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Preliminary physico-chemical profile of *Brahmi Ghrita*

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Abstract

Brahmi Ghrita was processed as per the process of *Snehapaka* procedure described in classics. It contained *Brahmi (Bacopa monneri), Vacha (Acorus calamus), Kushtha (Sassurea lappa), Shankhapushpi (Convolvulos pluricalis),* and *Purana Ghrita*. In the preparation of *Brahmi Ghrita, Brahmi Swarasa, Kalka Dravya* of *Brahmi, Vacha, Kushtha,* and *Shankhapushpi* were mixed in *Purana Ghrita* and heated for three hours at 110°C every day for three days. On the third day *Ghrita* was filtered to obtain the finished product. In this manner, three samples of *Brahmi Ghrita* were prepared. To understand the changes that occurred during the preparation, *Brahmi Ghrita* and *Purana Ghrita* were analyzed by using modern parameters such as Acid value, Saponification value, and so on. After the analysis, it was found that the Acid values of Sample A, B, and C of *Brahmi Ghrita* were 4.26, 4.03, and 4.03; the Saponification values of Samples A, B, and C of *Brahmi Ghrita* were 227.2, 230.01, and 230.01, and the Iodine values of Samples A, B, and C were 34.75, 35.88, and 35.88, respectively, and the Acid value, Saponification value, and Iodine value of *Purana Ghrita* were 1.57, 199.15, and 31.04, respectively. The present study revealed that, there was no significant variation in the analytical values among all three samples of Brahmi Ghrita.

Key words: *Brahmi Ghrita*, acid value, saponification value, iodine value

Introduction

Brahmi Ghrita is a polyherbal formulation of Ayurveda representing the group of *Snehakalpa*. In the present study, the selected *Brahmi Ghrita* contained *Brahmi (Bacopa monneri), Vacha (Acorus calamus), Kushtha (Sassurea lappa), Shankhapushpi (Convolvulos pluricalis),* and *Purana Ghrita* mentioned for the treatment of *Apasmara* (Epilepsy) and *Graha* disorders.[1] It is an important formulation mentioned in Charakasamhita as well as in many others classical books of *Ayurveda*, with different compositions, for the treatment of different disorders. *Snehakalpana* (medicated *Ghrita)* is a unique oleaginous dosage form used both for tropical as well as systemic administration. *Brahmi Ghrita* is indicated for the treatment of various mental disorders, which are discussed with rationality. What is significant in Ayurvedic classics is the reason for the occurrence of this disease, which is classified under categories of mental, social, and spiritual causes.

The standard of quality of any medicine is quite important for the reproducibility of the therapeutic effect. Certain organizations are working on preparing certain parameters, for Ayurveda medicine, of a different kind. The Central Council of Research in Ayurveda and Siddha has published a standard protocol, wherein analytical parameters must be followed for the quality production of Ayurveda medicine.

Brahmi Ghrita is prepared by heating *Brahmi Swarasa* with *Kalka*, made with *Brahmi*, *Vacha*, *Kushtha*, *Shankhapushpi*, and *Purana Go Ghrita*, in the prescribed quantity. In Vaidyak Paribhasha Pradeep, it is mentioned that when *Swarasa* is used in the *Snehapaka* process, the *Sneha paka* must be completed in three days. Initially three hours of heat is provided for the first two days and on the third day, heat is provided up to the completion of the *Sneha Siddhi Lakshana*. The chemical changes that occur during the process on account of heating the *Kalka Dravya*, liquid, and *Purana Go Ghrita*, are observed in the present study. This would help us to determine the efficacy of *Brahmi Ghrita* for the above-cited therapeutic purpose.

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Materials and Methods

Procurement of drugs

Brahmi was collected from Ramnagar, situated near Varanasi. *Vacha*, *Kushtha*, and *Shankhapushi* were collected from the local raw drug market (Goladina nath) of Varanasi and *Purana Ghrita* (ten-year-old) was collected from a Jalan shop (Local Market) of Varanasi.[2]

Preparation of *Brahmi Ghrita*

In the process of preparing *Brahmi Ghrita*[3] *Brahmi Swarasa* was used as the *Drava Dravya* and *Kalka* was prepared by using *Brahmi*, *Vacha*, *Kushtha*, and *Shankhapushpi* as per the procedure mentioned in Ayurveda. As *Brahmi Swarasa* is one of the liquid ingredients mentioned in the reference, as per the general procedure of *Bhaishjya Kalpana*, *Brahmi* was also incorporated in the *Kalka Dravaya* along with the others ingredients, that is, *Vacha*, *Kushtha*, and *Shankhapushpi*. Subsequently, this *Kalka* was mixed with *Brahmi Swarasa* and *Ghrita*, and it was processed by moderate heating (around 110°C), till *Sneha Siddhi Lakshana*, like *Sabdahinoagni-nikshipto*, *Vartivat Sneha Kalka*, and so on, were[4] observed. When the *Sneha Siddhi Lakshna* appeared then the *Ghrita* was filtered and *Brahmi Ghrita* was procured.

