Published online in http://ijam.co.in ISSN No: 0976-5921

*International Journal of Ayurvedic Medicine, Vol 15 (2), 2024; 333-340*

# Evaluation of Comparative Efficacy of *Vidarikandadi Churna* and its Modified Dosage Form for Assessment of Growth, Strength, and Stamina in Albino Rats

**Research Article**

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## Abstract

*Vidarikandadi Churna* (VC) is a Polyherbal formulation suggested for *karshya* that is also said to be beneficial for weight gain and development. *Yogaratnakara* mentions *Vidarikandadi churna* as a formulation. *Vidarikandadi Churna* for their nootropic and antioxidant qualities. On Wistar male rats, conducted a research to examine the strength, stamina, growth-promoting abilities of conventional supplements and traditional health supplements. Aim: Pharmaceutical analytical study of *Vidarikandadi Churna* and its modified dosage form and assessment of their comparative efficacy for Strength, Stamina, and Growth as compared to standard supplements in albino rats. Objectives: To assess and compare the strength, stamina, and growth parameters in VC, VB, standard supplements. Material and Methods: A total of 30 Wistar male rats were used and five groupings were formed. Except for the Normal control group, all of the rats were given health supplements. For 30 days, groups II, III, IV, and V received Milk, Complan, VC, and *Vidarikandadi* Biscuits. A swim endurance test was used to assess the strength and stamina of Wistar rats in each group, growth was assessed by measuring body length and body weight. Observation and Results: A group of rats with the greatest development growth, strength, and stamina were studied. Group V rats had the most strength and stamina, followed by Group IV, Group III, and Group II rats. Conclusion: In the current study, discovered that group V rats had the most strength, stamina and greatest growth followed by groups IV, III, and II respectively.

**Keywords:** Growth, Strength, Stamina, *Vidarikandadi Churna, Vidarikandadi* Biscuits.

## Introduction

To survive and reproduce, humans and other animals require strength, stamina, and growth. Traditional food has long been thought to be excellent for decreasing fatigue, increasing strength and stamina, and hastening growth. Fatigue is an advanced phenomenon that may be distinguished as a "time-dependent, exercise-induced loss in a muscle's maximum force generating capability."(1,2) Children commonly feel exhausted as a result of today's hectic pace of life and cutthroat competition, and their growth suffers as a result; thus, a well-balanced dietary supplement, in addition to adequate nourishment, is essential.(3)Preschool children's organs grow the fastest, therefore good nutrition is critical during this time to keep up with the body's rising demands.(4). Modern health supplements contain fortified nutrients and sweets; nevertheless, they are relatively pricey, and many low-income families in developing countries such as India cannot afford them. The popularity of energy drinks among children and teenagers has resulted in a rise in their negative health consequences.(5) The usage of commercial dietary supplements has increased significantly as a result of their exemption from drug and food regulation.(6) The search for safe and effective health supplements has redirected researchers' focus to traditional health supplements..(7) *Vidarikand (Pueraria tuberosa* DC), *Godhuma (Triticum sativum* L.), and *Yava (Hordeum vulgare* L.) are the main ingredients of *Vidarikandadi Churna*.(8) *Pueraria tuberosa* DC has nootropic and growth hormone-inducing effects.(9) *Pueraria tuberosa* DC may improve weight gain and physical strength by inducing growth hormones.(10) *Pueraria tuberosa* DC study reveals considerable anxiolytic and anti-stress characteristics of Pueraria tuberosa extract (PTE)(11), validating the therapeutic usefulness of the Ayurvedic herb.(12) Natural foods boost strength and stamina by supplying critical nutrients for development and growth.(13) The current study compares and investigates the stamina, strength, and growth-promoting benefits of natural food-based health supplements vs commercially available health supplements in evolving Wistar rats.

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A healthy person must have both strength and stamina. A person's capacity to exert is limited by a lack of stamina, which reduces the length of time one can spend on an activity (endurance).(14)Intensive labor and exercise generate and accumulate free radicals, causing oxidative stress damage to the body. (15)Researchers' attention has been drawn to traditional and alternative therapies in their hunt for safe and effective anti-fatigue approaches. *Pueraria tuberosa* DC, often known as *Vidarikanda*, is one such medicinal herb. (16)Another name for it is Indian kudzu. It is extensively used in Indian medicine as an energy booster and to increase general wellness for musculoskeletal diseases.

The tubers are the most commonly used therapeutic component of the plant. This investigation supports the notion that *Pueraria tuberosa* DC has a significant anti-stress adaptogenic effect (17). *Pueraria tuberosa* DC is commonly consumed in powdered form with milk since it delivers the maximum benefits. The current study is to determine the effectiveness of milk-treated *Pueraria tuberosa* DC tuber powder supplemented with its modified dosage form in enhancing swim endurance in rats.

## Materials and Methods

### Material

*Vidarikandadi churna* and its modified dosage form is a Polyherbal Ayurvedic medication. It contains herbs in proper proportions along with cow ghee and sugar. The components in *Vidarikandadadi churna* and its adjusted dose form work together to provide important health advantages. Ingredients in *Vidarikandadi churna* and its modified form, such as *Pueraria tuberosa DC*, *Hordeum vulgare Linn*, *Triticum aestivum L* and *Withania somnifera* have been shown to have rejuvenating, Immunumodulatory, anti-oxidant, and strength promoting along with endurance characteristics and to improve strength, stamina, vitality, and general health.. *Pipali* (*P.longum* Linn) is bioavailability enhancer effect. *E.cardamomum* is having antioxidant effect.

