

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**



A dissertation submitted to the Department of Pharmacy, Daffodil International University In the partial fulfillment for the degree of Bachelor of Pharmacy (B. Pharm)

Submitted To

Department of Pharmacy
Daffodil International University

Submitted By

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Approval

This project report submitted to the Department of Pharmacy, Daffodil International University has been accepted for the fulfillments of requirements Of the Bachelor of Pharmacy & approved as to its contents.

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Internal Examiner-I

Internal Examiner-II

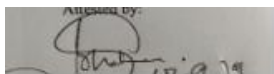
Internal Examiner-III

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DECLARATION

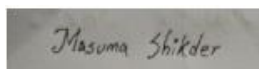
I hereby declare that, this project report is done by me under the supervision of Prof. Dr. Sharif Mohammad Shaheen, Department of Pharmacy, Daffodil International University, in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy. I am declaring that this Project is my original work. I also declare that neither this project nor any part there of has been submitted else where for the award of Bachelor or any degree.

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Dedicated to

**My Beloved Parents Teachers and
my Friends**

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ABSTRACT

The project aims to find valuable rewards for functional cosmetics that can be used to correct the well-being of human skin on a daily basis. These functional cosmetics come from these known herbs and have multiple effects. Through the study of biological activity, qualitative effects can be reflected in the new addition of beauty technology. Known techniques make it possible to obtain special and useful herbs as functional cosmetics.

Today, people are accustomed to using various cosmetics to clear skin infections, inflammation, spots, acne, psoriasis, etc., such as several skin problems, but they use various synthetic chemicals such as steroids, antibiotics, but it is inconclusive. In remedy. Here, in addition to dry skin in herbal cosmetics, other types of skin problems can be eliminated every day.

In the less commonly used seaweed such as *Caulerpa racemosa* or sea grapes, new methods with multiple formulations can completely change people's minds, so that people can avoid the use of creams that can be used on the skin Or gel herbal cosmetic formula.

The herbs used to prepare these skin cosmetics have melanin inducing, antioxidant, anti-inflammatory, antiseptic and antibacterial properties. Innovative functional skin products are more effective than commercial products. Herbs can change the skin without any side effects, which is why people pay attention to herbal formulas that use various cosmetics.

Key words: Functional cosmetics, herbs, *Caulerpa racemosa*, biological activity, cosmetology, melanin, antioxidant.

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Abbreviations

Seaweed	: <i>Caulerpa racemosa</i>
DPPH	: 2,2-diphenyl-1-picrylhydrazyl
mm	: millimeter
FM	: Formulation

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CHAPTER:ONE

INTRODUCTION

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

1.1 General Introduction:

1.1.1. Functional cosmetics:

Functional cosmetics are new therapies for improving the skin. By mimicking peptides at the cellular level, mimicking nature by repairing skin imbalances with biomimetic peptides, thereby restoring balance. By mimicking our own natural repair mechanism, we can also treat causes rather than symptoms. Treats chronic skin inflammation, which is the main cause of accelerated aging and reporting skin problems, and personalized treatment by adding active ingredients to high-quality serum before use .



Fig.1.1: Functional Cosmetics for natural use.

Physicians and patients have begun to expect our prescriptions to be not only locally effective, but also minimally irritating and aesthetically pleasing. A lot of research and development effort is being spent to identify new tools to achieve these goals. Consumers also demand over-the-counter products to give them noticeable results. The multi-billion dollar drug and cosmetics industry is at the forefront of research. We reviewed the literature to identify and discuss certain delivery systems used in consumer health products .

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1.1.2. Herbal Cosmetics:

"Your food is your medicine." Hippocrates. In the Hippocrates era, herbs were the official medicine. For a long time, people of every culture have taken herbal medicine in the same way as garlic or bananas, because these herbs provide important nutrients and have special repair value for the human body [3]. Theophrastus (371-287 BC) established plant science with his books *De Causis Plantarum* in Plant Etiologies and *De Historia Plantarum* in Plant History. In the book, he classified more than 500 medicinal plants known at the time. Among other things, he mentioned cinnamon, iris rhizomes, fake hellebore, mint, pomegranate, cardamom, fragrant hellebore, aconite, etc. In describing the phytotoxic effects, Theophrastus emphasizes important characteristics that make humans accustomed to them by gradually increasing the dose. As a result of his consideration of the above topics, he was given the title of "Father of Botany" because of his great advantages in the classification and description of medicinal plants [4]. Generally, herbs are plants with a salty or aromatic character, used to flavor foods, medicines, or as spices. Cooking often distinguishes herbs from spices.



Fig.1.2: Some natural ingredients of Herbal Cosmetics

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Herbs refer to the green leaves or flowering parts (fresh or dried) of a plant, while spices are usually dried and produced from other parts of the plant, including seeds, berries, bark, roots and fruits. In plant English, the word "herb" is also used as a synonym for "herbaceous plant".

Herbs have many uses, including cooking, medicinal and, in some cases, spirituality. The general usage of the term "herb" differs between cooking herbs and herbs. In medical or spiritual use, any part of a plant can be considered "herbal", including leaves, roots, flowers, seeds, root bark, internal bark (and forming layers), resin and peel [5].

These herbs have played a vital role in health care since humans first started treating diseases. Medicinal plants or herbal plants are the foundation and basis of medicine and disease treatment.

