

# Formulation and Evaluation of Herbal Shampoo Containing Extract of *Grewia Optiva*

Archana Dhyani, Nardev singh, Vijay kumar

**Abstract:** Synthetic shampoos are responsible for undesirable properties among customers. An additional method used to decrease the use of artificial components is by adding natural component. of *Grewia optiva* bark was selected on the basis of its surfactant property. The aim of this research is to formulate a hair shampoo with *Grewia optiva* bark with importance on protection and efficiency. The formulation was evaluated for different parameters. It was found that the product has good foaming capacity and capable of reduction of surface tension .

**Keywords:** Shampoo, *Grewia optiva*, surfactant, surface tension, cleansing action.

## I. INTRODUCTION

The Indian word capna meaning “push,” which was extended to point out the action of washing hairs.<sup>1</sup>Shampoo is a aesthetic product used to dirt free the hair and scalp, and have a number of types of constituents in its formulation such as surfactants, solvents, coloring agents, pH adjustments, preservatives, and so on.<sup>2</sup>It consists of surfactant either in liquid or solid which eliminate the oil of hairs , removes dirt and dust with no adverse effect on the hair , scalp or wellbeing of the user.<sup>3</sup>Shampoo are used regularly for organizing the hair and its surroundings. In the early 1900’s soap is only available for cleaning of hair.<sup>4</sup>Shampoos are thick and can be used in the form of liquid or semi-solid forms.<sup>5</sup>Shampoos are divided into different types as per their use.<sup>6</sup>The drawback of using the artificial shampoo is that they cause rough hairs with loss and effects eyes as well. Herbal shampoos are favored over synthetic shampoos because of their low side effects and their natural benefits.<sup>7</sup>

The aim of the research article is to formulate and evaluate the herbal shampoo of *Grewia optiva* commonly known as Bhimalin Uttarakhand .The tree is found at an altitude of 2000 meter. It found in the mountain area.<sup>8</sup>The bark of Bhimal have saponins which is responsible for the surfactant and detergency property. The shampoo was subjected to different evaluation parameters like pH, viscosity, wetting time, foam formation and cleansing action.<sup>9</sup>*Grewia optiva* is used as fodder in Uttarakhand but traditionally it is used to clean the hairs in ancient time. So, this traditional use of *Grewia optiva* is used to prepare the shampoo.

## II. MATERIAL & METHODOLOGY

**2.1 Materials:** The plant was obtained from hills of Uttarkashi district of Uttarakhand . The different ingredients were procured from Central Drug House Ltd.(CDH), New Delhi.

**2.2 Preparation of Plant Extracts:** The bark of the plant were converted into powder by size reduction. Weigh about 50 gm of powder and add 200ml methyl alcohol in it . The sample is kept in dim area for 2 days at normal temperature. The sample was put into filtration by using filter medium. The filtrates obtained were exposed at 60 °C for 30 min. so that the methanol can evaporate. Then, the filtrates were stored at 4°C for further use.<sup>4</sup>

**2.4 Preparation Of Shampoo:** For preparation of shampoo saponification is done. The different oils were mixed with potassium hydroxide for reflux condensation. The plant extract is added in it .Finally ,glycerin and ethanol were added in the formulation .(Table 1)



Fig1: *Grewia optiva*

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**Table 1: Composition of Herbal Shampoo**

Ingredients(%w/w)	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>
Potassium Hydroxide	3	4	3	4	3
Olive Oil	2	3	2	3	2
Castor Oil	1	2	1	2	3
Coconut Oil	5	10	15	5	10
Glycerin	2	2	2	2	2
Ethanol	4	4	4	4	4
<i>Grewia optiva</i> Extract	5	10	15	20	25
Distilled water <i>q.s</i>	100	100	100	100	100

## 2.5 Evaluation Parameters

**1. Physical appearance/visual inspection:** The organoleptic properties were determined by sensory organ.<sup>5</sup>

**2.pH:** pH meter helps in pH determination .

**3. Foam Formation (Shake Test):** Took 20 ml of the 2% shampoo solution in a 250 ml measuring cylinder and the volume was noted down . The cylinder was covered and shaken 10 times. Calculate the foam produce and % foaming capacities of all the formulations for a time period of 60 minutes.<sup>6</sup>

**4. Cleaning action:** For this specific quantity of wool were treated with greasiness and then put into contact with shampoo at room temperature. The samples were shaken well and after specific period of time detergency percentage was calculated.<sup>7</sup>

The formula used for calculation of detergency is :

$$DP = 100(1 - T/C)$$

DP –Percentage detergency power

C -weight of sebum in the control sample

T -weight of sebum in the test sample.

