

DEVELOPMENT AND QUALITY ASSESSMENT OF RHODODENDRON (*RHODODENDRON ARBOREUM*), FENNEL SEEDS (*FOENICULUM VULGARE*) AND PEPPERMINT (*MENTHA PIPERITA*) HERBAL INFUSION

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Abstract– Rhododendron is one of the common wild flowers found in the north eastern state of India. Which has high antioxidants, color pigments and other quality parameters besides its medicinal properties. Fennel seeds which is also a perennial herb and spices and Peppermint is a prominent medicinal herb and largely acknowledged by medicinal and food processing industries due to its excellent health benefits. Based on findings of the present experiment, it is concluded that treatment T3 (Rhododendron 40 : Fennel seeds 35: Peppermint 25) was found superior in terms of Antioxidant and Moisture. The treatment T2 (Rhododendron 45: Fennel seeds 30 : Peppermint 25) was found superior in terms of pH. The treatment TO (Rhododendron 75: Fennel seeds 00 Peppermint 30) was found superior in terms of Fat, Carbohydrates, Protein, Ash, Anthocyanin, Total solids. whereas, in terms of color and appearance (9.0), Taste and Flavor (9.0), Consistency (8.0) and Overall acceptability (8.0) in Treatment T2 (Rhododendron 45: Peppermint 30 : Fennel seeds 25) was found superior. The highest Total cost (24.6)/sachet was recorded in Treatment T1, T2 and T3. Research was conducted to exploit its wide quality parameters for the development of Rhododendron “READY TO SERVE” herbal Infusion on a commercial scale in the state for its proper utilization. Hence, best quality beverages without the addition of artificial color, additives and flavor were developed.

INTRODUCTION

A herbal infusion refers to a beverage made by organic solid such as herbs, leaves, flowers, or dried plant materials in hot water to extract flavors, aromas, and beneficial compounds to infuse into the liquid. Commonly known as herbal tea, these infusions do not contain leaves from the *Camellia sinensis* plant (caffeine 5-6%), Herbal infusions are a popular choice for those seeking caffeine-free alternatives and natural remedies for relaxation and well-being.

The aim of this research is to develop and assess the efficacy and safety of Rhododendron and fennel herbal infusion for their beneficial effects on respiratory and gastrointestinal disorders, digestion and menstrual cramps.

In this research, we have used lab equipment to

standardize the formulation of the herbal infusion and validate its efficacy and safety using in vitro experiments. The results of this research will contribute to the growing body of evidence for the therapeutic potential of herbal infusions and promote the use of natural remedies in modern healthcare practices.

Rhododendron (*Rhododendron arboreum*) is a flowering plant and it is commonly found in the NE Part of India. It has been primarily used to alleviate respiratory and gastrointestinal disorders, inflammation, and cough, among others. The word Rhododendron originates from the Greek word. Rhodo meaning “Rose” and Dendron meaning “Tree”, So together It means Rose Tree. The genus Rhododendron belongs to the family Ericaceae and was described by Carl Linnaeus in 1737 in ‘Genera Plantarum’. On the other hand, Fennel is an aromatic

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herb that belongs to the Apiaceae family. Its seeds have been used for thousands of years as a spice and for its medicinal properties, primarily to improve digestion and relieve menstrual cramps.

Peppermint (*Mentha piperita*) and Fennel (*Foeniculum vulgare*) are two herbs that have been used for their medicinal properties for centuries. Peppermint has been used to alleviate respiratory and gastrointestinal disorders, while fennel has been used to improve digestion and relieve menstrual cramps.

India is recognized for its ancient Indian ayurvedic system and its enormous natural diversity which allows for the investigation of different plants for common healthcare. Rhododendron is one such plant that is gaining a unique position in the cultural as well as socioeconomic life.

Rhododendron is one of the naturally occurring plants which hold several health benefits for instance of treatment and prevention of ailments linked with heart, dysentery, constipation, fever, detoxification, diarrhea, inflammation, asthma, and bronchitis (Nisar *et al.*, 2013).

MATERIALS AND METHODS

An experiment entitled “Development and Quality assessment of Rhododendron (*Rhododendron arboreum*), Fennel seeds (*Foeniculum vulgare*) & Peppermint (*Mentha piperita*) herbal infusion” was conducted in a Completely Randomized Design with 4 Treatments and 5 Replications. The treatments were TO (Rhododendron 75: Peppermint 25), T1 (Rhododendron 50: Fennel seeds 25: Peppermint 25), T2 (Rhododendron 45 Fennel seeds 30: Peppermint 25) and T3 (Rhododendron 40: Fennel seeds 35: Peppermint 25).