The composition of *Vidarikandadi churna* and its modified dosage form and proximate analysis are given in Table 1 and Table 2 and Table 3.

**Table 1: Ingredients of *Vidarikandadi churna* (18)**

| Sr. No | Name of Ingredients | Latin name | Useful part | Parts | Quantity |
|---|---|---|---|---|---|
| 1 | *Vidarikanda* | *Pueraria tuberosa DC* | Tuber | 2 parts | 200gm |
| 2 | *Godhuma* | *Triticum aestivum L* | Seed | 2 parts | 200gm |
| 3 | *Yava* | *Hordeum vulgare Linn* | Seed | 1 parts | 100gm |
| 4 | *Ghrita* | - | | 1 part | 100gm |
| 5 | *Sharkara* | - | | 5 parts | 500gm |

**Table 2: Ingredients of *Vidarikandadi* Biscuits**

| Sr. No | Name of Ingredients | Latin name | Useful part | Quantity |
|---|---|---|---|---|
| 1 | *Vidarikanda* | *Pueraria tuberosaDC* | Tuber | 150gm |
| 2 | *Godhuma* | *Triticum aestivum L* | Seed | 300gm |
| 3 | *Yava* | *Hordeum vulgare Linn* | Seed | 100gm |
| 4 | *Ghrita* | - | - | Q.S |
| 5 | *Sharkara* | - | - | 200gm |
| 6 | *Ashwagandha* | *Withania somnifera* | Roots | 150gm |
| 7 | *Pippali* | *Piper longum* | Seeds | 5gm |
| 8 | *Ela* | *Elettaria cardamomum* | Seeds | 5gm |
| 9 | Milk powder | | - | 90gm |

**Table 3: Proximate analysis of *Vidarikandadi Churna* and *Vidarikandadi* Biscuits**

(By Laboratory based Analysis and the analysis of sample as per Ayurvedic Pharmacopeia of India.)

| Tests | Reports | |
|---|---|---|
| | ***Vidarikandadi Churna*** | ***Vidarikandadi* Biscuits** |
| Description | Light cream color | Light brown color |
| Total calories (kcal/100 g) | 291.31kcal | 341.91kcal |
| Total fat (%w/w) | 1.75 | 13.54 |
| Carbohydrate (%w/w) | 63 | 47.5 |
| Total sugar content (%w/w) | 1.06 | 1.12 |
| Protein content (%w/w) | 5.89 | 7.52 |

### Experimental Animals (Preparation of Animals)

The study proceeded after getting clearance from the Institutional Animals Ethics Committee (DMIMS/ IAEC/20-2021/14). The experiment was carried out on 30 male Wistar albino rats. The study lasted 30 days, from April 1st to May 1st, 2023, in the animal house division of Datta Meghe College of Pharmacy, Wardha 442001. Growing Wistar Albino male rats weighing 100 to 150 g with body lengths of 22.5 and 25cm were employed in this study as inclusion criteria. The study comprised 30 Wistar male Albino rats in total. For 15 days before the start of the trial, the animals were kept in conventional circumstances (23° 2 °C, 40%-70% relative humidity, and a 12-hour light and dark cycle). They were given free access to RO drinking water and conventional feed. Except for the normal control group, each group of rats received health supplements (traditional or commercial) in addition to a regular diet and water.

**Experimental Design**

The study involved 30 male Albino Wistar rats weighing 100g-150g on average. The rats were put into five groups, each with six rats: After acclimatization, animals were randomized into five groups of six animals each on day 0 (baseline) based on Swim Endurance (SE) time.

- Group 1- Normal control (NC) with rats given normal food for 30 days
- Group 2- Vehicle Control (VC) with rat given Milk for 30 days
- Group 3- Standard Control (SC) with rats given standard supplements (Complan) for 30 days
- Group 4- *Vidarikandadi churna* (VC) with rats given *vidarikandadi churna* for 30 ays
- Group 5- *Vidarikandadi* Biscuit (VB) with rats given *vidarikandadi* biscuits for 30 days

The animals have been divided into five groups of six males apiece. Group 1 was given Normal food and acted as the control group. Group 2 received 1 mL/ 150g Cow's Milk and acted as the vehicle control. Group 3 was given Complan with Cow's Milk 216mg/ 150g as the standard control. Groups 4, 5, and are given *Vidarikandadi Churna* with Cow's Milk and *Vidarikandadi* Biscuits with Cow's Milk at 216mg/150g body weight daily for 30 days. Body weight, mortality, and food and drink consumption were all observed.

The test material was produced in cow's milk and administered orally through gavage from Day 1 to 30 sequentially at a dosage volume of 10 ml/Kg, q.i.d. The control group (G1) received just distilled water at a comparable dose volume. *Vidarikandadi Churna* is an Ayurvedic remedy. The animal dosage was calculated using the human dose of churna and Biscuits. (19, 20, 21) To evaluate any dosage response impact, several dose levels were used. Rat swimming exercise was assessed using a plastic round tub (63x 49x 35cm) filled with water kept at 34 ± 1ºC.(22) All of the animals were permitted to swim until they were exhausted. It was made sure that the animal's tail did not come into contact with the tank's base since this would help the rat in balancing and keeping its head above the water's surface. The SE test was considered complete when the rats drowned more than three times.