**5. Viscosity:** For determination of viscosity multipoint rotational Brook field viscometer is used.<sup>8</sup>

**6. Wetting time:** Weighed amount of velvet is sinked into a solution of shampoo for determination of wetting time . The time in which the velvet is sinked is noted down.<sup>9</sup>

**7. Surface tension:** It was determined by using stalagmometer.<sup>1</sup>

**8. Determine percent of solid contents:** A dry china dish was taken and 4 grams of shampoo is poured in it. The exact weight was noted. The dish is then put for evaporation till the whole liquid was evaporated. The amount of solid left drying was determined.<sup>11</sup>

## III. RESULTS AND DISCUSSION

### Formulation of Shampoo:

The shampoo was formulated by using the extract of *Grewia optiva* which is also known as Bhimal in Uttarakhand. The plant contains saponins thus it has good detergency and cleansing property. The coconut oil olive and castor oil will acts as conditioner after washing the hairs.

**1. Physical appearance/visual inspection:** The color of the shampoo was found to be dark brown in color .The odor was not found to be obnoxious.

**2.pH:** The pH of all formulations in the range of 5-7.The pH plays an important role and helps in reduction of eye irritation.

**3. Foam Formation:** All the shampoos have a good quality foaming capacity. The foaming capacity varies from 49 to 61 %. Foam produced by shampoos was uniform .Although foam formation does not have any relationship with cleansing property. But it is required for the satisfaction of the customer.It is a desirable property for the customer. Since it was believed that more foam production is associated with the high cleansing property.

**4.Cleaning action:** The cleaning action of all formulation was found in the range of 65 to 89 % which shows that the shampoo has good quality cleansing property.The cleansing property helps to evaluate the capability to take away dirt from hairs.The formulation containing high percentage of *Grewia optiva* has more cleansing activity .

**5.Viscosity:** The shampoos must have appropriate viscosity since the viscosity is directly related to the stability of the product,shelf-life of product, ability to flow and capability to spread.

The viscosity was found in the range of 1268 to 3256cP.

**6.Wetting time :** The wetting property depends on various factor like surface tension,diffusion coefficient and surface nature.The wetting time was found in the range of 198-224 sec.

**7.Surface tension:**The shampoo is supposed to have the property of reducing the surface tension. The prepared formulations have the capability to reduce the surface tension .The values was found to be between 14 to 28 dyne/cm which shows that the prepared formulations has a good surfactant and detergency property and thus it helps in removal of dirt from hairs.

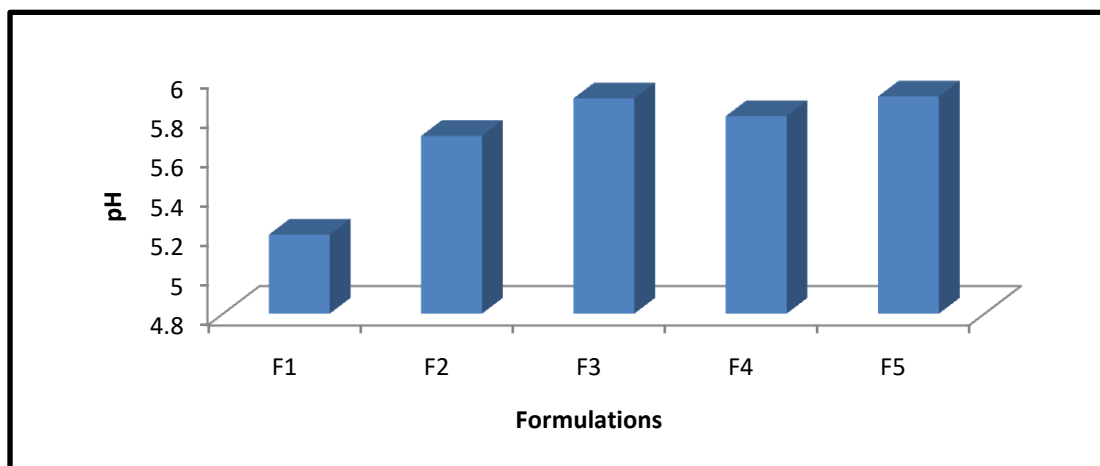
**8.Determination of Solid Content :** The solid content is required in the shampoo so that the shampoo cannot be wash away easily.Some amount of solids helps the shampoo to retain on the surface of hairs. But, the amount of solids should be such that it can be easily removed from the hairs.The results given in the table 2 which shows that there is considerable amount of solids are present in the shampoo.However, the values varies from 23 to 39%.

