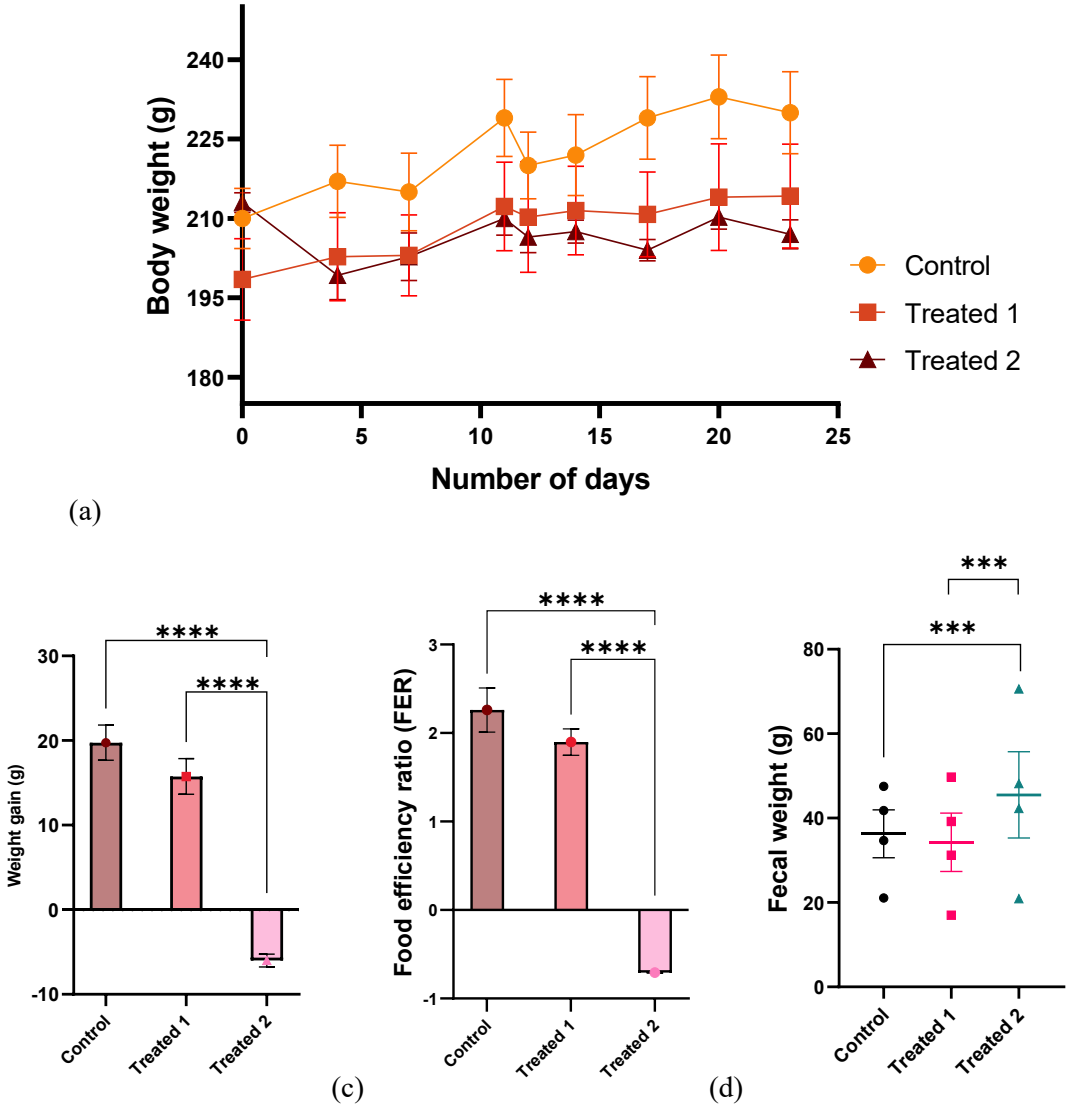



**Figure 2. Parameters of body weight, food efficiency and faecal content in rats. (a) Body weight changes over treatment period; (b) Weight gain in grams; (c) Food efficiency ratio (FER) over the treatment period; (d) Average faecal weight (g) produced per group for the treatment period. Data are represented as Mean±SEM and $p \leq 0.05$ is considered significant.**

Rats fed with Batrisu vasanu at 1 g and 10 g of human dose equivalent batrisu vasanu in treated group 1 and treated group 2 respectively indicated non-significant change in diet and water intake. However, its body weight was decreased significantly than control group, but faecal weight increased. It suggests a better gastrointestinal motility and decreased absorption in the body (Choi *et al.,* 2014; Na *et al.,* 2021). Similar results were shown in a study where food consumption was normal but body weight and Food

efficiency ratio decreased (López-Varela *et al.,* 1995). Starvation is showed to induce decrease in food efficiency ratio; however, it is evident that the laxatives might induce the better bowel movement and results in higher faecal weight.

