



Bio-Active Plant Compound used as a Expected Stabilizer for Cream and Gel

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Abstract: *Skin care is the main part of a person's overall appearance. Our daily routine we use cosmetics which most of them are synthetic product. Many herbal product industries use synthetic material as preservatives like methyl paraben, propyl paraben, butyl paraben which are preserve cosmetic product long life. But some of them carcinogenic. The plant is having antibacterial, antifungal, antioxidant, anthelmintic, carminative, aromatic, stimulant, expectorant, anti-inflammatory properties. Many plant extracts, spices, essential oils having property to kill the micro-organism or to stop their growth and preserve cosmetic product long life. In this study main aim is to estimate moisture content and stability at different temperature.*

Keywords: Microbial Assay, natural Preservatives

I. INTRODUCTION

Natural skin care is the care of the skin using naturally-derived ingredients (such as herbs, roots, essential oils and flowers) combined with naturally occurring carrier agent, preservatives, surfactants, humectants and emulsifiers (everything from natural soap to oils to pure water). The classic definition of natural skin care is based on using botanically sourced ingredients currently existing in or formed by nature, without the use of synthetic chemicals, and manufactured in such a way to preserve the integrity of the ingredients. As a result of this definition, many people who use natural skin care products generally make their own products at home from naturally occurring ingredients. Many people use natural skin care recipes to make remedies to care for their skin at home. Many spas and skin care salons now focus on using more naturally-derived skin care products.

The Aryan period witnessed the use of turmeric, saffron, indigo, raktachandan etc., for beautification. Using Mehndi for dying and conditioning hair was also practiced in the older times. Thus, the concept of beauty and herbal cosmetics is as old as mankind and civilization. Natural skin care has its roots in the 4th millennium BC in China and the Middle East. In the modern age many people with unique skin types and needs (sensitive skin, dry skin, and oily skin) have turned to natural skin care solutions.

Some examples of natural skin care ingredients include Jojoba, Safflower oil. Some examples of natural skin care ingredients include Jojoba, Sunflower oil, Rose hip seed oil, shea butter, beeswax, witch hazel, aloe Vera, tea tree oil, and chamomile. Many of these natural ingredient combinations can be tailored specifically to the individual's skin type or skin condition.

The term natural has considerable market value in promoting skin care cosmetic products to consumers. preservatives are commonly used to preserve the safety and efficacy in these products.



What makes a good preservative?

To overcome the broad spectrum of activity, it is essential to use a preservative that is effective, not to be harmful to the skin and deleterious to other ingredients in the formulation. It is essential to use the right preservative. The optimal preservative should have the following characteristics:

1. Broad spectrum activity (bacteria, fungi, viruses)
2. Be effective over the anticipated shelf life
3. Be preferably liquid and water soluble
4. Be effective over a wide pH range
5. Not be deactivated by other ingredients
6. Be odorless, colorless and safe



Why select these oils as Preservatives?

The use of Essential oils in the production of cosmetics and related products may have several advantages. Essential oils in cosmetic formulations at relatively high concentrations are likely to provide skin benefit. Essential oils have been shown to possess antibacterial, antifungal, antiviral, insecticidal and antioxidant properties. Some oils have been used in cancer treatment. Some other oils have been used in aromatherapy and fragrance industries. Essential oils are a rich source of biologically active compounds. There has been an increased interest in looking at antimicrobial properties of extracts from aromatic plants particularly essential oils.



II. MATERIALS AND METHODS

The Experimental Material: -Gel and Cream, Essential oils use as Preservatives(Collected from Gayatri Herbal PVT. LTD.)

Gel Formation

Composition: Base Aloe Gel (For ~100ml), 88ml Spring Water, 1g/2ml tsp Xanthan Gum, 10ml Aloe Vera extract, 12 drops(0.6ml/g) Preservative.

Method: Measure the water in a jug & pour into a bowl. Weigh 1gm or measure a level 2ml measuring spoon with Xanthan Gum powder.