**Table 2: Results of different formulations (F<sub>1</sub> to F<sub>5</sub>)**

Formulations	Physical Appearance	pH	Foaming Capacity (%)	Viscosity (Cp)	Surface Tension (dyne/cm)	Wetting time(sec.)	Cleaning action(%)	Solid Content(%)
F1	Brownish, no smell	6.54 ±0.21	49.43	1268±0.98	28.45±0.76	224±0.76	65.30±0.12	23.41±0.38
F2	Brownish, no smell	6.2±0.53	46.98	2459±0.48	14.98±0.34	206±0.21	71.27±0.25	24.56±0.98
F3	Brownish, characteristic smell of extract observed	5.89±0.67	54.18	3458±0.92	31.22±0.56	219±0.31	79.87±0.55	27.87±0.78
F4	Brownish, characteristic smell of extract observed	5.5±0.91	57.89	3543±0.99	25.89±0.92	198±0.48	85.89±0.24	29.16±0.29
F5	Brownish, characteristic smell of extract observed	5.9±0.79	61.45	3876±0.49	22.89±0.89	210±0.65	89.72±0.98	32.98±0.55



**Fig 2: Formulation of herbal shampoo**



**Fig 3 : Results of pH on different formulations**

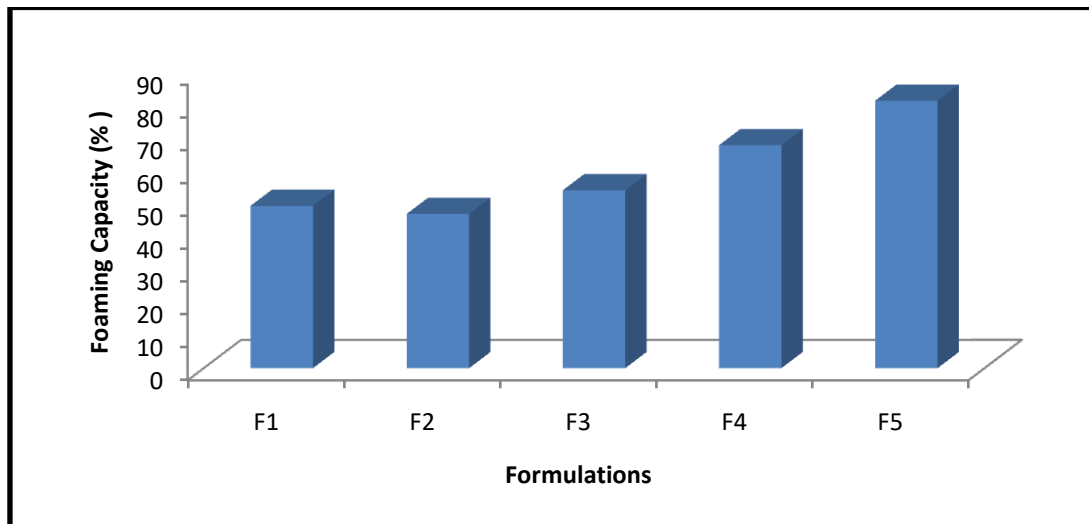


Fig 4: Results on foaming capacity (%) on different formulations

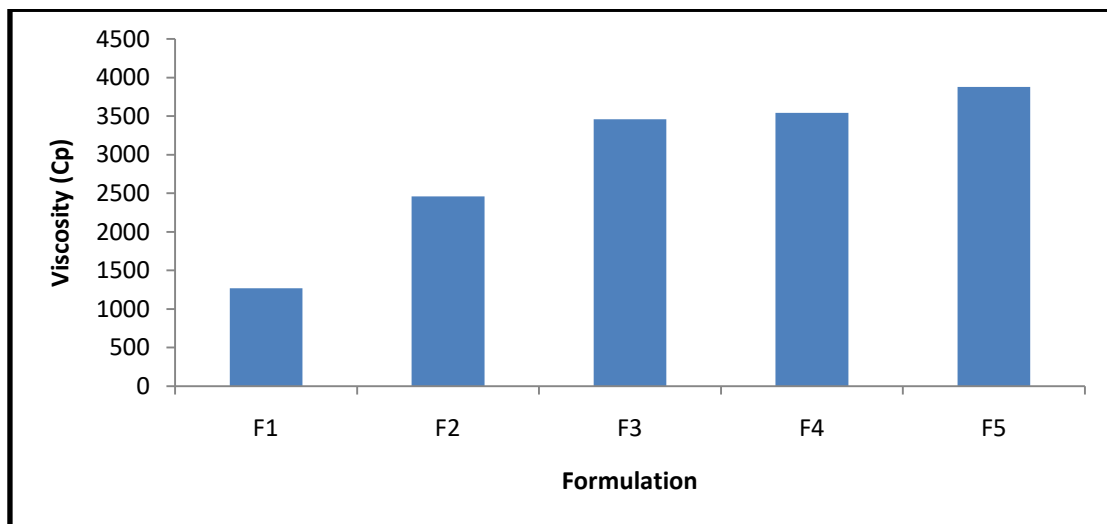


Fig 5 : Results of viscosity on different formulations

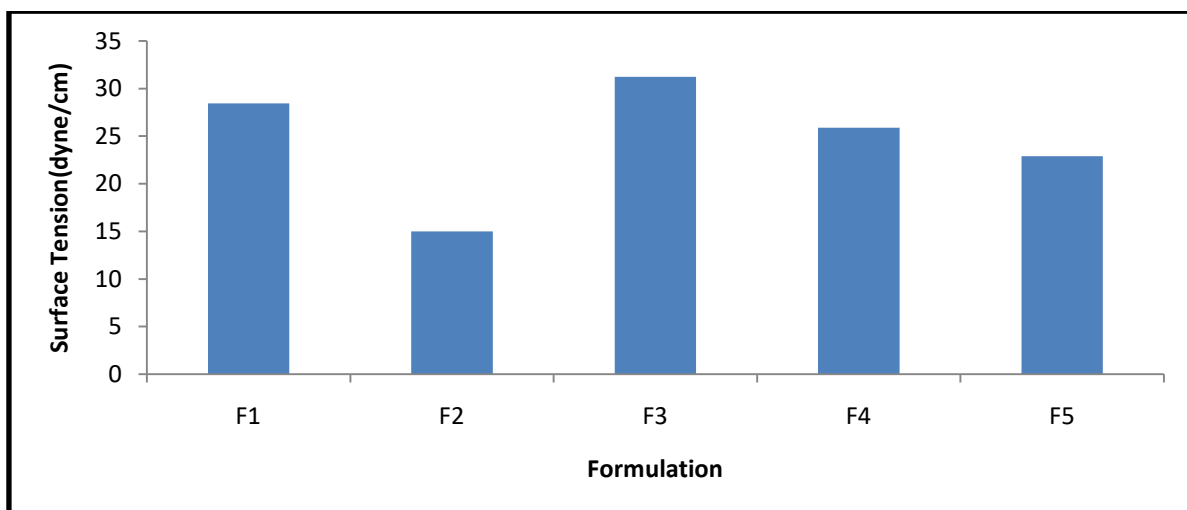


Fig 5 : Results of Surface tension on different formulations

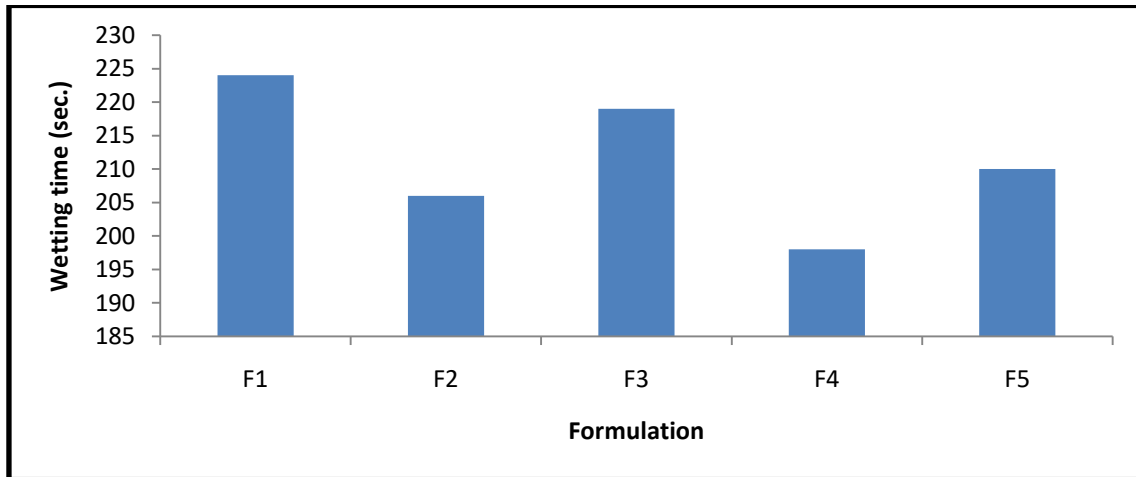


Fig 6: Results of wetting time on different formulations

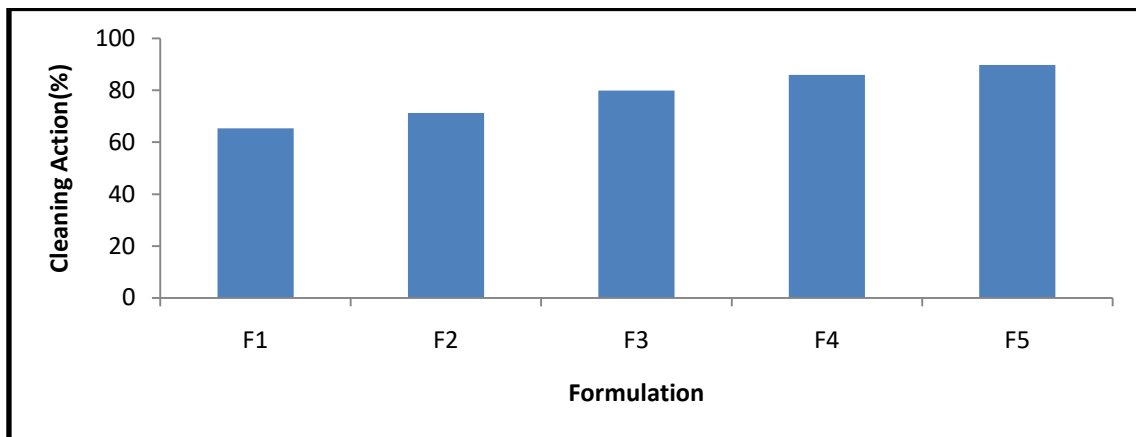


Fig 7: Results of cleaning action (%) on different formulations