**Determination of Swim Endurance (SE) time and Strength, Stamina, and Growth Activities: (23)**

Swim Endurance (SE) tests were carried out on Days 0, 15, and 30; animal weights were also recorded.

The strength and stamina of Wistar rats in each group were measured and compared using a swim endurance test (seconds) at 0, 15, and 30 days, respectively. The growth of rats in each group was measured and compared to other groups by measuring body length (cms) and body weight (g) at 0, 15, and 30 days, respectively. The rat groups with the maximum growth (body length and weight) and the highest stamina on the swim endurance test (seconds) were evaluated statistically.

Each group's growth was tracked by measuring body length and weight (gms) on the first, fifteenth, and thirty days. The Swim Endurance test (ability to swim in the water before sinking) was used to assess strength and stamina.

**Statistical Analysis**

The descriptive and inferential statistics were used in the statistical analysis, which included the Student's paired t-test, one-way ANOVA, and multiple comparisons. Tukey test and SPSS 27.0 software were used in the analysis, and p0.05 is regarded as the level of significance.

## Results

Wistar rats' mean body weights were 139.16 gms, 142.33 gms, 120.66 gms, 110.50 gms, and 139.66 gms in groups I, II, III, IV, and V, respectively. Wistar rats' mean body lengths were 26.2 cm, 26 cm, 26.6 cm, 25.8 cm, and 26.4 cm in groups I, II, III, and IV, V, respectively. Before supplementation, the mean duration of a swim endurance test of Wistar rats was 1 min 10 sec, 1 min 15 sec, 1 min 14 sec, 1 min 10 sec, and 1 min 15 sec in groups I, II, III, IV, and V, as shown in Table 4.

**Table 4: Wistar rats' mean body weight, length, duration of a swim endurance test, and mean grip strength before supplementation**

| At 0 day | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 |
|---|---|---|---|---|---|
| Mean body weight(g) | 139.16 | 142.33 | 120.66 | 110.50 | 139.66 |
| Mean length(cm) | 26.2 | 26 | 26.6 | 25.8 | 26.4 |
| Mean swim endurance time (sec) | 70 sec | 75 sec | 74 sec | 70 sec | 75 sec |

A statistically significant difference in the mean body weight (gms) of five groups was established using one-way ANOVA (F = 9.842, p value = 0.0001). Except for groups I, II, and III, when body weight was compared between five groups using the Multiple comparison Tukey tests, a significant difference (p-value 0.05) was found across groups. (Table 5).

**Table 5: Comparison of body weights (gm) in all five groups on day 1**

| Groups At 1st day | N | Mean | Standard deviation | Standard Error | 95% confidence interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound | | |
| Group 1 | 6 | 139.16 | 8.44 | 3.44 | 130.30 | 148.03 | 126.00 | 152.00 |
| Group II | 6 | 142.33 | 12.86 | 5.25 | 128.83 | 155.83 | 126.00 | 162.00 |
| Group III | 6 | 120.66 | 10.32 | 4.21 | 109.82 | 131.50 | 110.00 | 136.00 |
| Group IV | 6 | 110.50 | 14.58 | 5.95 | 95.19 | 125.80 | 100.00 | 136.00 |
| Group V | 6 | 139.66 | 7.08 | 2.89 | 132.22 | 147.10 | 130.00 | 150.00 |

The lower boundary of class is calculated by subtracting half value of the interval from the lower class limit, while upper boundary of a class is calculated by adding half of the value of the interval to the upper class limit.

After 15 days, the mean body weight (g) in group I was 144±10.03 (g), in group II it was 148.66±12.09 (g), in group III it was 129.16±12.52 (g), in group IV it was 138.66±11.23 (g) and in group V it was 170.00±12.34 (g). ). Using one-way ANOVA, a statistically significant difference in the mean body weight (g) of five groups was discovered (F=10.153, p value=0.0001). When body weight in p was compared across five groups using the Multiple comparison Tukey tests, a significant difference (p-value 0.05) was detected between all groups except group I, group II, and group III. (Table 6).

**Table 6: Comparison of body weights (gm) in all five groups on day 15th**

| Groups At 15th day | N | Mean | Standard deviation | Standard Error | 95% confidence interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound | | |
| Group 1 | 6 | 144.00 | 10.03 | 4.09 | 133.46 | 154.53 | 130.00 | 155.00 |
| Group II | 6 | 148.66 | 12.09 | 4.93 | 135.97 | 161.35 | 136.00 | 165.00 |
| Group III | 6 | 129.16 | 12.52 | 5.11 | 116.01 | 142.31 | 118.00 | 148.00 |
| Group IV | 6 | 138.66 | 11.23 | 4.58 | 126.87 | 150.45 | 125.00 | 156.00 |
| Group V | 6 | 170.00 | 12.34 | 5.03 | 157.04 | 182.95 | 156.00 | 190.00 |

Mean body weight (g) after 30 days in group I was 149.16±10.20 (gems), in group II it was 155.33±13.14 (g), in group III it was 137.66±14.30 (g), in group IV it was 173.66±8.98 (g) and in group V it was 195.00±8.39 (g). Using one-way ANOVA statistically significant difference was found in the mean body weight (g) of five groups (F=24.024, p value=0.0001). On comparing body weight between five groups using the Multiple comparison Turkeys tests, a significant difference was found between all groups (p-value <0.05) except between group I and group II. (Table 7)