Sprinkle the Xanthan Gum powder over the water little by little, whisking vigorously. If Gel gets lumpy, blend until smooth with a stick blender. When there are no more lumps, stop whisking or blending immediately. Add all of the pre-measured ingredients and mix in to the Gel. All the methods will keep for 1.5-2years.

Cream Formation

Composition:

Fat Stage (75-80⁰C)- 6ml Vegetable oil, 2g Bees wax, 2g acetyl Alcohol, 3g VE Emulsifier

Water Stage (75-80⁰C)- 4f MFEmulsifier, 75ml Boiling Spring Water, 4ml/g Glycerin, 12 drops(0.6ml/g) preservative

Third Stage(40-35⁰C)- 2ml NFF Moisturizer, 1ml/g Vitamin E oil (undiluted)

Fourth Stage (35-25⁰C)- 20 drops Essential oil,

Method:

1. Heat the fat stage ingredients in a double boiler until all of the ingredients have melted and the temperature has risen to 75-80⁰C. There is no use a whisk at this stage.
2. After boiling the Spring Water in a Kettle,measure it according to the recipe and pour it over the MF Emulsifier and the Glycerin, Sorbitol and preservative, which have put into a separate double boiler.
3. Whisk the water stage ingredients well together, making sure that the MF Emulsifier powder is fully dissolved in the water and that don't have any lump. Then allow the mixture to heat to 75-80⁰C.
4. When both fat and water stages are over 75⁰C, remove both double boilers from the hob, keeping the water stage mixture hot by leaving it on the top half of the double boiler.
5. Now pour the melted fat stage into the water stage in a thin, steady stream, while continuously whisking the mixture from side to side for 5 minutes. If necessary, use a spatula to scrape the mixture from the sides of the bowl.
6. Allow the mixture to cool, stirring all the time. Speed up by the cooling process by replacing the hot water in the double boiler with very cold water. In the process of cooling down, the mixture becomes a cream and will reach it thickest consistency when it is has cooled down to room temperature.

Concentration of essential oil used as preservatives:

- Clove oil (0.1%, 0.2%, 0.3%, 0.4%, 0.5%)
- Cinnamon oil (0.1%, 0.2%, 0.3%, 0.4%, 0.5%)

**Method:**

Sample	Microbial assays (Various conc.)	Qualitative test (Various conc.)
Cream	15 day's analysis	15 day's analysis
	30 day's analysis	30 day's analysis
	45 day's analysis	45 day's analysis
	60 day's analysis	60 day's analysis
Gel	15 day's analysis	15 day's analysis
	30 day's analysis	30 day's analysis
	45 day's analysis	45 day's analysis
	60 day's analysis	60 day's analysis

III. OBSERVATION AND RESULT**Test for Qualitative Study****Table 1.1:** Preliminary Test (Qualitative Assay) for Gel & Cream

Test	Preliminary Test for Gel	Preliminary Test for Cream
pH	6	6.5
Visual appearance	Soft	Smooth, soften
Stability at 45 ⁰ C	Dried	Dried
stability at 54 ⁰ C	Dried	Dried, oil layer separated
Skin irritation test after 24 hours	No skin irritation	No skin irritation
Disperse in water	Colorless solution obtained	Turbid solution
Moisture content	98%	80%

Table 1.2: Preliminary Test for Creamat Various Concentrations

Oil use as Preservative	Conc.	pH	Visual appearance	Stability 45 ⁰ C	Stability 54 ⁰ C	Irritation test
Cinnamon oil	0.1%	6.5	Soft	Dried	oil layer separated	No skin irritation
	0.2%	6.9	Soft	No changes	oil layer separated	No skin irritation
	0.3%	6.9	Soft	No changes	oil layer separated	No skin irritation
	0.4%	7.5	Soft	Dried	oil layer separated	No skin irritation
	0.5%	6.5	Soft	No changes	oil layer separated	No skin irritation
Clove oil	0.1%	6.6	Soft	Dried	oil layer separated	No skin irritation