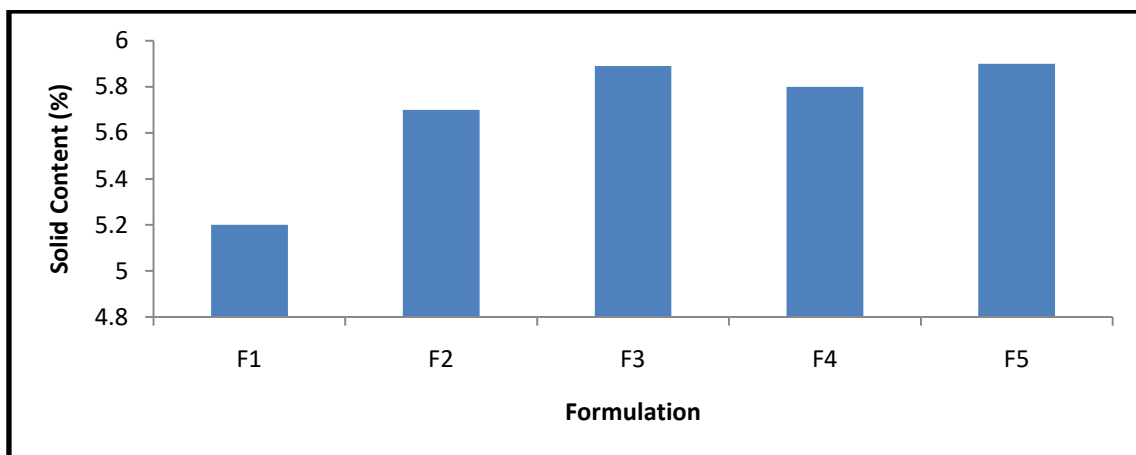


Fig 8: Results of Solid Content (%) on different formulations

#### IV. CONCLUSION

The purpose of study was formulation herbal shampoo using extract of *Grewia optiva* which is usually known as Bhimal in Uttarakhand .The bark of the plant was used for washing the hairs in the rural area. The study focused on the use of *Grewia optiva* (Bhimal) as natural surfactant in the shampoos. The shampoo is wholly prepared by using natural ingredients therefore it prevents the harm to hairs from the synthetic chemicals. Further, it will also promotes the use of *Grewia optiva* (Bhimal) as surfactant in National and International market.

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