Herbal therapies are based on traditional or folk medicine practices using plants and plant extracts. Traditional medicine is "knowledge, skills and practices based on theories, beliefs and experiences inherent in different cultures that are used to maintain health and prevent, diagnose, improve or treat mental illness" (World Health Organization). [6]

1.1.3. Cosmetics & uses of cosmetics:

In the United States, the Food and Drug Administration (FDA), which regulates cosmetics, defines cosmetics as "designed to be applied to the human body to clean, beautify, enhance attractiveness or change appearance without affecting the structure or function of the human body." Cosmetics must be effective when consumers use them under normal, labelled or foreseeable conditions of use [7]. Cosmetics are mainly used by women and sometimes also by men. More than 80% of cosmetics worldwide are made from synthetic materials. Every skin-related herbal or commercial product is consumed by customers, but not all products are useful and cannot meet the needs of all consumers early and accurately. Cosmetics have always looked perfect in the past and can make the skin beautiful, healthy and bright all day long. Sometimes they are used to treat diseases, bacteria or other kinds of skin infections.

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1.1.4. Common herbs as medicinal plants in Bangladesh:

In Bangladesh, there are more than 350 species of medicinal plants [8]. Medicinal herbs with medicinal and therapeutic properties or beneficial pharmacological effects on animals and humans. Bangladesh is a small country with an area of about 147,570 square kilometers. Limited locations and favorable acute treatment options can accept a variety of flora. Forests, agricultural lands, barren lands, wastelands, immersed bodies and homes, and roadsides all

have a lot of plants growing. Many of these trees and plants are often considered weeds and contain active substances with medicinal properties [9].

About 450 to 500 plants in Bangladesh are recorded as growing or available, with therapeutic value (Yusuf et al., 1994; Ghani, 1998). The rich indigenous capabilities associated with herbal anesthetics are recommended as the basis for all acceptable Bangladeshi medical systems. Most relieving plants in Bangladesh are well-adapted to the alertness of Unani, Ayurvedic and homeopathic medicines as herbal products or functional cosmetics [10].

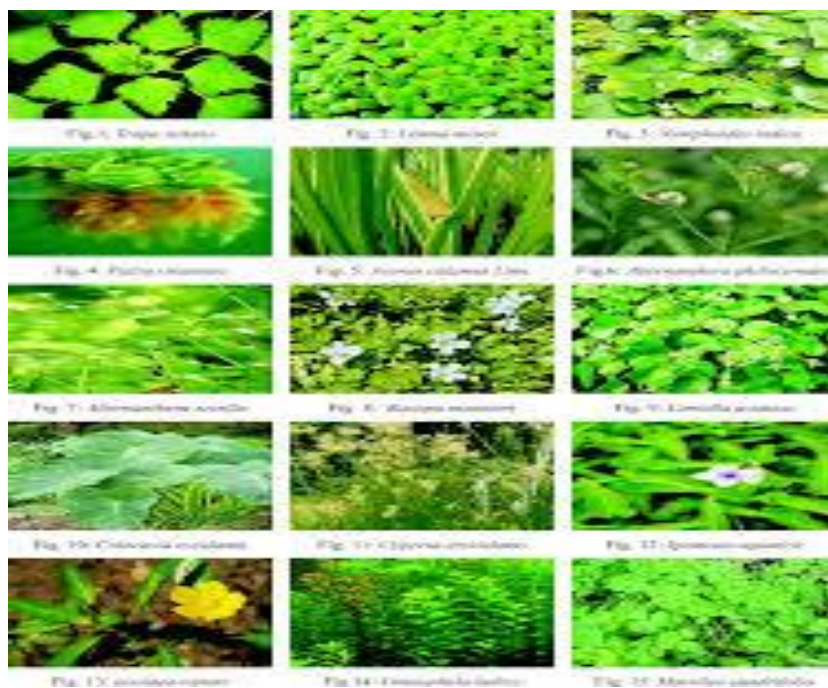


Fig.1.3: Some common herbs as medicinal plants.

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Examples of well-known plants: Basak, Thankuni, Neem, Tulsi, , Pathorkuchi, Aloe, Sunflower Oil, Assogandha, Sotomuli, Amla, Henna, Cloves, Garlic, Joba, Ginger, etc.

1.1.5. Skin, skin layers and skin function:

The skin is the largest organ in the human body, with a total area of approximately 20 square feet. The skin protects us from microorganisms and various elements, helps regulate body temperature, and can make you feel hot, cold and cold.

The skin is divided into three layers: the epidermis is the outermost layer of the skin, which provides a waterproof barrier and produces our complexion. The dermis beneath the epidermis contains tough connective tissue, hair follicles and sweat glands. The deeper subcutaneous tissue (subcutaneous tissue) consists of fat and connective tissue.

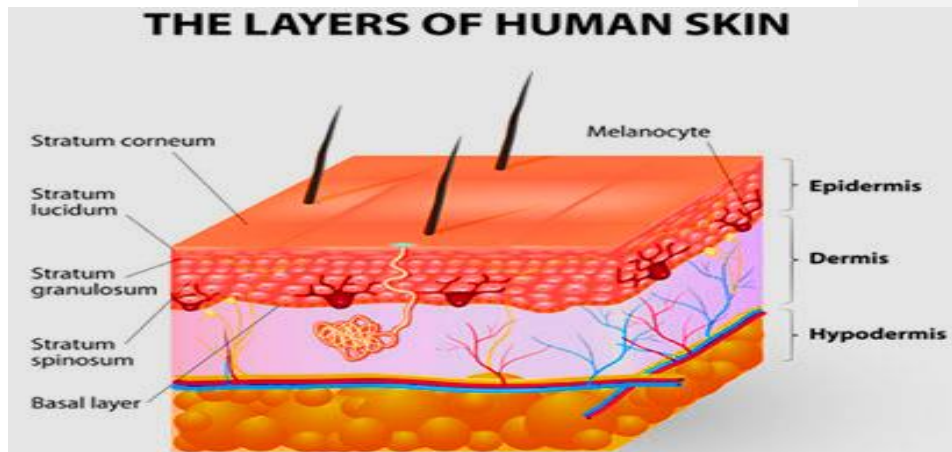


Fig.1.4: Layers of the skin.