**Table 7: Comparison of body weights (g) in all five groups on day 30th**

| Groups At 30th day | N | Mean | Standard deviation | Standard Error | 95% confidence interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound | | |
| Group 1 | 6 | 149.16 | 10.20 | 4.16 | 138.45 | 159.87 | 135.00 | 160.00 |
| Group II | 6 | 155.33 | 13.14 | 5.36 | 141.54 | 169.12 | 140.00 | 172.00 |
| Group III | 6 | 137.66 | 14.30 | 5.84 | 122.65 | 152.68 | 125.00 | 156.00 |
| Group IV | 6 | 173.66 | 8.98 | 3.66 | 164.24 | 183.09 | 156.00 | 180.00 |
| Group V | 6 | 195.00 | 8.39 | 3.42 | 186.19 | 203.80 | 185.00 | 210.00 |

**Graph 1: Showing the mean weight in grams for Group I, Group II, Group III, Group IV, and Group V on days 0, 15th, and 30th**

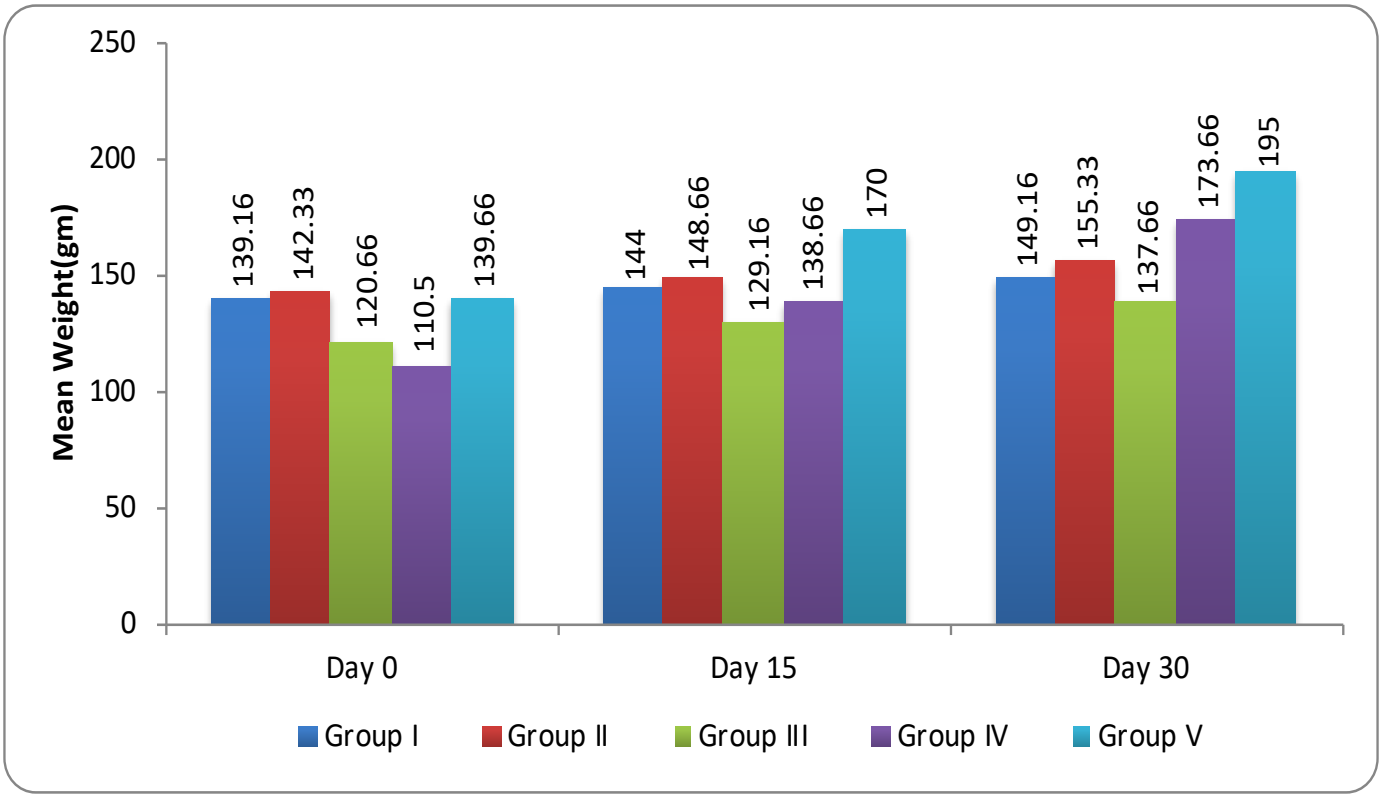


**Table 8: Comparison of Body Length in five groups on the 15th day**

| Groups At 15th day | N | Mean | Standard deviation | Standard Error | 95% confidence interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound | | |
| Group 1 | 6 | 30.00 | 0.54 | 0.57 | 28.51 | 31.21 | 28.00 | 31.00 |
| Group II | 6 | 33.17 | 0.80 | 0.31 | 32.37 | 33.37 | 32.00 | 34.00 |
| Group III | 6 | 31.26 | 0.75 | 0.32 | 30.45 | 32.23 | 30.00 | 32.00 |
| Group IV | 6 | 38.14 | 0.52 | 0.23 | 37.79 | 38.10 | 38.00 | 39.00 |
| Group V | 6 | 38.34 | 1.02 | 0.69 | 36.34 | 38.12 | 37.00 | 39.00 |

On the 15th day, the mean swim endurance test day in group I was 1.14±0.07 (min), in group II it was 2.06±0.07 (min), in group III it was 2.13±0.10 (min), in group IV it was 2.15±0.04 (min)and in group V it was2.19±0.05 (min). Using one-way ANOVA, a statistically significant difference in the mean Swim Endurance Duration of five groups was discovered (F=205.33, p value=0.0001). When the length of the swim endurance test was compared between five groups using the Multiple comparison Tukey tests, a significant difference (p-value 0.05) was detected between all groups except group II and group III group IV. (table 9).