Analytical Study

To ensure reproducibility of the *Brahmi Ghrita*, the analytical methods were applied to three samples, which were prepared with the same ingredients, following the same manufacturing method, and were coded as Samples A, B, and C. These were analyzed to obtain parameters, such as, organoleptic study, moisture content, acid value, saponification value, iodine value, and refractive index, according to the Quality Control Manual of Ayurveda, Siddha, and Unani Medicine (the standard protocol mentioned in books).[5]

Acid Value, Saponification value and Iodine Value

The test was done as per the standard pharmaceutical laboratory process given in Appendix 3 (Physical test determination) of the Ayurvedic Pharmacopeia of India.[6]

Observations

Organoleptic properties

The color of *Brahmi Ghrita* was different from the *Puran Go Ghrita*. The organoleptic characters of both the *Ghritas* are mentioned in Table 1. *Puran Go-Ghrita* wass golden yellow in color and had a peculiar smell. All three samples, that is, Samples A, B, and C of the *Brahmi Ghrita* had yellowish-green Color and a peculiar smell, which is different from the *Purana Go-Ghrita*.

Analytical parameters

Purana Go-Ghrita had a lower acid value, saponification value, iodine value, as well as, a low refractive index, as compared to *Brahmi Ghrita*. The results are mentioned in Table 2.

Table 1: Organoleptic of *Purana Go-Ghrita* and *Brahmi Ghrita*

Sample	Color	Taste	Odor
Purana Go-Ghrita	Grayish yellow	Characteristic	Fragrant
Brahmi Ghrita A	Yellowish green	Characteristic	Fragrant
Brahmi Ghrita B	Yellowish green	Characteristic	Fragrant
Brahmi Ghrita C	Yellowish green	Characteristic	Fragrant

Table 2: Different analytical parameter of *Purana Go-Ghrita* and *Brahmi Ghrita*

Sample	Acid value	Saponification value	Iodine value	Refractive index
Purana Go-Ghrita	1.57	199.15	31.04	1.4545
Brahmi Ghrita A	4.26	227.2	34.75	1.4582
Brahmi Ghrita B	4.03	230.01	35.88	1.4582
Brahmi Ghrita C	4.03	230.01	35.88	1.4582

Result and Discussion

Acid value

The acid value indicates the free fatty acid (FFA) present in the *Ghrita*, which is related to its stability of that *Ghrita*. Formation of free fatty acid might be an important measure of rancidity for the *Ghrita*. FFA is formed due to the hydrolysis of triglycerides and may be promoted by the reaction of the *Ghrita* with moisture.[7] The fatty acid profile affects the shelf-life, flavor, and the stability of the *Ghrita*. The FFA present in the *Ghrita* indicates its identity or purity.[8] *Brahmi Ghrita* has higher acid value than *Purana Go Ghrita* [Table 2]. This indicates that during the process of *Snehapaka*, hydrolysis of *Ghrita* takes place, which may be promoted by the reaction of the triglycerides in the *Ghrita* with the active ingredients present in *Brahmi Ghrita*, resulting in glycerol and free fatty acids. High amounts of free fatty acid (Acid Value) favor a decrease in the quality of the *Ghrita*. This shows that quality (nutritive), stability, and shelf life of *Brahmi Ghrita* is less than that of *Go Ghrita*.