Raw Materials

The flowers of *Rhododendron arboreum* were procured from Ukhrul District in Manipur. Both Fennel seeds and Peppermint were procured from

the local Market, Khan Chauraha Mahewa Prayagraj. Packaging materials like Sachet, PET bottles and glass bottles were purchased from online store.

Chemicals

All the chemicals were procured from the Food Technology Laboratory Warner college of Dairy Technology, SHUATS.

Different proportions of rhododendron flower, Peppermint and Fennel Seeds are used for the experiment. Details of which are given in Table 2.1

After the preparation of various products, they were packed in respective packaging materials. The RTS Herbal beverage was packed in a Muslin cloth sachet which can hold up to 10 g and packed in pre-

The physico-chemical and sensory characteristics of all the products were estimated.

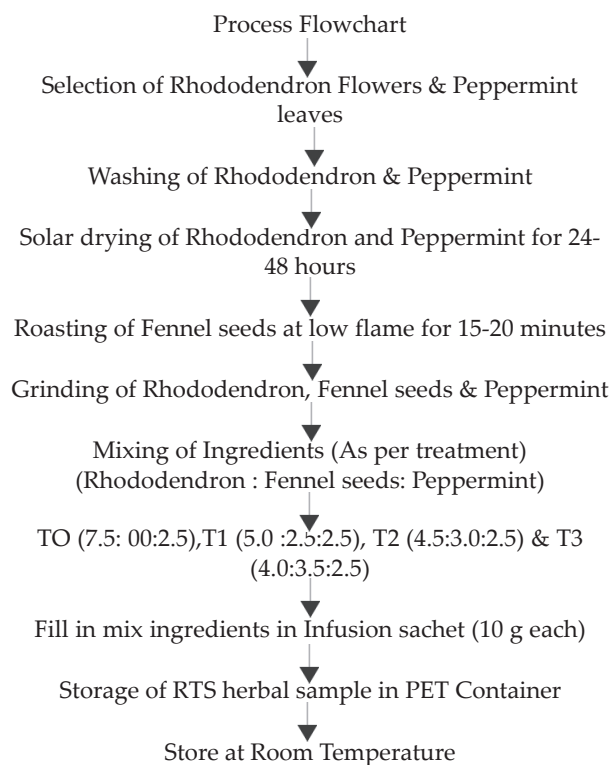


Table 2.1 Detail Treatment of RTS Rhododendron and Fennel seeds Herbal Infusion:

Sl. N.	Treatment	Rhododendron (gms)	Fennel seeds (gms)	Peppermint (gms)
1	TO	7.5g	00	2.5g
2	T1	5g	2.5g	2.5g
3	T2	4.59	3.0g	2.59
4	T3	4.09	3.5g	2.5g

*In all treatments 25% of Peppermint was used for Aroma uniformly.

sterilized glass and PET Containers. All the packed products were properly labeled and stored in ambient Temperature (20-25°C).

RESULTS AND DISCUSSION

Table 1. The different parameters experimental of RTS Herbal Infusion

Parameters	T0	T1	T2	T3
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Table 2. Different Physico-chemical analysis of RTS Herbal Infusion

Parameters	T0	T1	T2	T3
Protein %	0.938	0.878	0.82	0.8536
Fat %	0.292	0.385	0.509	0.526
Ash %	2.080	1.577	1.48	1.38
Moisture (%)	94.83	95.29	95.32	96.7
Carbohydrates %	6.1	5.3	4.4	3.1
pH	6.86	7.43	7.55	7.48
Total solids %	5.178	4.703	4.68	3.39
Anthocyanin %	11.55	11.44	10.97	10.86
Antioxidant %	9.66	11.22	11.23	11.30

Table 3. Organoleptic Scores (9-point hedonic scale)

Parameters	T0	T1	T2	T3
Color & appearance	9	8	9	8
Taste & Flavor	9	8	9	7.5
Consistency	9	8	8	8
Overall Acceptability	7	9	8	7.5

