Chemical Characterization And Antioxidant Efficacy Of Samvardhana Ghrita: An Analytical Study

Dr. Azizahmed I. Arbar[1] , Mahesh Kamate[2]
Dr. Basavaraj Tubaki[3] , Dr. Veena Kupati[4] , Dr. Rasulabi Arbar[5]

[1]professor, Kaher, Shri Bmk Ayurveda Mahavidyalaya, Shahapur, Belagavi, Azizarbar@Gmail.Com
[2]professor, Department Of Pediatrics, Kaher, Jn Medical College, Belagavi
[3]profesor, Department Of Kayachikitsa, Kaher, Shri Bmk Ayurveda Mahavidyalaya, Shahapur, Belagavi, Basavarajtubaki.Kaher@Kleayurworld.Edu.In
[4]associate Professor, Department Of Rasashastra And Bhaishajya Kalpana, Kaher, Shri Bmk Ayurveda Mahavidyalaya, Shahapur, Belagavi
[5]consultant, Arbar Polyclinic, Jeevak Natural Foundation For Child Health, Belagavi

Abstract

Samvardhana Ghrita is a traditional Ayurvedic formulation known for its rejuvenating and therapeutic properties. Composed of key ingredients such as Khadira, Prishnaparni, Arjuna Twak, and others, it is primarily used for It is used to promote healthy growth of child, and used to treat Pangu (inability to walk), Muka (subnormal speech), Ashruti (deaf), and Jada (subnormal intelligence). The study aims to evaluate the physicochemical properties, microbial quality, and antioxidant activity of Samvardhana Ghrita to confirm its efficacy and safety. Physicochemical analysis, including specific gravity, saponification value, iodine value, acid value, refractive index, and rancidity, was performed. Physicochemical testing of Ghrita exhibited the quality is normal. Microbial testing showed the absence of harmful microorganisms, with total bacterial and fungal counts within permissible limits. The antioxidant activity, measured using the Ferric Reducing Antioxidant Power (FRAP) assay, indicated moderate to good antioxidant potential. The results confirm that Samvardhana Ghrita meets quality standards for safety, purity, and therapeutic efficacy. This comprehensive evaluation highlights the importance of stringent quality control in Ayurvedic formulations.

Introduction

Samvardhana Ghrita[1] is a traditional Ayurvedic preparation used primarily for its rejuvenating and therapeutic properties. In Samvardhana Ghrita Khadira, Prishnaparni, Arjuna Twak, Kebuka, Saindhava lavana, Balamoola, and Atibala moola are the key ingredients in ghrita. Samvardhana Ghrita is used in Developmental disorders like Pangu (inability to walk), Muka (subnormal speech), Ashruti (deaf), and Jada (subnormal intelligence), Shosha (Emaciation), Dhatukshaya, and Mastishkaghata.[2] The preparation is evaluated for its physicochemical properties, microbial quality, and antioxidant activity, which help ensure its efficacy and safety for medicinal use. This study presents the results of such analyses to confirm the product quality and therapeutic value.

Materials and Methods

Materials

Samvardhana Ghrita was procured from the GMP-certified KLE Ayurveda Pharmacy, Belagavi. The analysis of the Ghrita was performed at the Central Research Facility, AYUSH-approved Drug Testing Laboratory for ASU Drugs, KAHER's Shri BMK Ayurveda Mahavidyalaya, Belagavi.

Methodology

Organoleptic Evaluation
The formulations were evaluated for their form, colour, odour and taste.

Physicochemical Analysis
The Samvardhana Ghrita was evaluated for specific gravity, [3] rancidity, [4] refractive index, [5] iodine value, [6] acid value, [7] and saponification value. [8] The results were incorporated in table no.1.

Microbial Limit Test
The Microbial limit test was carried out as per the API guidelines.

Antioxidant activity
The antioxidant activity of Samvardhana Ghrita was assessed using the Ferric Reducing Antioxidant Power (FRAP) assay. [9] The Samvardhanaa Ghrita drugs extract was prepared using a standard extraction method. A standard solution was prepared using $FeSO_4.7H_2O$ and distilled water. A 150 µl extract sample was mixed with 2850 µl of FRAP reagent and incubated for 10 minutes. Absorbance was measured at 593 nm, and the results were obtained in triplicate. The percentage of radical scavenging activity was calculated using the formula:

$$\% \text{ of Radical Scavenging activity} = \frac{(\text{Absorbance of the Blank} - \text{Absorbance of the Sample}) \times 100}{\text{Absorbance of the Blank}}$$

Results

The observations and results of Organoleptic characters and physicochemical parameters (Table No. 1), Microbial findings (Table No. 2), and Antioxidant activity of Samvardhana Ghrita (Table No.3) are represented.