The color of the skin is produced by special cells called melanocytes, which produce pigment melanin. Melanocytes are located in the epidermis.

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Skin function: Because the skin is in contact with the environment, it plays a key role in protecting the body from pathogens and excessive water loss. Its other functions are insulation, temperature regulation, sensation, synthesis of vitamin D and protection of vitamin B folic acid. The skin performs the following functions:



Fig.1.5: Healthy skin.

Protection: an anatomical barrier in the body's defenses against damage between pathogens and the internal and external environment; Langerhans cells in the skin are part of the adaptive immune system. Langerhans cell b. Feelings: Contains various nerve endings and responds to heat and cold, touch, pressure, vibration, and tissue damage. C.

Caloric Regulation: The blood contained in the skin far exceeds its demand, and energy loss can be precisely controlled through radiation, convection and conduction. Dilated blood vessels increase perfusion and heat loss, while constricted blood vessels greatly reduce blood flow to the skin and save heat.

Controlled evaporation: The skin provides a relatively dry and semi-impermeable barrier to moisture loss. The loss of this function results in a significant loss of fluid in the burn. e. **Aesthetics and communication:** Others can see our skin and can assess our emotions, physical state and attractiveness.

Storage and synthesis, A storage center for lipids and water, as well as a means to synthesize vitamin D by ultraviolet rays acting on certain parts of the skin.

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Excretion: Sweat contains urea, but its concentration is 1/130 of the urine concentration, so sweat excretion is at most a secondary function of temperature regulation.

Absorption: The cells that make up the outermost layer of the skin from 0.25 to 0.40 mm are almost "fully supplied by external oxygen" (Stücker, 2002). Alternatively, the drug can be administered through the skin, ointment or patch. Skin is an important place of transport for many other organisms.

Water resistance: The skin acts as a waterproof barrier, so essential nutrients are not washed out of the body .

1.1.6. Advantages of Herbal Cosmetics:

Herbal cosmetics are formulated using different cosmetic ingredients to form the basis of one or more herbal ingredients that can be used to treat various skin diseases. Cosmeceuticals have medicinal effects. Depending on the type of functional ingredients they contain, they can affect the biological function of the skin. These cosmetics are not only used for beautification, but also for various skin diseases. These products promote collagen growth by eliminating the harmful effects of free radicals, thereby improving the function / texture of the skin, keeping the keratin structure in good condition, and making the skin healthier. Herbal medicine is of great significance for preventing diseases and promoting health, and has the following advantages:

- Natural products Herbal cosmetics are natural and do not contain all harmful synthetic chemicals, which usually cause fatal damage to the skin.
- Safe to use: Natural cosmetics are protected for use. They are hypoallergenic and tested and proven by dermatologists to be safe to use anytime, anywhere. Because they are made from natural ingredients, people don't have to worry about rashes or itching.

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- Suitable for all skin types: whether you have dark skin or fair skin, regardless of skin tone, you can find natural cosmetics that suit you, such as foundations, eye shadows and lipsticks. Women with oily or sensitive skin can also use them without worrying about reducing their skin condition.

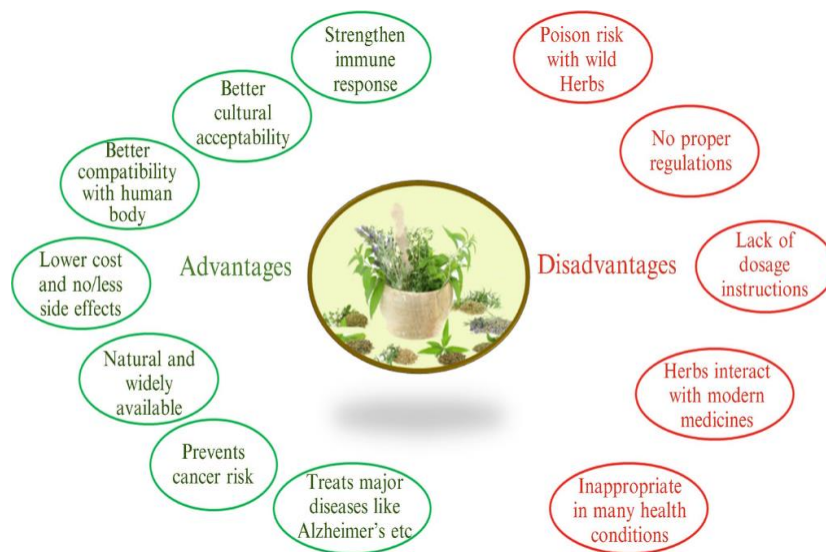


Fig.1.6: Advantages & Disadvantages of Herbal medicine

- Multiple options: These products are more affordable than synthetic products. They are offered at economical prices and are sold at bargain prices during the sales process. WHO estimates indicate that about 80% of the world's population depends on natural products for health care due to the side effects and rising costs caused by modern medicine.

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- No side effects: Synthetic beauty products can irritate the skin and cause acne. They may clog your pores and make your skin dry or greasy. No need to worry about using natural cosmetics. The natural ingredients used ensure no side effects; one can apply them anytime, anywhere.
- Cosmeceuticals: Cosmeceuticals are the fastest growing segment of the beauty industry. Cosmeceutical cosmetics are cosmetic products designed to improve skin health and beauty by providing specific results, from controlling acne and anti-wrinkle effects to sun protection .

1.1.7. Seaweeds

Seaweed, officially called macro algae, is divided into three different groups: Algae (brown), Red Algae (red), and Green Algae (green). "All forms of seaweed are rich in vitamins and antioxidants," explains Dr Joshua Zeichner, a board-certified dermatologist and Skincare.com consultant.



