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Biochemical and Organoleptic Analysis of Hibiscus-Rosa-Sinenesis

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Introduction

In the quest for novel bio molecules to serve as complementary health care back up in the contemporary sense researchers are now targeting, hitherto less explored options in a plant. Interestingly, the significance of flowers or flowering parts of the plant as Nutraceuticals is both promising and productive. In keeping with the geographic and climatic distribution of Malvacea family in the Indian context, Hibiscus holds immense research potential. Subjects with kidney dysfunction use the nascent floral extract as a natural diuretic. The homogenate of flowers and leaves is topically applied to tackle hair-fall and dandruff. Hibiscus is not only a natural emollient, used for softening or healing the skin but also a very effective antifungal agent, emmenagogue and refrigerant.

This research endeavour aims at the quantitative composition of Hibiscus-rosa-sinensis with the view of proximate analysis of protein, fats, fiber, and minerals. The possibility of utilization of the flower as a bio manure was highlighted by studying the effect of it on the germination profile of moong beans. Promising results have been obtained for the same. This research has provided a new dimension to the use of Hibiscus as a good pH indicator in the form of pH paper. This would be of great use as a practical tool to substitute the synthetic pH papers and provide an eco friendly method of testing pH of various solutions. In order to re-emphasize the medicinal quality of hibiscus, an oil preparation for topical application was actualized. This preparation was utilized by a voluntary panel over a defined period of time and the panel endorsed its aesthetic and utilitarian efficacy. Floral constituents are being viewed today as promising active ingredients in the preparation of wellness oriented dietary concoctions. With this realization, a novel concoction was generated using Hibiscus-rosa-sinensis. The preparation was sensorilly evaluated for its organoleptic attributes and promising results have been obtained.

Aims and Objectives

- Studying and comparing proximate analysis of Dry sample of Hibiscus rosa – sinensis flower and parts (Petals, sepals, stamens) vs. fresh samples and parts.
- Studying and comparing germination profile of moong seeds with respect to water and quantitative hibiscus solution.
- To carry out sensory evaluation to study the socio-cultural and organoleptic acceptance of Hibiscus oil.
- To carry out sensory evaluation to study the socio-cultural and organoleptic acceptance of Hibiscus tea

Selection of Samples

Dry and fresh samples of hibiscus flower and parts (petals,sepals,stamens)were selected for comparison. The samples were brought from a local flower shop. (Unbranded & loose).

Parameters Considered for Analysis

The following parameters were analyzed for the samples selected.

Proximate Analysis

- Estimation of Proteins by Biuret method.
- Estimation of Lipids by Soxhlet method.
- Estimation of Dietary fibre by Ash method.

Mineral Analysis

- Estimation of Calcium by Tinder's method.
- Estimation of Iron by Wong's method.
- Estimation of Phosphorus by Fiske-Subbarow method.

Germination Studies on Moong Using Water and Quantitative Hibiscus_Rosa_Sinensis Solution

- Rooting and Shooting profile

Sensory Evaluation of Hibiscus Oil and Hibiscus Tea Preparations:

A Sensory Evaluation was Performed with 2 Samples as Follows

- Sample A: Hibiscus-rosa sinensis oil.
- Sample B: Standard branded herbal oil.
- Similarly, sensory evaluation of Hibiscus tea was carried out:
- Sample A: Hibiscus tea (made from the floral whorls)

Sample B: Standard tea

A questionnaire was prepared and given to a panel of 39 semi trained members. The sensory evaluation is carried out with the help of a self-administered questionnaire consisting of four parts:

- Non-invasive evaluation.
- Sensitization.
- Invasive Evaluation.
- Summing Up.

The data thus obtained was collated and statistically analyzed. In the realization of these objectives, the researchers endeavoured to generate an understanding of the biochemical and nutritional significance of the Hibiscus-rosa-sinensis herbal oil and tea.

A biostatistical analysis was done using the Chi square test

Observations and Results

Estimation of Proteins

Sample	G Proteins/100g Sample
DRY	
Whole flower	0.06
Petals	0.14
Sepals	0.045
Stamens	0.06
FRESH	
Whole flower	0.042
Petals	0.02
Sepals	0.018
Stamens	0.02

The protein content in dry sample is higher than in wet sample

Estimation of Lipids

Dry Sample	g lipid/100g of sample
Whole flower	10.5
Petals	5.1
Sepals	4.9
Stamens	5.7

The fat content is maximum in the stamens.

Crude Fiber Estimation

Sample	g/100g of food
DRY	
Whole flower	54.6
petals	24.6
Sepals	26.9
Stamens	98.6
FRESH	
Whole flower	10.82
Petals	7.19
Sepals	0.0125
Stamens	2.8

The fiber content in the dry sample is more than the wet sample.

Estimation of Calcium

Sample	mg calcium/100g sample
DRY	
Whole flower	305.78
Petals	964
Sepals	49.95
Stamens	93.1
FRESH	
Whole flower	296
Petals	753
Sepals	434
Stamens	700

The calcium content in dry sample of whole flower and petals is higher than the wet sample whole and petal whereas the content of dry sepals and stamens is less than the fresh. The calcium content in petals is maximum.

Estimation of Iron

Sample	mg iron/100g sample
DRY	
Whole flower	453
Petals	131.23
Sepals	19.33
Stamens	19.33
FRESH	
Whole flower	53.57
Petals	52.43
Sepals	53.06
Stamens	53.73

The iron content in dry sample of whole flower and petals is higher than the wet sample whole and petals whereas the iron content of dry sepals and stamens is less than the fresh. Maximum iron concentration is in the petals.