	0.2%	6.5	Soft	Dried	oil layer separated	No skin irritation
	0.3%	6.5	Smooth	Dried	oil layer separated	No skin irritation
	0.4%	6.5	Smooth	No changes	oil layer separated	No skin irritation
	0.5%	6.5	Smooth	No changes	oil layer separated	No skin irritation

ANALYSIS OF BACTERIALCONTAMINATIONS(In TVC)

A. Clove oil as preservative

Table 2.3: Bacterial contamination observed in Gel (No. of colonies) –(Photo plate 5.A)

	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	10	5	4	2	1	1
30 th day	14	6	5	3	2	1
45 th day	29	7	4	3	2	2
60 th day	33	10	7	3	3	2

Table 2.4: Bacterial contamination observed in Cream (No. of colonies) –(Photo plate 5.B)

	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	4	4	4	2	1	1
30 th day	10	5	4	3	1	1
45 th day	20	5	4	3	2	1
60 th day	22	7	5	3	2	1

B. Cinnamon oil as preservative

Table 2.5: Bacterial contamination observed in Gel (No. of colonies) –(Photo plate 5.A)

	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	10	5	4	2	2	1
30 th day	14	6	4	2	1	1
45 th day	29	6	5	4	2	1
60 th day	33	8	7	4	1	0

Table 2.6: Bacterial contamination observed in Cream (No. of colonies) – (Photo plate 5.B)

	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	4	4	3	3	1	1
30 th day	10	4	3	2	1	1
45 th day	20	6	2	3	2	1
60 th day	22	7	5	3	3	0



ANALYSIS OF FUNGAL CONTAMINATION(In TVC)

A. Clove oil as preservative

Table 3.3: Fungal contamination observed in Gel (No. of colonies) – (Photo plate 6.A)

	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	3	3	2	2	1	1
30 th day	5	3	2	2	1	1
45 th day	9	4	3	2	2	1
60 th day	13	6	2	4	2	2

Table3.4: Fungal contamination observed in Cream (No. of colonies) – (Photo plate 6.B)

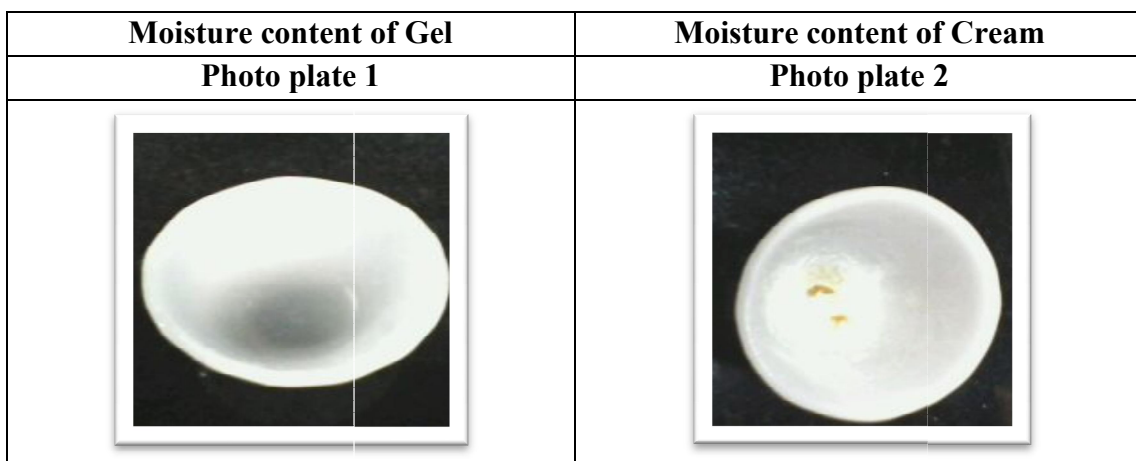
	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	3	3	2	1	1	0
30 th day	4	3	3	1	1	1
45 th day	7	3	2	2	1	1
60 th day	11	5	4	2	2	1

C. Cinnamon oil as preservative

Table 3.5: Fungal contamination observed in Gel (No. of colonies) –(Photo plate 6.A)