Saponification value

Long-chain fatty acids found in fat have low saponification value, that is, short-chain fatty acids (SCFAs) have a high saponification value.[9] Short-chain fatty acids are recognized as an essential fuel source for colonocytes, particularly in the distal colon.[10] The histological, endoscopic, and metabolic similarities between diversion colitis and ulcerative colitis suggest that a nutritional SCFA-deficiency state may play a role in the pathogenesis of these disorders.[10]

Short chain fatty acids are readily absorbed; a greater increase in SCFA production and potentially a greater delivery of SCFAs, specifically butyrate, to the distal colon, may result in a protective effect.[11] *Brahmi Ghrita* has a higher saponification value than *Purana Go Ghrita* [Table 2]. As *Ghritas* are esters that undergo a hydrolysis process in the presence of an alkali (in the presence of the alkaline nature of *Kalka Dravya* or the other *Drava Dravya* used in the *Snehapaka* process), the formation of fatty acid (short chain) occurs. This shows that *Brahmi Ghrita* has greater short chain fatty acid than *Go-Ghrita*. Thus, *Brahmi Ghrita* improves the colonic and systemic health and it is easily absorbed and digested, and plays a protective role greater than *Purana Go-Ghrita*.

Iodine value

Iodine values determine the unsaturated fatty material present in the *Ghrita*. The higher the iodine number, the more are the unsaturated bonds present in the fat. Unsaturated fat supplementation increases the total dietary energy intake to the recommended levels, and it has no adverse impact on the blood lipids. It also improves the nutritional status and reduces systemic inflammation.[12] A high iodine value indicates that the fats are a rich source of polyunsaturated fatty acids that possess health benefits such as regulating blood cholesterol levels.[13] *Brahmi Ghrita* has a higher iodine value than Go *Ghrita*, which

indicates that *Brahmi Ghrita* contains more unsaturated fatty acid than plain *Go Ghrita*. This analytical value shows that despite the fatty acid, *Brahmi Ghrita* does not produce an adverse impact on blood lipids; it improves the nutritional status, and reduces systemic inflammation. It may be due to the *Snehapaka* process that the unsaturation of the *Ghrita* is increased.

Refractive index

The refractive indices of the *Brahmi Ghrita sample* A (1.4582), sample B (1.4582), and sample C (1.4582) were higher than the *Purana Go Ghrita* (1.4545), which indicates that some active substances of *Brahmi*, *Vacha*, *Kushtha*, and *Shankhapushpi* were incorporated into *Purana Go ghrita*.

Conclusion

Purana Go Ghrita and other raw materials were taken in the mentioned quantities for all three samples (Samples A, B, and C) of *Brahmi Ghrita* and prepared by the *Snehapaka* process. From the present study it was found that the acid value, saponification value, iodine value, and refractive index of all three samples (A, B, C) of *Brahmi Ghrita* were higher than those of the *Puran Go Ghrita*, but sample A of *Brahmi Ghrita* had the highest acid value among all the samples of *Brahmi Ghrita* and this change was not significant. The saponification and iodine values of samples B and C were also higher than that of sample A. It was concluded that the analytical values, namely, the acid value, saponification value, and iodine value of *Brahmi Ghrita* were higher than those of *Purana Go Ghrita*. These variations in their values indicate that various active components of the ingredients used in the preparation of *Brahmi Ghrita* were incorporated in it. From the present study it was also revealed that, there was no significant variation in the analytical values among all three samples of *Brahmi Ghrita*. Hence, the average values of the analytical parameters may be used for quality assessment and standardization of *Brahmi Ghrita*.

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हिन्दी सारांश

बाह्मी घृत के विविध नमूनों का विष्लेषणात्मक अध्ययन

कपिलदेव यादव, के. आर. सी. रेड्डी, अल्का अग्रवाल

चरक संहिता मे वर्णित ब्राह्मी घृत का निर्माण–ब्राह्मी, वचा, कुष्ठ, शंखपुष्पी और पुराण घृत को मिलाकर स्नेहपाक विधि से किया गया । ब्राह्मी घृत मे ब्राह्मी स्वरस, ब्राह्मी, वचा, कुष्ठ, शंखपुष्पी का कल्कद्रव्य बनाकर पुराण घृत मिलाकर दो से तीन घण्टे प्रतिदिन सौ डिग्री सेन्टीग्रेट के ऊपर तापमान की अग्नि देकर तीन दिन पश्चात छान लिया इसको ब्राह्मी घृत कहते है । स्नेहपाक विधि मे हुए परिवर्तन को समझने के लिए ब्राह्मी घृत और पुराण घृत को आधुनिक मानक जैसे एसिड एवं आयोडिन मूल्यो के आधार पर अध्ययन किया गया । विष्लेषण के पश्चात हमने पाया कि ब्राह्मी घृत के तीनो एसिड एवं आयोडीन मूल्य, पुराण घृत की तुलना मे बढे हुए मिले तथा स्वरूप में भी परिवर्तन मिला ।