CONCLUSION

Based on findings of the present experiment, it is concluded that treatment T2 (Rhododendron 45: Peppermint 30 : Fennel seeds 25) was found superior in terms of pH, Protein, Fat, Ash, Moisture, Carbohydrates & Anthocyanin. The treatment T3 (Rhododendron 45: Peppermint 30 : Fennel seeds 25) was found superior in terms of Antioxidant & TO in Total solids. whereas, in terms of color and appearance (9.0), Taste & Flavor(9.0), Consistency (8.0) and Overall acceptability (8.0) in Treatment T2 (Rhododendron 45 : Peppermint 30 : Fennel seeds 25) was found superior. The highest Total cost (Rs.24.6)/sachet was recorded in Treatment T1, T2

Table 4. Cost of the Products

Treatment	T0	T1	T2	T3
RTS Herbal Infusion (in rupees/unit)	Rs 2715/unit	Rs 2815/unit	Rs 2815/unit	Rs 2815/unit
RTS Herbal Infusion (in rupees/Sachet 10g)	Rs 24.1/sachet	Rs 24.6/sachet	Rs 24.6/sachet	Rs 24.6/sachet

and T3.

This unique blend combines the therapeutic properties of both ingredients, resulting in a potent elixir that promotes overall well-being. Additionally, the infusion's calming effects aid in reducing stress and anxiety, contributing to mental wellness. The incorporation of *Rhododendron arboreum*, fennel seeds and Peppermint herbal infusion into daily dietary habits can undoubtedly prove advantageous to one's health and vitality.

Conflict of Interest- None

REFERENCES

- Acharya, K., Giri, S. and Biswas, G. 2011. Comparative study of antioxidant activity and nitric oxide synthase activation property of different extracts from *Rhododendron arboreum* flower. *International Journal of PharmTech Research*. 3(2): 757-762.
- Bhatt D, Bisht K and Kulshrestha K. 2007. Agrobiodiversity of Uttarakhand. *Rhododendron arboreum* (Buransh) a potential additive in product development. *Journal of Eco-Friendly Agriculture*. 2:134-135.
- Bhatt, M., Abrol, G., Kumar, S. and Nautiyal, B P. 2017. Preparation and Evaluation of Functionally Enriched Squash from *Rhododendron (Rhododendron arboreum Sm)* Flowers. *International Journal of Food and Fermentation Technology* 7: 191-196.
- Bhandari, L. and Rajbhandari, M. 2014. Isolation of quercetin From Flower Petals, estimation of Total Phenolic, Total Flavonoid and Antioxidant Activity of the Different Parts of *Rhododendron arboreum* Smith. *Scientific World*. 12 (12):3440.
- Chauhan, P., Singh, J., Sharma, R.K. and Easwari, T.S. 2016. Antibacterial activity of *Rhododendron arboreum* plant against *Staphylococcus aureus*. *Indian Journals*. 9 (1): 92-96.
- Devi and Vats, 2017. Determined the calcium and iron content of *Rhododendron* flowers. Chandra, S. and Saklani, S. 2015. Evaluation of **In vitro** Antimicrobial Activity, Nutritional Profile and Phytochemical Screening of *Rhododendron arboreum*. *World Journal of Pharmacy and Pharmaceutical Sciences*. 4(06): 962-971.
- Devi, S., Vats, C. K. and Dhaliwal, Y.S. 2018. Quality evaluation of *Rhododendron arboreum* flowers of different regions of Himachal Pradesh for standardization of juice extraction technique.

- International Journal of Advances in Agricultural Science and Technology*. 5: 51-57.
- Gautam, V., Sharma, A., Arora, S. and Bhardwaj, R. 2016. Bioactive compounds in the different extracts of flowers of *Rhododendron arboreum* Sm. *Journal of Chemical and Pharmaceutical Research*. 8: 439-444.
- Kashyap, P., Anand, S. and Thakur, A. 2017. Evaluation of Antioxidant and Antimicrobial Activity of *Rhododendron arboreum* Flowers Extract. *International Journal of Food and Fermentation Technology*. 7: 123 - 128.
- Negi, V.S., Maikhuri, R.K., Rawat, L.S. and Chandra, A. 2013. Bioprospecting of *Rhododendron arboreum* Sm. for Livelihood enhancement in central Himalaya, India *Environment and We an International Journal of Science Technology*. 8:61-70.
- Solanke, S.N., Chopra, C.S. and Sharma, S.K. 2016. Expression of *Rhododendron aqueous* extract and its use in preparation of RTS beverages. *Journal of Hill Agriculture*. 7:267-272.
- Srivastava, P. 2012. *Rhododendron arboreum*: An Overview. *Journal of Applied Pharmaceutical Science*. 02 (01): 158162.
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