	0%	0.1%	0.2%	0.3%	0.4%	0.5%
15 th day	3	2	2	1	1	0
30 th day	5	3	2	1	1	1
45 th day	9	3	3	1	1	1
60 th day	13	3	3	2	1	1

PHOTO PLATES






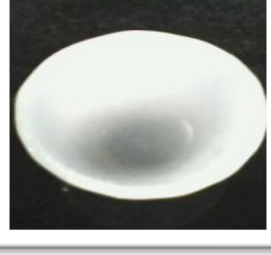
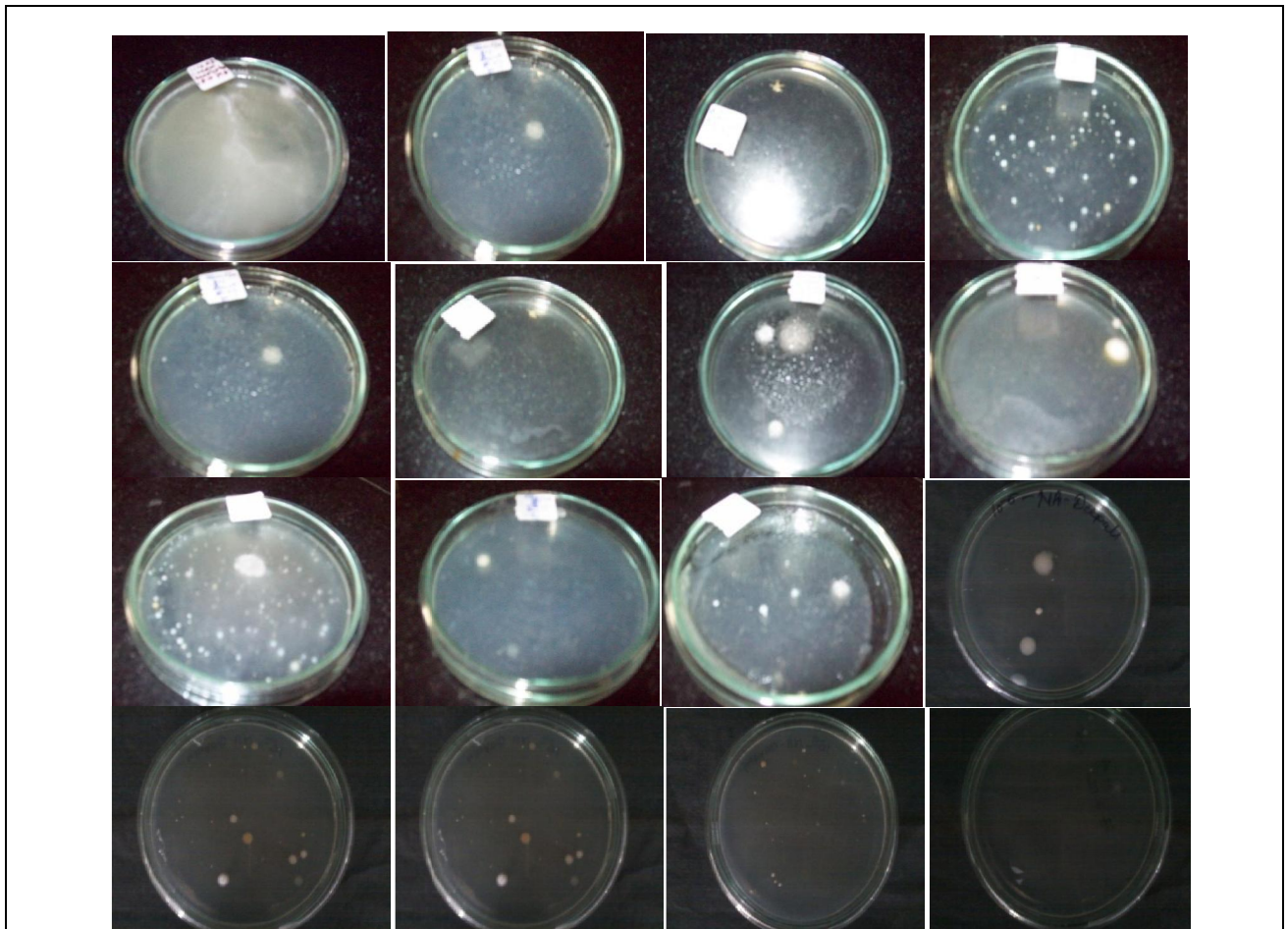
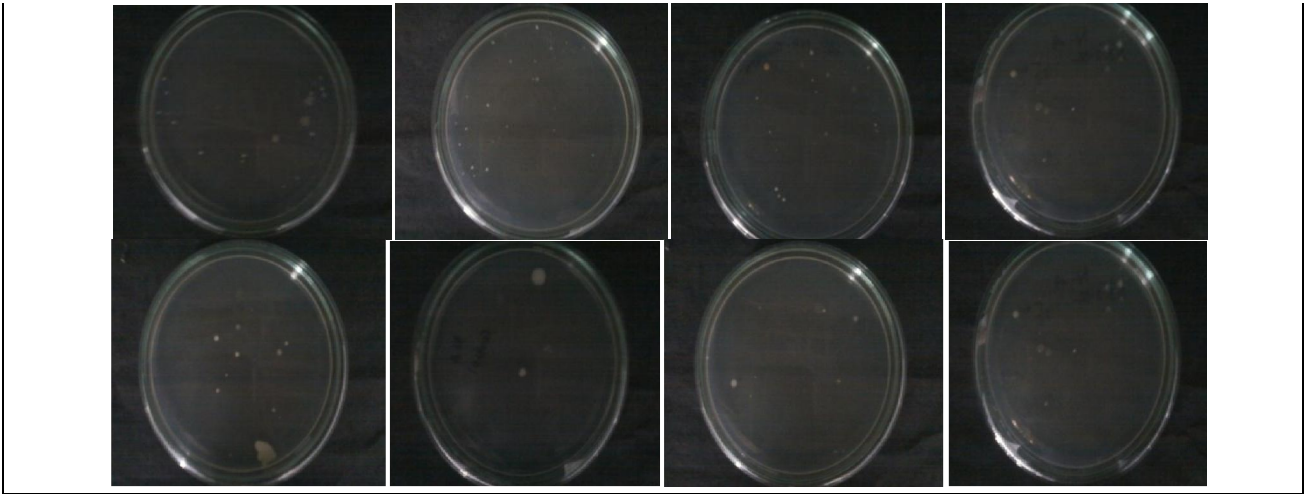
Stability of Cream at 45°C and 54°C respectively		Stability of Gel at 45°C and at 54°C respectively	
Photo plate 3.a	Photo plate 3.b	Photo plate 4.a	Photo plate 4.b
			

Photo plate 5.B: Analysis for Bacterial contamination in Cream

Bacterial contamination observed in Cream due to use of Cinnamon oil, Clove oil, as preservatives.





IV. DISCUSSION

Lavandula officinalis, and Rosmarinus officinalis, to be used as natural cosmetic preservatives in an aqueous cream formulation for antimicrobial activities against bacteria and fungi. All the test microorganisms used in this study were generally more susceptible to the oils during the challenge test in aqueous cream compared to the antimicrobial test performed on agar.

V. CONCLUSION

In this study, the herbal cosmetic products were tested for different test parameters. The two herbal cosmetics selected at regular interval microbial contaminants, were also studied to proven efficacy of essential oil as Natural Preservative and exhibit excellent anti-bacterial, anti-fungal properties. These natural preservatives were dose not change in their pH, moisture content, texture, stability of herbal cosmetic products. Cinnamon oil, Tea tree oil, Clove oil and Combination of all oil were shown more effective results as a natural preservative, compare to Eucalyptus oil in Gel. Cinnamon oil, Tea tree oil and Combination of all oil were shown more effective results as a natural preservative, compare to Clove oil and Eucalyptus oil in cream.

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