## CONCLUSION

The present study on nulliparous female Wistar rats, demonstrated that Batrisu vasanu significantly reduces body weight and food efficiency ratio (FER) while increasing faecal bulk, without altering food or water intake. The significant decrease in FER ($-0.71 \pm 0.001$, $p \leq 0.001$) alongside elevated faecal output ($182 \pm 4.2$ g vs. $145.1 \pm 4.2$ g in controls) suggests reduced nutrient absorption. The difference also approves that there was no appetite suppression, but possibly due to enhanced gastrointestinal motility or interference with lipid assimilation. However, further details in the field can be obtained with detailed clinical parameters study. These findings align with the herbal laxatives which affect only excretion without affecting caloric intake. This result establishes that the Batrisu vasanu, popular galactagogue is safe to use postpartum, which exerts its effect without affecting weight gain. Since, it did not induce metabolic stress – as evidenced by stable food and water consumption – its weight-modulating effect may stem from altered intestinal absorption rather than toxicity.

## ACKNOWLEDGEMENT

We would like to thank Dr. R Devkar, Department of Zoology and his research team for helping in animal experiments. We are also thankful to The Maharaja Sayajirao University of Baroda for research support vide University supported research projects grant No. GCU/RCC/2020-21/II-9/180/44.

## REFERENCES

**Birari RB & Bhutani KK (2007).** Pancreatic lipase inhibitors from natural sources: unexplored potential. *Drug Discovery Today*, **12**(19–20), 879–889.

**Buntuchai G, Pavadhgul P, Kittipichai W & Satheannoppakao W (2017).** Traditional Galactagogue Foods and Their Connection to Human Milk Volume in Thai Breastfeeding Mothers. *Journal of Human Lactation*, **33**(3), 552–559.

**Chao J, Ko CY, Lin CY, Tomoji M, Huang CH, Chiang HC, Yang JJ, Huang SS & Su SY (2021).** Ethnobotanical Survey of Natural Galactagogues Prescribed in Traditional Chinese Medicine Pharmacies in Taiwan. *Frontiers in Pharmacology*, **11**, 2443.

**Charola S, Tadvi B, Albert S, Suresh B & Nair S (2021).** Analysis of a polyherbal galactagogue Batrisu vasanu, an indigenous Indian ethnomedicine. *Indian Journal of Natural Products and Resources*, **12**(4), 610–616.

**Choi JS, Kim JW, Cho HR, Kim KY, Lee JK, Sohn JH & Ku SK (2014).** Laxative effects of fermented rice extract in rats with loperamide-induced constipation. *Experimental and Therapeutic Medicine*, **8**(6), 1847.

**Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, Robinson TN, Scott BJ, Jeor SS & Williams CL (2005).** Overweight in children and adolescents: Pathophysiology, consequences, prevention, and treatment. *Circulation*, **111**(15), 1999–2012.

**Hasani-Ranjbar S, Nayebi N, Larijani B & Abdollahi M (2009).** A systematic review of the efficacy and safety of herbal medicines used in the treatment of obesity. *World Journal of Gastroenterology*, **15**(25), 3073–3085.

**Lepkovsky S, Lyman R, Fleming D, Nagumo M & Dimick MM (1957).** Gastrointestinal regulation of water and its effect on food intake and rate of digestion. *The American Journal of Physiology*, **188**(2), 327–331.

**López-Varela S, Sánchez-Muniz FJ & Cuesta C (1995).** Decreased food efficiency ratio, growth retardation and changes in liver fatty acid composition in rats consuming thermally oxidized and

polymerized sunflower oil used for frying. *Food and Chemical Toxicology*, **33**(3), 181–189.
**Na JR, Lee KH, Kim E, Hwang K, Na CS & Kim S (2021).** Laxative effects of a standardized extract of Dendropanax morbiferus H. Léveille leaves on experimental constipation in rats. *Medicina (Lithuania)*, **57**(11).
**Payab M, Hasani-Ranjbar S, Aletaha A, Ghasemi N, Qorbani M, Atlasi R, Abdollahi M & Larijani B (2018).** Efficacy, safety, and mechanisms of herbal medicines used in the treatment of obesity. *Medicine (United States)*, **97**(1).
**Rakha MK, Nabil ZI & Hussein AA (2008).** Cardioactive and vasoactive effects of natural wild honey against cardiac malperformance induced by hyperadrenergic activity. *Journal of Medicinal Food*, **11**(1), 91–98.
**Ravi R & Joseph J (2020).** Effect of fenugreek on breast milk production and weight gain among infants in the first week of life. *Clinical Epidemiology and Global Health*, **8**(3), 656–660.
**Tsoukalas D, Zlatian O, Mitroi M, Renieri E, Tsatsakis A, Izotov BN, Burada F, Sosoi S, Burada E, Buga AM, Rogoveanu I, Docea AO & Calina D (2021).** A novel nutraceutical formulation can improve motor activity and decrease the stress level in a murine model of middle-age animals. *Journal of Clinical Medicine*, **10**(4), 1–17.