Fig.1.7: Common Bangladeshi seaweed

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According to research conducted by the MDPI, there are different known benefits based on substances extracted from a particular class of seaweed-not just one benefit for each type of seaweed. For example, amino acids extracted from green algae may be active ingredients of humectants, antioxidants and natural sunscreens, while extracts of green algae species may have more moisturizing properties. Bladderwrack (officially known as fucus vesiculosus) is a common extract of brown seaweed because of its emollient and moisturizing effects. Red seaweed (especially a species called asparagus) may help protect the skin surface and activate surface cell regeneration.

Seaweed's unique skin benefits include clearer complexion, hydrated and healthier skin-all of which contributes to the soothing and anti-aging effects of these powerful ingredients.

The seaweeds that multiply in our oceans are a natural source of amino acids, vitamins and minerals with anti-aging and anti-inflammatory properties that help heal the skin.

Known benefits of seaweed

There are many variants of seaweed, and each species has its own unique benefits. There are three main types of seaweed : green , brown and red. The difference between them is the pigmentation of the skin. Giving them a unique ability to moisturize and repair the skin.



Fig.1.8: Benefits of seaweed

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Benefits of seaweed on human skin

- Hydration: Seaweed is full of humectants that absorb moisture from the environment. It contains vitamin E, which also moisturizes the skin.
- Provides younger looking skin: The amino acids in seaweed help plump your skin and have anti-aging properties to smooth fine lines.
- Treats eczema, acne and other skin problems: Natural minerals including omega, zinc and magnesium contained in seaweed can form a barrier to protect the skin from bad weather or excessively dry environment, while help heal any infected skin.
- Makes even skin pigmentation: Antioxidant such as Vitamin B & C help heal the skin and remove pigmentation that forms from prolonged exposure to sunlight.

Common Bangladeshi seaweed “*Caulerpa racemosa*”

Caulerpa racemosa is a kind of edible green algae and a kind of seaweed of the family Leguminosae. It is often called sea grape (and related locust) and can be found in many shallow sea areas of the world. There are many different forms and varieties, one of which appeared in the Mediterranean in 1990, which has attracted attention as an invasive species.



Fig.1.9: *Caulerpa Racemosa*

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Below, we share the three seaweed-infused skincare products we love and why you should consider one in your daily routine.

- The seaweed bath Co awaken exfoliating detox body scrub: This body scrub contains brown bladder-deposited seaweed that naturally detoxifies the skin and promotes skin elasticity. Reward Points: It has a fresh mint scent that will wake you up immediately if you feel sleepy.
- Algenic prebiotic body mask: This color changing mask is formulated with prebiotics from green alga
- 100% pure dark spot remover: Use it as a spot treatment or for the entire skin to help resolve the appearance of dark spots. The formula contains asparagus, a kind of red algae, especially chlorella extract.



Seaweed hand cream



Seaweed face pack

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Seaweed Sleeping mask



Seaweed face wash

Figure 2.0: Seaweed Containing Cosmetics

Checking of antioxidant properties of seaweed:

The antioxidant and antibacterial properties of seaweed have caused widespread concern. *Caulerpa racemosa* or "sea grapes", is a common green algae in different parts of the world, but the antioxidant and antibacterial potential of Bangladeshi seaweed *caulerpa racemosa* has not been fully studied. In this study, a crude extract of seaweed was prepared by using water. The approximate composition (total solids, protein and total carbohydrate content), total phenol content (TPC) of the extracts of macro algae *Caulerpa racemosa* were tested And their contents through four different determination methods (ABTS free radical cation decolorization, DPPH free radical scavenging activity, trivalent iron reducing antioxidant capacity (FRAP) and oxygen free radical absorption capacity (ORAC)) with BHT compounds Than has in vitro antioxidant activity. The lipid oxidation parameters (peroxide value (PV), p-anisidine value (AV), TBARS value, conjugated diene (CD)) were also evaluated to evaluate the synthetic resistance of extracts from rapeseed oil as an oil stabilizer Oxidant (BHT) method.) And TOTOX index) under accelerated storage conditions (16 days, 60 ° C). There is an inverse relationship between total solids content and total polyphenol content in seaweed extracts. it showed an intermediate TPC (1.15 g PGE / 100 g extract), but when measured using the ABTS, DPPH and FRAP tests, it showed the highest in vitro antioxidant activity.

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Seaweed extract added at a concentration of 500 ppm significantly reduced the oxidation of rapeseed oil during storage at 60 ° C, as this antioxidant effect was significantly higher than the antioxidant effect of BHT added at a concentration of 50 ppm. The results show that seaweed extract can effectively inhibit the oxidation of rapeseed oil and can be used as a healthier substitute for synthetic antioxidants in the petroleum industry.

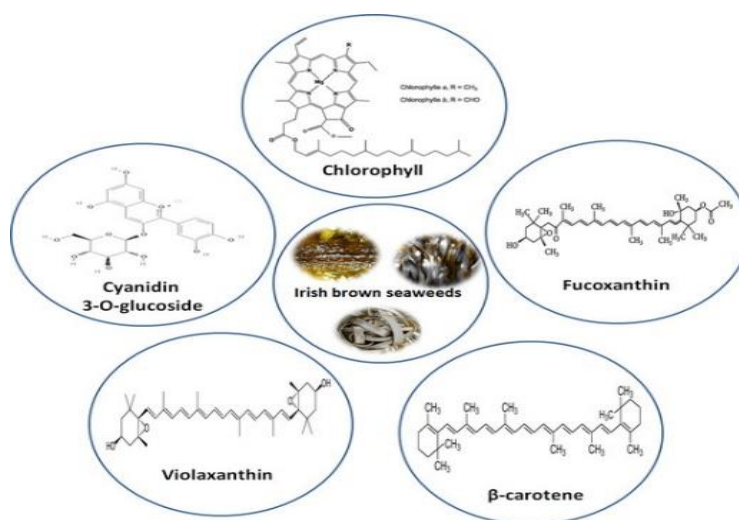


Figure 1.9: Antioxidants in Seaweed

LCMS analysis showed that the chloroform extracts of racemes were mainly polyunsaturated and monounsaturated fatty acids, terpenes and alkaloids. In short, *Caulerpa racemosa* may be an important source of new antioxidants and antibacterial agents, but biologically active compounds need to be isolated and purified to study their mechanism of action.