Table No.1: Physicochemical analysis of Samvardhana Ghruta

Tests	**Results**
Form	Ghrita
Colour	Yellowish
Odour	Characteristic
Taste	Salty
Specific gravity	0.924
Saponification value	223.01
Iodine value	37.46
Acid value	2.087
Refractive index at 40° C	1.46
Rancidity	Negative

Table No.2: Microbial limit test of Samvardhana Ghrita

Test for specified Micro-Organisms (Qualitative)		
	Limits (as per IP)	**Results**
E – coli	Absent/100ml	Absent
S aureus	Absent/100ml	Absent
P aeruginosa	Absent/100ml	Absent
S abony	Absent/100ml	Absent
Microbial Limit test (Quantitative)		
	Limits (as per IP)	**Results**
Total Bacterial Count	30 – 300 cfu/ml	76 cfu/ml
Total Fungal Count	10 – 100 cfu/ml	07 cfu/ml

Table No. 3: Antioxidant activity of Samvardhana Ghrita

Sample	Form	Result
Samvardhana Kashaya	Liquid	23.76±0.02 Mm Fe (II)/ ml

Discussion

Physicochemical Analysis

The physicochemical properties [10] of Samvardhana Ghrita were evaluated for form, color, odour, taste, and various chemical characteristics.

The sample was found to be in the form of Ghrita (ghee), which is a semi-solid consistency typical of this preparation. The preparation exhibited a yellowish color, which is characteristic of high-quality ghee. The odour of Samvardhana Ghrita was noted to be characteristic, indicative of its natural composition. A salty taste was observed, which could be attributed to the specific ingredient used in the formulation.

The specific gravity was found to be 0.924, which falls within the expected range for ghee-based preparations. The saponification value was determined to be 223.01, indicating a moderate level of fatty acid esterification, essential for ghee-based formulations. The iodine value was measured at 37.46, which is an indication of the unsaturation level of the fat.

The acid value was recorded at 2.087, which helps assess the level of free fatty acids, providing information about the freshness and quality of the ghee.

The refractive index at 40°C was measured to be 1.46, providing further insight into the purity and consistency of the preparation.

The preparation was found to be free from rancidity, indicating proper storage and handling.

Microbial Limit Test

Microbial safety is a critical parameter in the quality control of herbal formulations. The microbial limit test for Samvardhana Ghruta involved both qualitative and quantitative assessments to ensure the absence of harmful microorganisms and to measure the microbial load.

The test for E. coli**,** Staphylococcus aureus**,** Pseudomonas aeruginosa, and Salmonella species was found to be absent, which confirms the product's microbiological safety.

The quantitative microbial tests revealed the following bacterial and fungal counts: 76 cfu/ml, which is within the acceptable range of 30–300 cfu/ml, 7 cfu/ml, which is well within the prescribed limit of 10–100 cfu/ml respectively. These results demonstrate that the product is microbiologically safe for consumption, with acceptable levels of bacterial and fungal contamination.

Antioxidant Activity

The antioxidant activity of Samvardhana Ghruta was measured by assessing its ability to reduce Fe(III) to Fe(II), a commonly used method for evaluating antioxidant potential. The result was found to be 23.76±0.02 Mm Fe (II)/ml of sample, indicating a moderate to good level of antioxidant activity. This suggests that Samvardhana Ghruta may have potential benefits in protecting the body from oxidative stress.

Conclusion

The physicochemical and microbial analyses of Samvardhana Ghruta confirm its quality, safety, and effectiveness as a medicinal preparation. The preparation meets the standards for purity, microbiological safety, and antioxidant potential. Such evaluations are essential for ensuring the therapeutic efficacy of Ayurvedic formulations in modern medical practice. This detailed analysis underscores the importance of regular quality testing to maintain the high standards of Ayurvedic medicines, ensuring they are both safe and effective for use.

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