**Table 9: Comparison of Swim Endurance test duration in five groups on the 15th day**

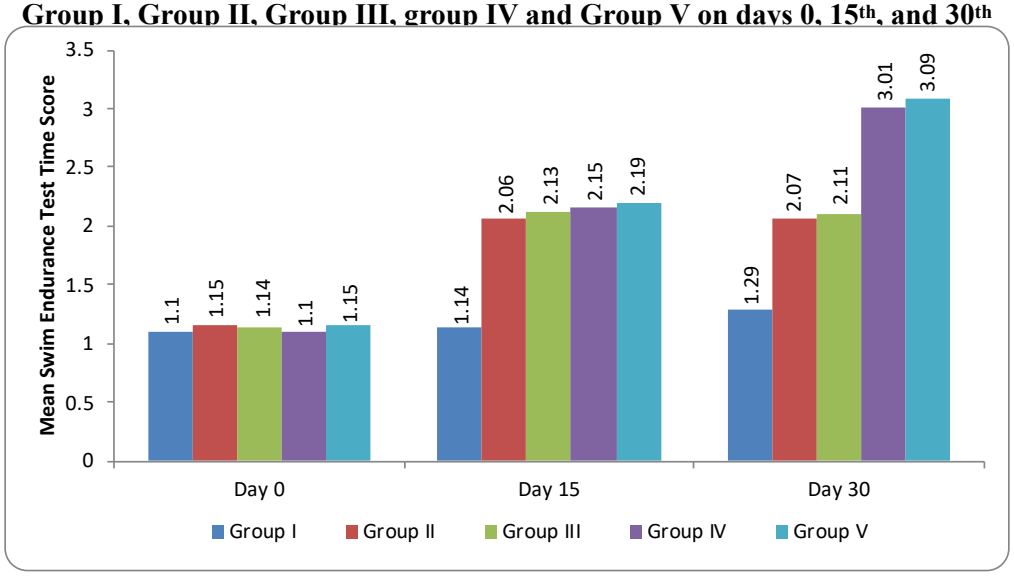
| Groups At 15th day | N | Mean | Standard deviation | Standard Error | 95% confidence interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound | | |
| Group 1 | 6 | 1.14 | 0.07 | 0.03 | 1.06 | 1.22 | 1.00 | 1.20 |
| Group II | 6 | 2.06 | 0.07 | 0.03 | 1.98 | 2.14 | 2.00 | 2.15 |
| Group III | 6 | 2.13 | 0.10 | 0.04 | 2.02 | 2.24 | 2.00 | 2.30 |
| Group IV | 6 | 2.15 | 0.04 | 0.01 | 2.10 | 2.19 | 2.10 | 2.20 |
| Group V | 6 | 2.19 | 0.05 | 0.02 | 2.13 | 2.25 | 2.15 | 2.30 |

Mean swim Endurance test on the 30th day in group I was 1.29±0.36 (min), in group II it was 2.07±0.08 (min), in group III it was 2.11±0.05 (min), in group IV it was 3.01±0.26 (min)and in group V it was3.01±0.26 (min). By using one-way ANOVA statistically significant difference was found in the mean Swim Endurance duration of five groups (F=52.01, p value=0.0001). On comparing the duration of the swim Endurance test between five groups using the Multiple comparison Tukey tests, a significant difference was found between all groups (p-value <0.05) except between group I and group II. (Table10).

**Table 10: Comparison of Swim Endurance test duration in five groups on the 30th day**

| Groups At 30th day | N | Mean | Standard deviation | Standard Error | 95% confidence interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound | | |
| Group 1 | 6 | 1.29 | 0.36 | 0.14 | 0.91 | 1.67 | 1.00 | 2.00 |
| Group II | 6 | 2.07 | 0.08 | 0.03 | 1.98 | 2.16 | 2.00 | 2.20 |
| Group III | 6 | 2.11 | 0.05 | 0.02 | 2.06 | 2.17 | 2.05 | 2.20 |
| Group IV | 6 | 3.01 | 0.26 | 0.10 | 2.73 | 3.29 | 2.50 | 3.20 |
| Group V | 6 | 3.09 | 0.33 | 0.13 | 2.73 | 3.44 | 2.45 | 3.40 |

**Graph 2: Showing Mean Swim Endurance Time of Group I, Group II, Group III, group IV and Group V on days 0, 15th, and 30th**