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Amazing activity of *Caulerpa racemosa* on body or skin:

Seaweed can be the bane of your survival after bathing at the beach, but as a cosmetic ingredient, it can have surprising benefits to your skin. In addition to its super moisturizing function, seaweed also has anti-aging and anti-inflammatory effects. It is also rich in amino acids, vitamins and minerals,

and its antibacterial properties make it an ideal ingredient to resist everything from acne to signs of aging (see reference 1). With this all-natural marine treasure, you can make your skin look young and shiny-well beyond the beach.

To improve your complexion, search for products that contain nutrient-rich purple seaweed. Some products that increase skin cell renewal, such as Mermaid Beauty Seaweed C-Serum, will ultimately help reduce sun damage and age spots and keep your skin tone even.

To target redness, eczema or psoriasis, use a laver scrub or exfoliating powder, which are usually also mild enough for sensitive skin types (see reference

1). If your skin needs soothing after long beach activities, look for anti-inflammatory seaweed gels (see reference 2). Women's Health magazine recommends Seaflora Therapeutic Firming Porphyra Gel based on its powerful combination of marine ingredients: kelp laver can cure, replenish moisture and calm the skin, while Porphyra laver can relieve muscle and joints after increasing a certain amount of exercise Discomfort (see reference 2). The third type, iris seaweed, firms and conditions the skin and can even help reduce the appearance of cellulite by helping to increase circulation (see reference 2).

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Figure 2.1: Health Benefits of Seaweed

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Traditional / Ethnic Plant Uses

For centuries, seaweed has received the attention of plants, industry, and pharmaceuticals. Due to its high nutritional content, seaweed has been used as food throughout Asia.

Chinese medicine uses hot water extracts of certain seaweeds to treat cancer. In addition, Japanese and Chinese cultures have used seaweed to treat goiter and other glandular diseases since 300 BC.

The Romans used seaweed to **treat wounds, burns and rashes**. The Celts point out that common seaweed will shrink after drying and then swell with moisture. In Scotland in the 18th century, doctors used dried laver stems to successfully drain abdomen wall abscesses. They also inserted laver into the cervix to treat dysmenorrhea. Many reports outline the use of seaweed to induce abortion. Laver is used for maturation of the cervix in the vagina, and for stenosis in the rectum.

1. Most famous spas use seaweed wraps and baths, which are said to help the body expel excess bodyfluids.
2. It is also believed that seaweed bath can relieve skin diseases such as psoriasis and acne.
3. Since ancient times, this sea vegetable has been widely used in cosmetics. It is used in facial masks, soaps, lotions, shaving foams, shampoos, cleansers, creams; the list is endless.
4. The secret of flawless and soft skin of Japanese women can be attributed to their consumption of Japanese 5. It is specially cultivated in the Sea of Japan. Wakame Wakame is said to be a good food and skin conditioner. It contains high mineral content and helps to nourish the skin. seaweed, also known as plant wakame or wakame seaweed.
5. It is specially cultivated in the Sea of Japan. Wakame Wakame is said to be a good food and skin conditioner. It contains high mineral content and helps to nourish the skin.
6. Today extracts from seaweed are made use of in many formulas that are manufactured for the treatment of wounds, burn ,eczema ,dry skin, moisturizing and for anti aging purposes.

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**



Seaweed paste on skin burn



Seaweed paste on skin burn



Seaweed as antiaging



Seaweed paste as facemask



Seaweed paste for removing



Seaweed for hair

Figure 2.2: Traditional uses of Seaweed

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

General purpose

Few clinical trials support treatment recommendations for seaweed. However, seaweed is an important source of minerals with low sodium content. They may be useful in heart disease because of lowering cholesterol and suppressing appetite. Alginates extracted from seaweed have been used in wound dressings.

Types of Seaweed

- **Bladderwrack:** Also known as brown algae, brown algae, sea oak, red rock algae, and black soup, is a brown seaweed that can be found in the North Sea, the Baltic Sea, the Atlantic Ocean and the Pacific Ocean. It has carotene, selenium, zinc, and vitamins A, C, and E for anti-aging and anti-inflammatory effects.
- **Oarweed:** Also known as kelp digital algae and filamentous algae, it is a golden brown seaweed found in the North Atlantic. It is known for its large amount of moisture, which can give your skin great hydration and elasticity.
- **Organic kelp powder:** Also known as Nocosum, is part of Laminariales and grows in cold water oceans. These large brown algae are the main sources of iodine, calcium, iron, copper, potassium, magnesium, vitamin A, B1, B2, C, D and E. Kelp powder offers many benefits, including helping the body moisturize and restore the balance of natural pH levels.
- **Carrageenan :** Chondrus Crispus, also known as Irish Moss, is a red seaweed found in the cold waters of the Atlantic Ocean. Carrageenan has no nutritional value; it is used as a safe, natural thickener in cosmetics for a variety of products from creams to conditioners. What to say about ingredients that are harmless and safe for all skin types!

