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**THE GREEN SYNTHESIS OF VARIOUS COSMETIC PRODUCTS  
USING *FICUS CARICA LINN.* [FIG LEAF]****PANDA SR\*, PATEL SM AND SALVI RD**Department of Chemistry, Parul Institute of Applied Science, Parul University, Limda-  
391760 Waghodiya, Vadodara, Gujarat, India**\*Corresponding Author: Dr. Sujata Rani Panda: E Mail: [sujata.panda20165@paruluniversity.ac.in](mailto:sujata.panda20165@paruluniversity.ac.in)**Received 15<sup>th</sup> Sept. 2022; Revised 15<sup>th</sup> Oct. 2022; Accepted 4<sup>th</sup> Dec. 2022; Available online 1<sup>st</sup> Aug. 2023<https://doi.org/10.31032/IJBPAS/2023/12.8.7374>**ABSTRACT**

The green synthesis of various cosmetic products (soap, toothpaste, shampoo, cold cream) by using *Ficus carica linn.* (Fig leaf) extract. Cosmetic make up used for cleaning, beauty and express moods. On the focus of environment safety as well as reduces damage of body cells awareness increasing in the society regarding natural products. Fig leaf contains many vitamins and minerals which is good for body parts like skin, hair, teeth etc.

**Keywords: Fresh fig leaves, Olive oil, NaOH, Borax, Mannitol Glycerol, Methyl salicylate****1. INTRODUCTION:****Fig leaf**

From the long time ago human being have used plants as a medicine. As a result of so many experiments and observations, too many plants are identified as a great source of important medication [1]. This plant *F.*

*carica* commonly known as Fig, which is very important plant of this genus. It is assumed that this *F. carica* is originated in western Asia and then moved slowly throughout the Mediterranean region from there [2].



*Ficus carica* Linn. Leaves are large, broad, and flat. The fresh fig leaf has 3-5 lobes with thick veins and a conspicuous stem in a brilliant, vibrant green colour. They are around 12-25 cm long and 10-18 cm in width. They develop in alternating pattern, with a rough, sandpaper like top and small, stiff hairs on the bottom. It has a strong aroma, with notes of coconut, peat, vanilla, and green walnut release. In numerous cultures, fig trees have come to represent knowledge, awareness, passion, and fertility. Fig trees are thought to have originated more than 11,400 years ago in Middle Eastern towns near ancient Jericho. After that it spread to other countries. In now a days it is widely cultivated tree. ed while crunching the leaf.

Fig leaves are high in vitamin A, vitamin B<sub>1</sub> and B<sub>2</sub>. Calcium, Iron, Phosphate, Manganese, Sodium, and Potassium are among the other minerals found in them. After a researched this is proved that *Ficus carica linn.* (Fig leaf) extract contains flavonoid, tannin, and terpenoids like active substances which have been known for their antibacterial, antiviral and antioxidant properties [3]. Diabetes, excessive cholesterol, and skin issues are all treated with fig leaf tea. An ethanol extract of *Ficus carica* was found to have a strong antipyretic effect in a research, with dose of 100, 200, and 300 mg/kg effective in lowering normal body temperature [6].

**Names in local language of *Ficus carica* Linn. [Fig leaf] [4]:-**

Language	Name
English	Fig
Hindi	Anjir, Tin
Sanskrit	Angira. Anjeer, Phalgu
Arabik	Teen
Bengali	Dumur
Chinese	Mo Fa Guo

Kingdom	Plantae
Clade	Tracheophytes
Family	Moraceae
Genus	<i>Ficus</i>
Species	<i>F. carica</i>
Bionomical Name	<i>Ficus carica</i> L.

**Taxonomically Classification [5]:-**

**Nutrient content of fig [5]:** (Value per 100g)

Energy	74 kcal	
Carbohydrates	19.2 g	
Sugar	16.3 g	
Vitamins	Quantity	% DV
A	7 µg	1 %
B1	0.06 mg	5 %
B2	0.05 mg	4 %
K	4.7 µg	4 %
C	2 mg	2 %
Minerals	Quantity	% DV
Calcium	35 mg	4 %
Iron	0.4 mg	3 %
Manganese	0.13 mg	6 %
Magnesium	17 mg	5 %
Phosphorus	14 mg	2 %
Potassium	232 mg	5 %
Sodium	1 mg	0.1 %
Zinc	0.15 mg	2 %