## Discussion

*Pureria tuberosa* Dc is regarded in Ayurvedic medicine for its rejuvenating and tonic effects. *Pureria tuberosa* Dc is also known as Indian kudzu. It has traditionally been used in Indian medicine / Ayurveda for libido loss, fatigue, recovery from long-term illness, and mental problems, and as a *rasayana* (rejuvenator) (24). In this study, the physical endurance-boosting qualities of milk treated with *vidarikandadi churna* and modified form powder were compared to commercial preparations powder in rats. The swim endurance test is a typical model for experimenting with these parameters. The current study compares the growth, strength, and stamina qualities of *Vidarikandadi Churna* and *Vidarikandadi* Biscuits to vehicle control in male Wistar rats. Swimming was used to assess strength and stamina in rats since it is widely known that swimming is an experimental exercise model.(25,26)Bulk promotion is considered significant in Ayurveda for the entire growth of the body as well as for increasing strength, energy, and endurance in healthy persons.(27) As a result, this medicine was chosen to help youngsters increase their sports performance and physical strength. *Pueraria tuberosa* DC contains nootropic and hormone-inducing properties.(28) *Withania somnifera*, is an Ayurvedic herb categorized as "*rasayana*" (possessing rejuvenating, longevity-enhancing, and revitalizing properties. *Piper longum* is known for its synergist action which can be looked as a bioavailability enhancer (29). That means *Piper longum* when combined with either combination of herbs enhances the property as compared to the single use of it The benefits of "*Vidarikandadi Churna*" include growth hormone induction, nootropic, anxiolytic, anti-stress, adaptogenic, immunomodulatory, and antioxidant properties.(30,31,32,33,34). *Pueraria tuberosa* adaptogenic activity proves its worth in dealing with stress caused by physical and mental exertion. (35)

Growing rats' rates of development and weight gain can be influenced by administering standard commercial preparations and traditional medications in addition to a normal diet.(36) In the current study, 30 rats were divided into four groups: one group was given *vidarikandadadi churna* with milk, another group was given milk, one group was given standard commercial preparation complain with milk, one group was a control group that was not given any health supplement, and the last group was given *vidarikandadi* Biscuits. All indicators were tested before using any health supplements, as well as on the 15th and 30th days. Rats' lengths were measured from the tip of the nose to the tip of the tail. Statistically significant differences in mean body length were discovered at 30th on multiple comparison Tukey's test between Group I (30.00 cms), Group II (33.17 cms), Group III (31.26 cms), Group IV (38.34 cms), and Group V (38.14cms When comparing the increase in body weight (g) on day 15, group II (148.66 g) rats had a statistically significant increase in body weight, followed by group V rats (170.00 g), but group I (144.00 g), group III rats (129.16 g), and group IV (138.66) rats did not. And, when comparing the increase in body weight on the 30th day, group V (195.00g) rats had a statistically significant increase in body weight followed by group IV (173.66g), whereas group I (149.16g), group II (155.33g), and group III (137.66g) rats did not. In one study, rats given the maximum amount of bee pollen as a supplement exhibited a considerable rise in body weight, according to Galik et al. (37,38) However our study shows that *Vidarikandadi* Biscuits and *Vidarikandadi Churna* had weight-increasing properties."

On the 15th day of the trial, rats in Group V displayed a statistically significant difference on the swim endurance test (2.19 sec), followed by Group IV (2.15 sec) and Group I (1.14 sec). On the 30th day, rats in group V displayed a statistically significant difference on the swim endurance test (3.09 sec), followed by rats in group IV (3.01 sec), followed by rats in group III (2.11 sec). The rats in group V had the most stamina, followed by the rats in group IV, who were followed by the rats in groups III and II. There was no statistically significant difference in duration on the swim endurance test between group IV and group V rats.

Group V rats consuming *Vidarikandadi* Biscuits had better stamina than group IV rats taking *Vidarikandadi Churna*, whereas group III rats taking commercially prepared complain had no significant difference in stamina on the swim endurance test. In one study on the effects of resveratrol on middle-aged rats by Kan NW et al, rats taking resveratrol as a supplement showed a significant increase in stamina on the swim stress test. [39,40] In our study, rats taking traditional health supplements also showed a significant increase in stamina on the swim Endurance test, but the authors used a fortified supplement, whereas this study used resveratrol as a supplement.

In one study on the strength and endurance of rats using the swim stress test, rats receiving *ratnaprash* (a natural supplement) demonstrated increased endurance on the swim stress test and a decrease in blood lactate level (41, 42), whereas, in the current study, rats fed traditional health supplements (*Vidarikandadi Churna* and *Vidarikandadi* Biscuits) demonstrated a significant increase in stamina via the swim Endurance test. Pathak et al. conducted another investigation on the strength and stamina of rats using a swim endurance test, and rats taking commercial supplements had increased strength and growth (43), but in the current study, *Vidarikandadi Churna* and *Vidarikandadi* Biscuits showed substantial increases in strength and stamina. Traditional uses include *Kshaya* (44) (Wasting), *Shosha* (Emaciation), *Daurbalya*(45) (Debility), *Sthairyakrita*(46) (Stabilising), adaptogenic(47), immunomodulatory (48,49,50) and others.

## Conclusion

Supplementation of *vidarikandadi churna* and its modified form boosted swim endurance duration in preclinical mice. The current study found that traditional health supplements (*vidarikandadi churna* and *Vidarikandadi* Biscuits) had a greater ability to increase body growth than commercial health supplements (complain), followed by a group solely

treated with milk. In terms of body growth-enhancing properties and weight gained, the health supplement (*Vidarikandadi* Biscuits) was found to be superior, followed by the health supplement (*Vidarikandadi Churna*) and commercial health supplement (complain); however, both traditional health supplement *Vidarikandadi Churna* and *Vidarikandadi* Biscuits showed equal length growth enhancing property and weight gaining property. *Vidarikandadi Churna*, followed by *Vidarikandadi* Biscuits, enhanced stamina and strength, according to the present study.