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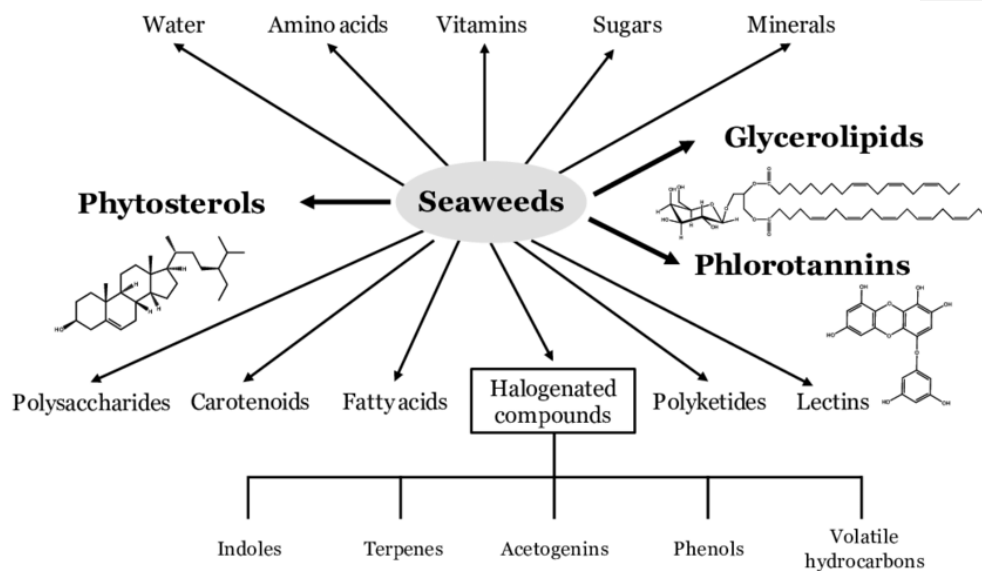


Figure 2.3: Constituents in seaweed

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

1.1.8. Scientific classification of seaweed “ *Caulerpa racemosa*”:

P	Chlorophyta
C	<u>Ulvophyceae</u>
C	Bryopsidales
F	Caulerpaceae
G	<i>Caulerpa</i>
S	<i>C. racemosa</i>



Formatted Table

1.1.12. Important Medicinal Properties of *Caulerpa racemosa*:

Caulerpa racemosa is widely used to treat burn, wound, eczema & inflammation. Study on the anti-nociceptive, anti-edema and anti-inflammatory effects .. It can also be used without any injection and with different standards and the way this live plant is used. [25] The water extract of kelp can show powerful analgesic effects, The results continue to be effective for anti-inflammatory and analgesic effects. [26]

Caulerpa racemosa has rich in medicinal properties. The following are the medicinal properties and their meanings:

- a) Astringent: Causes the contraction of skin cells and other body tissues and helps stop bleeding.
- b) Analgesics: pain relief.

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- c) Anticoagulants: reduce platelet aggregation and inhibit thrombosis.
- e) Anti-inflammatory: reduce inflammation by acting on human body mechanisms.
- f) Preservatives: can prevent infection by inhibiting the growth of infectious agents.
- j) Disinfectant: Eliminate bacteria.
- k) Emollient: It has a soothing and softening effect on the skin or the irritated inner surface.
- l) Immune regulation: alters the immune response or the function of the immune system.
- m) Hemostasis: Hemostasis when applied to wounds [27].

1.1.13. Pharmacological benefits of *Caulerpa racemosa* (live plants) :

Checking of antimicrobial activity of *Caulerpa racemosa*: The antibacterial activity of the extracts from the leaves of *Caulerpa racemosa* was screened. Gram-positive organisms are

more sensitive to methanol and topical ginkgo extracts from nutmeg. Extracts from other solvents show moderate to weak effects .

Checking further study on anti-inflammatory focus of *Caulerpa racemosa*: The anti-inflammatory and analgesic activity of the water extract *Caulerpa racemosa* is mainly due to the presence of this steroid compound. More research on this herb remains to be continued. This steroid is beneficial for a variety of inflammatory or analgesic effects [30]. Green *Caulerpa racemosa* or sea grape, is a green edible macroalga that can grow on salinity or fresh water.

Natural products and their derivatives account for more than 50% of all drugs in modern therapies. Due to the low success rate and huge capital investment requirements, the development of conventional drugs is very expensive and difficult. For the past few decades, researchers have been working to discover drugs from herbal or plant sources, which are an important part of

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
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complementary and alternative medicine (CAM) treatment. In herbal cosmetics, although synthetic sources are mainly used in therapeutic arsenals, including anti-inflammatory drugs, in recent years, there has been new interest in treatment methods, which many health care professionals consider to be welcome or unscientific. Therefore, herbs and other natural remedies have been used as alternative or complementary therapies [32].

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

1.2 Aim of the work:

The purpose of this project is to find out the actual value of herbal-derived functional cosmetics. There is growing reassurance of using herbs as natural products as cosmetics. In this research agreement, we mainly found the cheap reality and the most common and most valuable products that people could not imagine. Plants, herbs, and ethnic botanicals have been used since early humans and are still being used to promote health and treat diseases worldwide. Plants and natural resources form the basis of today's modern medicine and make important contributions to commercial bioactive drugs such as cosmetics produced today. About 25% of prescription drugs worldwide are from plants. Nevertheless, herbal medicines are often used instead of drugs in health care. For some people, herbal medicine is their preferred treatment. For others, herbs are used as an adjunct to regular cosmeceuticals.

However, in many developing societies, traditional medicine with herbal cosmetics as its core is the only available or affordable health care system. For whatever reason, you should rest assured that people who use herbal medicines are safe and include their intended use regardless of whether the product purchased is a specific herbal medicine or a specific amount of a specific herbal ingredient. Bringing digital changes to herbal cosmetics with functional cosmetics. More and more research is increasingly developing functional medicines such as herbal remedies, and people are reducing the burden of using natural products.