Estimation of Phosphorus

Sample	mg Phosphorus/100g sample
DRY	
Whole flower	203.53
Petals	192.8
Sepals	11.4
Stamens	8.64
FRESH	
Whole flower	20.0
Petals	17.8
Sepals	19.75
Stamens	28.15

The phosphorus content in dry sample of whole flower and petals is higher than the wet sample whole and petal whereas the content of dry sepals and stamens is less than the fresh.maximum concentration is in the petals.

Summation for proximate principle

The concentration of most of the minerals is high in the petals, since hibiscus is also considered to be edible the petals should be consumed as they are high on mineral content.

Comparison of Rooting of Moong Seeds by Using Water and Quantitative Solution of Hibiscus-Rosa-Sinensis

Procedure

- Take 3gms of moong seeds and check germination with water, This is the control.
- Take 3gms of moong seeds check germination in quantitative solution of hibiscus-rosa-sinensis, This is the test.
- Take reading at interval of 8hrs.

Observations

- Length in cms.
- MW- moong in water.
- MHW-moong in hibiscus+water.

Time in hours	MHW	MW
8	0.2 cms	0.4cms
16	0.8 cms	1.0 cms
24	0.8 cms	1.0 cms
32	0.9 cms	1.0 cms
40	1.0 cms	1.4 cms
48	1.4 cms	1.4 cms
56	1.9 cms	2.0 cms
64	2.2 cms	3.0 cms
72	2.8 cms	3.8c ms

Result

There is not much difference in the rooting of MHW and MW. But its color is retained in hibiscus solution than in water alone,the moong soaked in hibiscus has a much thicker diameter than the one soaked on water.

Conclusion

The above observation concludes that hibiscus can be used as an effective Supplement along with watering to retain the natural healthy appearance and stronger rooting of the plant.

Comparison of Shooting in Moong Seeds by Using Water and Quantitiative Solution o f Hibiscus-Rosa-Sinensis for Watering the Plants

Procedure

- Take 3gms moong seeds, pot them in a pot and water them, This is the control.
- Take 3gms moong seeds, pot them in a pot and water them with hibiscus solution, this is the test.
- Take readings at the interval of 24hrs.

Observation

- Height in cms.
- MW- moong in water.
- MHW-moon in hibiscus+water.

Time in days	MHW	MW
Day1	3.5cms	5.1cms
Day 2	3.5cms	7.3cms
Day 3	3.6cms	8.1cms
Day 4	3.8cms	8.9cms
Day 5	7.4cms	10.5cms
Day 6	12.0cms	13.0cms
Day 7	14.0cms	15.0cms

Observation

There is not much difference in the shoot growth of MHW and MW, but the shoot and leaf color is much green and thicker than the one which is watered normally

Conclusion

The above observation concludes that hibiscus can be used as a supplement with water to retain natural healthy appearance of the plant.

Sensory Evaluation of Hibiscus-Rosa-Sinensis

In order to project the organoleptic appeal of the hibiscus oil and hibiscus tea, sensory evaluation was carried out with the semi-trained panel. A panel comprising of biostatistical significant number of panelists (39) was chosen for the evaluation.

The Hibiscus oil was prepared by heating crushed Hibiscus-rosa-sinensis flowers with coconut oil on a low flame. Once it boils, few leaves of tulsi were added, followed by fenugreek seeds. The preparation was allowed to cool and then sieved into a glass bottle. This hibiscus oil was used for comparative analysis with a standard branded oil product. The data obtained from sensory evaluation was subjected to biostatistical analysis, which proved that the innovative oil product of hibiscus-rosa-sinensis was very well accepted.

Hibiscus tea was prepared by placing dried hibiscus petals in cold water with lemon extract and allowed to sit until the color has faded from the flowers. The juice was strained through a fine sieve and flavoured with honey, ginger and cinnamon. A comparative sensory evaluation of this hibiscus tea preparation with standard tea was carried out with a semi-trained panel. The results showed that 81% of the panel preferred the hibiscus tea over the other sample.

Conclusion

- Research findings indicate high Mineral content. Consumption of fresh and desiccated petals is a suitable dietary practice for ingestion of micronutrients.
- Water with Hibiscus extract is a useful preservation medium for sprouts and germinating seeds due to its effect on the germination profile. Hibiscus can be used as an effective Supplement along with watering to retain the natural healthy appearance and stronger rooting of the plant.
- Hibiscus oil and hibiscus tea were sensorilly evaluated for its organoleptic attributes and promising results have been obtained.

References

[1] Biochemical Methods, 2nd edition, Dr S Sadasivam, A Manickam, New Age International Publication.

[2] Research Methodology: Methods & Techniques, 2nd edition, Dr C R Kothari, New Age International Publication.

[3] Laboratory Manual in Biochemistry, Jayaraman J. New Age International Publication.

[4] Medicinal plants of the world- by Ivan. A. Ross.
[5] Compendium of medicinal plants-by NIIR.
[6] A Handbook of Medicinal Plants: A Complete Source Book, Narayan Das Prajapati; S.S. Purohit; Arun K Sharma and Tarunkumar, Agribios.
[7] http://www.trop-hibiscus.com/gindr.html#shelter#shelter.
[8] http://www.pfaf.org/database/plants.php?Hibiscus+rosa-sinensis.
[9] http://aromatherapy.savvy-cafe.com/hibiscus-essential-oil-for-a-variety-of-uses-2007-09-25/##.
[10] http://pharmaceuticals.indiabizclub.com/profile/1734940~natural_cosmetic_supplies~new%20delhi.
[11] http://www.ageless.co.za/herb-hibiscus.htm