**Cosmetics**

Cosmetics are made up of a variety of chemical substances taken from either natural or manufactured sources [7]. Cosmetics serves a variety of functions. Cleanse and protect the body and skin with products designed for personal care and skin care. According to Food and Drug Administration (FDA) , United States, definition of cosmetic is “ Intended to be applied to the human body for cleansing, beautifying, promoting attractiveness, or alternating the appearance without affecting the body’s structure or functions” [8]. From the Greek word (“kosmetike tekhnē”), meaning “technical of dress and ornament” cosmetic word derives. There are another word (kosmetikos) means “Skilled in ordering or arranging” .Cosmetics can be used to hide faults, emphasis natural characteristics, add colour to a person’s face

or completely transform the face to resemble a new person, creature or object. Cosmetics are made up of a variety of organic and inorganic substances. L’Oréal, Procter & Gamble, Unilever, Shiseido, and Estée Lauder are the world’s largest cosmetics firms. Cosmetic packaging is governed by national or regional rules such as those issued by the EU or the FDA, and is standardized by ISO 22715, set by the International Organization for standardization.

**Soap:-**

Soap is a fatty acid salt that is used in a wide range of washing and lubricant goods. Soap are surfactants that are commonly used in the home for washing, bathing, and other sorts of housekeeping. Soaps are utilized as thickeners, components of various lubricants, and precursors to catalysts in industrial uses. Soap is

chemical product and it's formed when an alkali (mostly sodium or potassium hydroxide) reacts with a fatty acid. The first evidence of soap like compounds being manufactured dates back to roughly 2800 BC in Ancient Babylon [9] and Sumeria [10]. The Babylonians used water, alkali and cassia to make soap [11]. It can't be used in solutions that are too much acidic. Mild hand soaps are only adequate for removing excess skin oils.

### Shampoo

Shampoo is a hair cleaning product that is commonly in the form of thick liquid. But now a days it's also available in bar form. During the colonial period, the word shampoo made its way into English language from the Indian subcontinent. It was first used in 1762 and was derived from Hindi word "capo" [12] which is comes from the Sanskrit word "capati" meaning is "to press, knead or soothe." Shampoo is applied to wet hair, massaged into the scalp, and then rinsed out with water for cleaning hair. In most cases, shampoo is prepared by mixing a surfactant, such as sodium lauryl sulphate or sodium laureth sulphate, with a co-surfactant, such as cocamidopropyl betaine, in water. In the 16<sup>th</sup> century, Guru Nanak, First guru of Sikhism, made connection to the soapberry tree which is called in India "phenka" and soap and became founder of soap. Shampoo contain a variety of contact

allergens, and contact allergies induced by shampoo are well known. Shampoos are prohibited in the United States by 11 substances, Canada by 587, and the European Union by 1328 [13]. Now a days there are many specialized shampoo are marketed like for Dandruff, for colored hair, for baby, sulfate free shampoos, solid shampoo, Jelly and gel shampoo, paste and cream shampoo, antibacterial shampoo [14] etc.

### Cold Cream:

Cold cream is a water and fat emulsion that is used to soften skin and removed makeup. It frequently contains beeswax and other fragrance ants. Because of its hydrating characteristics, cold cream is primarily used for skin treatments (such as a facial mask or lip balm). It also works as a makeup remover and shave cream [15]. The term "cold cream" refers to the chilly sensation that the cream imparts to the skin. Cold cream is an emulsion of water in a higher amount of oil than vanishing cream, which appears to vanish when applied to skin. Galen, a Greek physician from the second century, is credited with inventing cold cream [16]. In the original recipe, rose water, beeswax, and either almond or olive oil were utilized which is invented by Galen. Beeswax is very necessary for a successful cream because it is an emulsifier, although it is inefficient with compared to current emulsifiers. For

approximately 2000 years, many variations of the substance have been used. Almost all current cold creams use mineral oil in place of plant oils, as well as alcohol, glycerin and lanolin [20]. Jojoba oil became a popular component in the 1970s, when it was utilized as a substitute for whale spermaceti [21]. Pond's and Noxzema are two popular cold cream brands in the United States.

#### **Toothpaste:-**

Toothpaste is a dentifrice paste or gel that is used to clean and maintain their appearance and health of teeth and it's applied with toothbrush. Toothpaste is an abrasive that helps remove dental plaque and food from the teeth, suppresses halitosis, and distributes active chemical (mostly fluoride) to help prevent tooth decay and gum disease [17]. The development and widespread usage of fluoride containing toothpaste during the 20<sup>th</sup> century has been credited for reducing tooth decay [18]. Except for chemical with a medical purpose, such as fluoride, which are regulated as pharmaceuticals in the United States, Toothpaste is governed as a cosmetic by the US Food and Drug Administration Egyptian have been making

tooth powder form of powdered bovine hooves, myrrh, powdered and burnt eggshells, and pumice since 5000 BC. By adding abrasives like broken bones and oyster shells, the Greeks and subsequently the Romans enhanced the recipes. Colgate & Company Dental Cream was packaged in Sheffield- style collapsible tubes in York in 1896. Lead was used in the first collapsible toothpaste tubes [19].