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1.3 Present study protocol to meet demand:

This research plan can be designed as:

- a) More active herbal products.
- b) Discover valuable herbal active compounds.
- c) Use this technology to prepare more effective products.
- d) Look for more antibacterial and anti-inflammatory ingredients.
- e) Use these formulations to find out the exact activity on human skin.
- f) Further discover more valuable ingredients based on herbal formulas.
- g) Research to obtain better formulas to heal human skin naturally.
- h) More clinical trials to study the further processing of these preparations.
- i) Use more herbs as traditional medicine in the last used population.
- j) To meet all natural needs, please find more accurate results in these preparations

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CHAPTER:TWO

METHODOLOGY

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

Methodology

Materials:

2.1 Experimental section of collection materials:

All chemicals and reagents used are from the Advanced Research Analysis Laboratory of the Daffodil International University Pharmacy. All the ingredients and all experimental instruments used belongs to Daffodil International University Pharmacy Advanced Research Laboratory. Some material diagrams are shown below:

Analytical balance	Funnel	Weight scale
Beaker	Spatula	Measuring cylinder
Filter paper	Burette holder	Bowl-shaped container,
Aluminium foil	Bunsen burner	Mortar & pestle



Analytical Balance

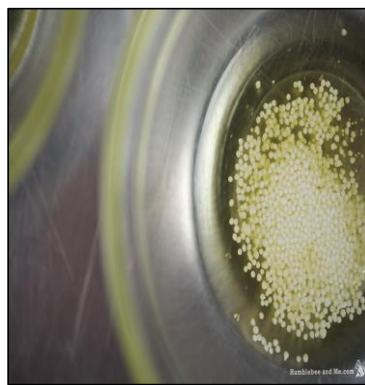


Burette holder

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity



Chemical Reagent



Chemical Reagent

2.2. Collection of plant materials:

The main active plant ingredients *Caulerpa racemosa* which is collected from the same source. These are the most common Bangladeshi seaweed grows both in salinity water and fresh water.



Caulerpa racemosa



Caulerpa racemosa

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

2.3 Accumulations of formulation materials:

Olive oil	Methyl paraben	Beeswax
Glycerin	Propyl paraben	Sesame oil
Cetyl alcohol	Trimethyl amine	Carnauba oil
Stearic acid	Potassium hydroxide	Borax
Jasmine flavor		

all materials were collected from cosmetology lab of Daffodil International University.

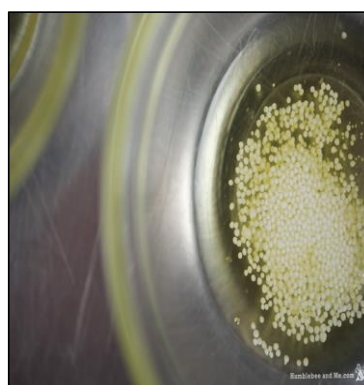


Figure 2.4: Using formulation materials on laboratory

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

Methods:

All methods & preparations of all products serially given down:

2.4. Preparation of Blend extract of seaweed *Caulerpa racemosa*:

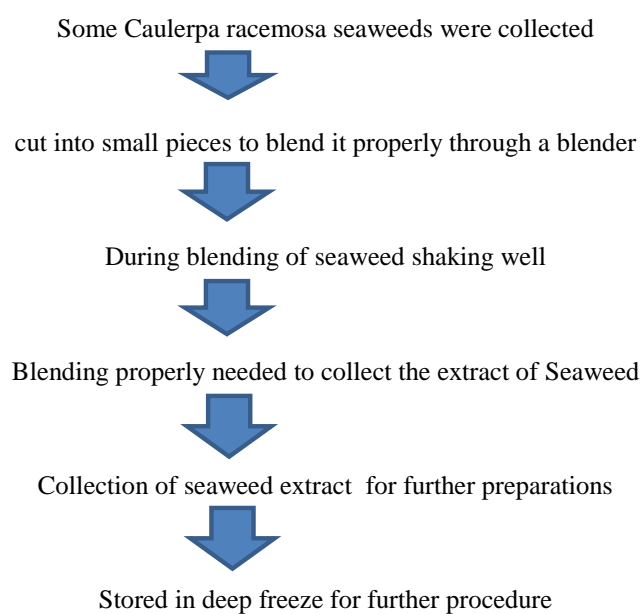


Figure: Flow chart of Seaweed extract collection

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity



Before blending



After blending

2.5. Method of filtration of seaweed *Caulerpa racemosa*:

Upon next day of freezing *Caulerpa racemosa* blended paste were filtered through a filter media by burette stand and funnels with cotton.



After filtration *Caulerpa racemosa* was ready for formulation as water phase of emulsion



extract was stores then in a normal temperature in a freeze with a protective way. After several times of filtration this extract were ready for further procedure..

Figure: Flow chart of extract filtration

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“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**



Filtration Process



Filtrate

2.7. Preparation of Seaweed “ *Caulerpa racemosa*” herbal cream :

Formulations of seaweed *Caulerpa racemosa* containing herbal products are the newest efficacy procedure on herbal preparations for the first time. Seaweed like *Caulerpa racemosa* which is a abundant plant well known as sea grapes those are the very well-known by the people over the world. So this concept will make people mind healthier and bring more consciousness on this innovative formulations on uses on their skin.