**Acknowledgments**

The author would like to thank DMIHER for motivating and providing the necessary help for writing this article

**Conflict of Interest:** None

**Financial Support**: DMIHER (Deemed to be University) Sawangi, Wardha.

## References

1. Veerasammy S, Davidson JB, Fischer SL. Multi-task exposure assessment to infer musculoskeletal disorder risk: a scoping review of injury causation theories and tools available to assess exposures. Applied ergonomics. 2022 Jul 1;102:103766.
2. Bouffard J, Yang C, Begon M, Côté J. Sex differences in kinematic adaptations to muscle fatigue induced by repetitive upper limb movements. Biology of sex differences. 2018 Dec;9(1):1-1.
3. Xu M, Liang R, Li Y, Wang J. Anti-fatigue effects of dietary nucleotides in mice. Food Nutr Res. 2017 Jan;61(1):1334485.
4. Mohsein AA, Ibadi AK, Atshan R, Naser NI. Nutritional status of students and employees of Al-Kufa institute at Al-Furat Al-Awsat technical university, Al Najaf province. Pharmacophore. 2019;10(6). Headey DD, Alderman HH. The relative caloric prices of healthy and unhealthy foods differ systematically across income levels and continents. The Journal of Nutrition. 2019 Nov 1;149(11):2020-33.
5. van Breemen RB. Development of Safe and Effective Botanical Dietary Supplements. J Med Chem. 2015 Nov 12;58(21):8360-72.
6. Gupta A, Kumar S, Rajput R, Srivastava R, Rai RK, Sastry JLN. Evaluation of Ratnaprash for its effect on strength, stamina, and fatigue using swim endurance test and biochemical estimation in Swiss albino mice. Anc Sci Life. 2015 Sep;35(1):26-31.
7. Wanjari AS, Rathi BJ, Wanjari DS, Gokarn RA. Interdisciplinary Perspective of Laghumalini Vasant an Ayurvedic Formulation Towards Therapeutic Potential in Antenatal Care. Pharmacophore. 2023 May 1;14(3).
8. Rao NV, Pujar B, Nimbal SK, Shantakumar SM, Satyanarayana S., Nootropic activity of tuber extract of Pueraria tuberosa (roxb) Indian Journal of Experimental Biology.; (2008) 46(8):591–598.
9. Puri HS. Rasayana: Ayurvedic herbs for longevity and rejuvenation. CRC Press; 2002 Oct 17.
10. Patisaul HB. Phytoestrogen action in the adult and developing brain. Journal of neuroendocrinology. 2005 Jan;17(1):57-64.
11. Winston D. Adaptogens: herbs for strength, stamina, and stress relief. Simon and Schuster; 2019 Sep 17.
12. Georgievich PG. development of speed and strength abilities of children, taking into account the typology. Pharmacophore. 2021 Nov 1;12(6).
13. Gandevia SC. Spinal and supraspinal factors in human muscle fatigue. Physiol Rev. 2001;81(4):1725-89.
14. Fitts RH. Cellular mechanisms of muscle fatigue Physiol Rev. 1994;74(1):49-94.
15. Kanthaliya B, Joshi A, Meena S, Arora J. Biology and Biotechnological Strategies for Conservation Management of Pueraria tuberosa, a Traditionally Established Medicinal Liana. Medicinal Plants: Domestication, Biotechnology and Regional Importance. 2021 Sep 2:693-719.
16. Nimbhorkar R, Rasane P, Singh J. Caffeine alternatives: Searching a herbal solution. Pharm. Innov. J. 2021 May 1;10:256-64.
17. Shrilaxmipati shastri, Yoga Ratnakar, bala roga chikitsa,6th edition, chaukhambha Sanskrit sansthan, Varanasi, (1997) page no.444
18. Shubha JR, Bhatt P. Functional attributes of polyphenol-rich Woodfordia fruticosa extract: An active ingredient in traditional Indian medicine with nutraceutical potential. Journal of Herbal Medicine. 2021 Oct 1;29:100488.
19. Senarathne UR, Naria M, Patgiri B. international ayurvedic medical journal.
20. McCarthy JS, Yalkinoglu Ö, Odedra A, Webster R, Oeuvray C, Tappert A, Bezuidenhout D, Giddins MJ, Dhingra SK, Fidock DA, Marquart L. Safety, pharmacokinetics, and antimalarial activity of the novel plasmodium eukaryotic translation elongation factor 2 inhibitor M5717: a first-in-human, randomized, placebo-controlled, double-blind, single ascending dose study and volunteer infection study. The Lancet Infectious Diseases. 2021 Dec 1;21(12):1713-24.
21. Muralidharan P, D'Cruz JM, Toms T, Raj JP, Rao M. Physical Endurance Enhancement of Withania somnifera Milk Treated Powder Compared to Commercial Preparation in Mice. Pharmacology, Toxicology and Biomedical Reports. 2017;3(3).
22. Veskoukis AS, Kyparos A, Paschalis V, Nikolaidis MG. A novel swimming performance test in rats. Chinese Journal of Physiology. 2018 Jun 30;61(3):144-51.
23. Pandey H, Srivastava S, Dwivedi M, Upadhay N, Singh M. Pharmacognostic standardization of tuber Pueraria tuberosa. J Imer Tech Innov Res. 2019;6(4):611-22.
24. Veskoukis AS, Kyparos A, Paschalis V, Nikolaidis MG. A novel swimming performance test in rats. Chinese Journal of Physiology. 2018 Jun 30;61(3):144-51.

