

Formulation and Development of Skin Care Cream by Using Tea Fluff

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Introduction

Medicinal and aromatic plants are used in pharmaceutical and cosmetic industries all around the world as natural sources. There have been many research conducted to prove the skin care properties perform by Polyphenols and anti oxidants present in tea. During the course of fermentation, the Polyphenols of green tea are rapidly converted to the Polyphenols of black tea. Depending on the degree of fermentation, some green tea Polyphenols remain unconverted. (Coggon, Moss and Sanderson, 1973).

Tea fluff is a waste product generated in secondary manufacturing and it is rich with Polyphenols as same as the black tea. There are many cosmetic products that made by both black tea and green tea as the term of value added product, but it was noted that skin care products that are made by using tea fluff are not present in the Sri Lankan market. Therefore this study was conducted to show the potential to make a tea based cosmetics by using tea fluff as the theme of value addition.

Methodology

DPPH (2,2-diphenylpicrylhydrazyl radicals) Assay and Folin –ciocalteu method were used to find the anti oxidant activity and total polyphenol content of tea fluff. Complete Randomize Block Design was used as the experimental design. Samples were prepared with 1%,2%,3%,4%,5% and 6% of tea fluff from the total weight. Then they were subjected to sensory evaluation using 30 panelists to evaluate visual smoothness, spreadability, greasiness and overall acceptability. Another sensory evaluation was conducted to evaluate visual appearance of the formulation in the jar, feel of the cream in the jar, skin feel during absorption and skin feel after absorption as advanced sensory session. Results were analyzed using the MINITAB statistical analysis package according to the Freedman test at 5 % level of significance and the best treatment level was selected. Four replicates from the selected best treatment were evaluated for aerobic plate count test and visually observed the physical determinants to study the shelf life. pH value, non volatile matters at 105 C, thermal stability and total non-aqueous content of final selected product were determined according to the SLSI standards as Quality Analysis.

Results and Discussion

According to the Table 1, the antioxidant activity of tea fluff is in good and effective level. And also Percentage of total polyphenol was 103.4 mg Gallic acid equivalents /g tea fluff sample (10.34 GAE %).

Table 1. DPPH radical scavenging activity for tea fluff.

Sample	mg Trolox equivalents/ml tea brew	mg Trolox equivalents/ g of tea sample
Tea fluff	534.50 ± 8.76	164.58 ± 2.69

Table 2. Results of sensory 1.

Sensory Attributes	Treatments							P value
	1	2	3	4	5	6	7	
Visual smoothness	3.875	3.875	4.000	5.000	4.000	3.000	1.286	0.000
Spreadability	4.000	3.929	4.000	5.000	4.214	2.857	2.000	0.000
Grassiness	3.143	3.143	3.143	4.000	3.286	3.143	2.144	0.000
Texture	3.286	3.286	4.143	5.000	4.143	3.429	2.714	0.000
Overall acceptability	3.000	3.286	4.000	5.000	3.857	2.857	2.000	0.000

Among seven samples (1, 2, 3, 4, 5, 6, 7) the highest preference was for the treatment 3,4 and 5 ($P < 0.05$). These samples are different from other treatments in all sensory attributes (Table 2).

Table 3. Results of sensory 2.

Sensory attributes	Treatments			p value
	1	2	3	
Visual appearance of the jar (Cream)				
Gloss	3.5000	4.0000	3.0000	0.005
Lightness	3.7500	3.9167	3.0833	0.001
Transparency	3.5000	3.8333	3.1667	0.000
Visual smoothness	4.0000	4.0000	3.0000	0.000
Overall acceptability	3.0000	5.0000	3.0000	0.000
Feel of the cream in the jar				
Firmness	3.0000	5.0000	4.0000	0.000
Slipperiness	3.1667	3.0000	2.3333	0.000
Peakedness	3.0000	4.0000	3.0000	0.001
Stickiness	3.0000	3.0000	3.0000	0.002
Overall acceptability	3.0000	5.0000	3.0000	0.000
Skin feel during the absorption				
Spreadability	3.0000	4.3333	3.6667	0.000
Absorbency	4.0000	5.0000	3.0000	0.000
Thickness	4.0000	4.6667	3.3333	0.000
Wetness	4.5000	4.5000	3.5000	0.000
Overall acceptability	3.6670	5.0000	3.3333	0.000
Skin feel after the Absorption				
Grassiness	3.0000	4.0000	3.0000	0.000
Silkeness	4.3333	5.0000	3.6667	0.000
Film residual	4.0000	5.0000	4.0000	0.000
Stickiness	4.0000	4.5000	3.0000	0.000
Overall acceptability	3.0000	5.0000	3.0000	0.000

According to the second sensory evaluations the sample which has 4% of tea fluff is selected as the best cream sample with consumer preference for all sensory attributes (Table 3).

There were not any remarkable changes in physical attributes of color, odor, texture (layer separation) and appearance for fortnightly observed two months in three best samples. According to the SLSI standards the aerobic plate count of skin cream should be on or below

1000 g-1 to reduce the microbial proliferation. For seven week of period, product maintained its acceptable condition for aerobic plate count level. According to the SLSI standards the pH level of skin care cream must be in 5.0 to 9.0. All Four samples that are produced fortnightly maintained their pH in 5.0 to 9.0.

14.73% was non volatile matters at 105 °C in best cream sample as the SLSI standards the Non volatile matters at 105 °C of skin care cream must be in 15%. (According to the SLSI standards no oil separation is observed on removal from the humidity chamber to pass the test. According to the results the product maintained its acceptable proportions of aqueous and non aqueous contents (66.3%).

Conclusions

Tea fluff contains considerable amount of total polyphenol content and free radical scavenging activity as same as the black tea. Incorporation of 4% tea fluff to the formulation was the best amount for the product development. Developed product met the standard requirements of Sri Lanka Standard Institute for aerobics plate count, pH level, thermal stability and total non volatile compounds. Further research can be done to find the effectiveness of that selected product by launching a clinical trial with the period of time.

References

Coggon, P., Moss G.A., Sanderson, G.W., 1973. *Phytochemistry*. Englewood Cliffs. NJ 07660. 12.