#### **MATERIAL AND METHODS:**

**2. Material:** Condenser set, Beaker, Fresh fig leaves, Burner, 250 ml beaker, magnetic stirrer, thermometer, soap mold

##### **2.1 Preparation of Fig extract (Oily)**

Firstly, set up set for condensation. Taken fresh fig leaves from tree. Cut the leaves in small pieces with small amount of water and put it in round bottom flask. On the burner and condensation started. In other side of set got extraction which is oily in comparison to normal extraction.

##### **2.2 Preparation of normal fig extract**

Freshly small pieces of fig leaves were taken in beaker and cut in small pieces and water to it. Solution was kept for boiling. After 30 minutes Fig extract is ready with its nutrients. Filter the solution and used as extraction.

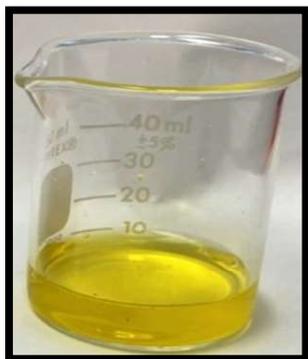


Figure 1: Fig leaves oil



Figure 2: Fig leaves extraction

### 2.3 Preparation of Soap

In 250 ml beaker, combine 10 ml olive oil (preheated to 35°C) and fig leaf extract (oily). Add 1-2 drops of fig fragrance. Then add 3 ml of 9 M NaOH solution to the beaker. Put it on magnetic stirrer for 20-45 minutes (mixture become smoother and thicker as pudding like consistency). After that add 2-3 drops of desired food colour. Add pinch amount, approximately 1/8 teaspoon of stearic acid. Take it down from magnetic stirrer and put in chosen soap mold. After saponification process, it was kept undisturbed for minimum 12 to 16 hours.

### 2.4 Preparation of Shampoo

Weight out 38gm SLS and dissolved it in 90ml extraction in beaker 1. In beaker 2 dissolved 0.5gm NaCl in 5ml extraction. Now beaker 2 solution was added to beaker 1 and mix it properly. Now add 2.0 ml paraffin and 9 gm Guar gum in mixture. After that add 1.0ml oil extraction and pinch amount of dye. Now mix it uniformly

till shampoo like viscosity. Fill in the container.

### 2.5 Preparation of Cold Cream.

Weight an exact 2.8gm bees wax and heat to its melting point (70°C). After that add 10.2 ml olive oil into melted bees wax and mix it properly. (Note: The temperature should not rise above 70°C otherwise beeswax will started to degrade and its polymeric form will change). Now add 0.2gm borax powder in 6.8 ml extraction in other beaker and heat and make both beaker temperature same. Now beaker 2 added in beaker 1 with continue stirring at constant temperature (70°C). Stir it since mixture form like cream and filled into container.

### 2.6 Preparation of Tooth Paste.

0.9gm acacia and 8.25gm calcium carbonate was taken in beaker 1 and mixed it properly. 0.15ml glycerin, 0.15gm mannitol, 0.30 ml oily fig extract was taken in beaker 2. Beaker 2 solution was mixed with beaker 1. After the formation of

uniform mixture 0.45gm SLS was added to it. 1 ml of Fig extraction was added to it.

### 3. RESULT AND DISCUSSION

These result shows the significant importance as it contains vitamins A, vitamin B<sub>1</sub>, vitamin B<sub>2</sub> and minerals which are good for skin, hair and teeth. fig leaf extract possessed anti- microbial, anti-viral and anti-oxidant, flavoring and skin whitening property. pH of all cosmetic product is nearly same as required. The

products almost not giving irritation by using it. So that all cosmetic products by using fig leaf extract is safe and usable for human body.

Soap: Antibacterial test on *E.coli* gives antibacterial effect with MBC at 50% and anticytotoxic to fibroblast cells.

Toothpaste: Using agar plates to test it against the pathogenic microorganism like *E.coli*.

Cosmetic product name	colour	Odour	pH	Foam stability	Irritation	Dirt dispersion
Soap	Orange	Fig leaf	6.2	Poor	No	Good
Shampoo	Light orange	Fig leaf	5.6	Good	Little in eyes	Good
Cold cream	White	Fig leaf	6.4	-	No	-
Toothpaste	White	Fig leaf	6.8	Good	No	Good

### 4. CONCLUSION

We have successfully synthesized soap, shampoo, cold cream and toothpaste from fig leaves extract which shows good anti-microbial, anti-viral and anti-oxidant property. Antibacterial test was also done on *E.coli*. It shows good antibacterial effect and anticytotoxic to fibroblast cells.

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