25. Portier H, Benaitreau D, Pallu S. Does physical exercise always improve bone quality in rats? Life. 2020 Sep 23;10(10):217.
26. Phadke GM, Avalaskar A. Conceptual Study of Balya Karma W.r.t. Chronic Neurological Disorders.
27. Wang S, Zhang S, Wang S, Gao P, Dai L. A comprehensive review on Pueraria: Insights on its chemistry and medicinal value. Biomedicine & Pharmacotherapy. 2020 Nov 1;131:110734.
28. Sharma S, Agrawal M, Lal M. Cultivation of "vidarikand"(Pueraria tuberosa dc): a drug of potential importance. Int. J. Inf. Retr. Res.(IJIRR). 2018 Mar 19;5(5):5460-2.
29. Nadirbhai DM, Vyas PP, Singhal HK. Role of Ayurvedic Herbs and Panchakarma Procedures in the Management of Cerebral Palsy.
30. Sharma D, Kumari K. Influence of spices and herbs incorporation on popular Indian dairy products: A review.
31. Bawne YB, Deore SL, Shrikhande BK, Dhurde SS, Keshwar U. Formulation, Development And Microbiological Study Of Aphrodisiac Capsule, And Identification And Determination of Gallic Acid in Embelica Officinale By HPTLC.
32. Gholap AH, Pedhekar S. A Review of the Individual Contents of Jeevaniya Mahakashay and its Role as Immunomodulator.
33. Pawar N, Gandhi K, Purohit A, Arora S, Singh RR. Effect of added herb extracts on oxidative stability of ghee(butter oil) during accelerated oxidation condition. Journal of Food Science and Technology. 2014 Oct;51:2727-33.
34. Puri HS. Rasayana: Ayurvedic herbs for longevity and rejuvenation. CRC Press; 2002 Oct 17.
35. Wilson AS, Koller KR, Ramaboli MC, Nesengani LT, Ocvirk S, Chen C, Flanagan CA, Sapp FR, Merritt ZT, Bhatti F, Thomas TK. Diet and the human gut microbiome: an international review. Digestive diseases and sciences. 2020 Mar;65:723-40.
36. Gálik B, Bíro D, Šimko M, Juráček M, Capcarová M, Kolesárová A, et al. The effect of dietary bee pollen intake on growth performance and biochemical indicators of rats. Acta Vet Brno. 2016;85(1):99-104.
37. Taghian RA, El-Ati A, Allam FM, Mahmoud GB. Effect of Date Palm Pollen and Bee Pollen as Growth Promoters on the Performance of Saidi Rams. Assiut Journal of Agricultural Sciences. 2017 Sep 1;48.
38. Kan NW, Ho CS, Chiu YS, Huang WC, Chen PY, Tung YT, et al. Effects of Resveratrol Supplementation and Exercise Training on Exercise Performance in Middle-Aged Mice. Molecules. 2016 May 18;21(5)
39. Kim YT, Jeon H, Kim SH, Heo K, Shim JJ, Lee JL, Yang DC, Kang SC. Fermented antler recovers stamina, muscle strength, and muscle mass in middle-aged mice. Applied Sciences. 2021 Dec 23;12(1):106.
40. Gupta A, Kumar S, Rajput R, Srivastava R, Rai RK, Sastry JLN. Evaluation of Ratnaprash for its effect on strength, stamina, and fatigue using swim endurance test and biochemical estimation in Swiss albino mice. Anc Sci Life. 2015 Sep;35(1):26-31.
41. Wanjari AS, Pathak SS, Rajput D, Wanjari DS, Jadhao S, Gokarn R. Effect of Piper longum Linn on the oral bioavailability of Phenytoin. International Journal of Botany Studies. 2020;5(6):119-22.
42. Pathak SS, Yadav NS. Comparison of health supplements on strength, stamina, and growth of rats.
43. Sharma PV. Varanasi: Chaukhamba Surbharti Prakrashan; Priya Nighantu, Pippalyadi varga, Sutra 44-45, Page no. 65. Reprint 2004.
44. Pandey D. First Ed. Varanasi: Chaukhamba Orientalia;. Madanpal Nighantu, Abhayadi varga, 2012 Page no. 141.
45. Tripathi B. 7th ed. Varanasi: Chaukhambha Surbharti Prakashan; 2000. *Charaka Samhita Sutra*, 27/21.
46. Babu V, Venkatrao N, Shantakumar SN. A study on the adaptogenic activity of tuber extract of Pueraria tuberosa, DSpace at RGUHS University. 2005
47. Salve PD, Bijoy Singh RR, Kapila S, Arora S, Rastogi S, Singh Rawat AK, et al. Immunomodulatory & oxidative potential of herb (Pueraria tuberosa) in mice using milk as carrier- International Journal of Dairy Technology. 2013;66:202–6.
48. Simioni C, Zauli G, Martelli AM, Vitale M, Sacchetti 26. Wagner, Eugene S, Raman Mocharla. Washington D.C: 1991. Feb 16, "Immune System Components Altered by a Food Supplement". Paper presented at the 1991 Annual Meeting of the American Association for the Advancement of Science.
49. . Pramanik SS, Sur TK, Debnath PK, Bhattacharyya D, et al. Effect of Pueraria tuberosa tuber extract on chronic foot shock stress in Wistar rats. *Nepal Med Coll J.* 2010;12(4):234–238.
50. Arya A, Tripathi SK, Shukla S. a conceptual study on role of trivritadi kwath in vatarakta (gout).

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