Formulations	Ingredients	Amount (%)
1. For 100 gm seaweed cream (O/W)	Seaweed extract	42 gm
	Olive oil	20 gm
	Glycerol	20 gm
	Cetyl alcohol	4 gm

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	Stearic acid	12 gm
	KOH	0.5 gm
	Methyl paraben	Q.S
	Propyl Paraben	Q.S
	Color	Q.S
	Flavor	Q.S
2. For 100 gm seaweed cream (W/O)		
	Seaweed extract	40 gm
	Olive oil	20 gm
	Glycerol	25 gm
	Cetyl alcohol	4 gm
	Stearic acid	12 gm
	KOH	0.5 gm
	Methyl paraben	Q.S
	Propyl Paraben	Q.S
	Color	Q.S
	Flavor	Q.S

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
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Formulations	Ingredients	Amount (%)
3.For 100 gm seaweed cream (Water phase & Oil phase amount is equal)	Seaweed extract	40 gm
	Triethanol amine	0.5 gm
	Beeswax	12 gm
	Borax	0.7 gm
	Castor oil	20 gm
	Seasame oil	20 gm
	Methyl Paraben	Q.S
	Propyl Paraben	Q.S
	Color	Q.S
	Flavor	Q.S

2.8. Preparation of emulsions phase:

Phases of the basic emulsions are two types. Type one oil in water & water in oil. In this preparations water in oil phase of emulsion base are selected.



Water phase



Oil phase

Fig.2.7: Phases of emulsion of all preparation

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

2.9. Procedure of all formulations:

Formulation no 1 as follows the o/w emulsion type with the active ingredients of *Caulerpa racemosa* and all other ingredients such as olive oil , glycerol ,cetyl alcohol, Steric acid and preservatives. All the formulations must be follow the basic criteria of an emulsion type. Basically all preparations ingredients must be changed in different section of formulations because of better purposes of further formulations preparations. The oil phase and the water phase simultaneously mixing well in laboratory preparations to formulate these formulations.

The oil soluble ingredients were mixed and heated to 70 degree Celsius in a beaker.



This makes the oily phase



The extract were used as a water phase



Then Oily phase is transferred to aqueous phase in small portions with continuous stirring to make a homogenous emulsion



Once the transfer is completed, it is allowed to come at room temperature all the while being stirred.



Perfume is added just before the finished product is transferred to suitable container

Figure: Flow chart of formulation preparation

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Formula no. 1 (O/W seaweed cream)

Formulation no 1 as replaceable form of basic formulation no 1 for the same way but in a different ingredients and also follows the basic rule of emulsion base type. Then all active ingredients were added to the preparations and finally done the formulation to see the difference and performance from other formulations.

Formulation no 2 is a modified form of the basic preparation of formula no 1. But it is a W/O type cream preparation. Then again prepare the same and ordinarily followed the emulsion rules to see the performance from others.



Formula no. 2 (W/O seaweed cream)

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- ✚ Formulation no 3 is also modified for the better performance of this herbal formulation product. In this formulation water phase & oil phase amount is equal. But the formulation ingredients were changed. Mainly the oil phase ingredients were changed to see any difference.



**Formula no.3 seaweed cream
(Water phase 50%, Oil phase 50%)**

All preparations follows at a fixed temperature during formulate each herbal products. So, all the preparations were performed carefully. At last of the preparations ,food graded colouring agent was added to get better aesthetic property. These formulations must be modified by further better activity on different kind of sector to be used as herbal active cosmetics depending upon market demands of people.

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

2.10. Data Analysis:

2.10.1. Adsorbent analysis of all preparations of herbal products:

The test of these preparations were determined to get adsorbent capacity of all preparations. This test was designed to get better performance on skin adsorption against dryness or other medicated purposes. Firstly, on a filter paper all preparations were markedly distributed and then another filter papers were cut into pieces. After all four strips like filter papers were cohering onto the formulations filter paper. Shown below on (Fig.2.14)

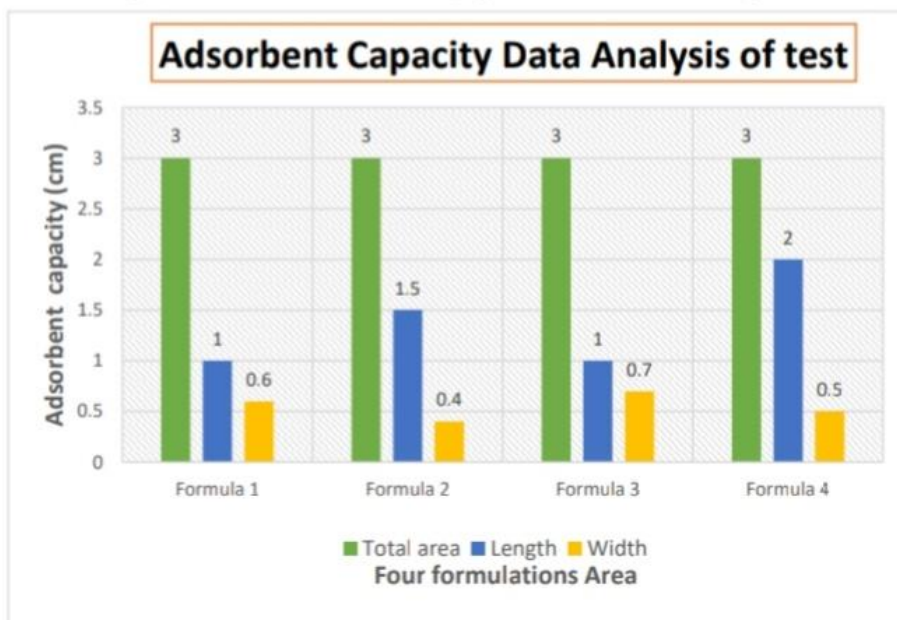


Fig.2.14: Adsorbent capacity analysis with all data.

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

2.10.3. pH-scale analysis of all preparations:

All know human skin pH-value as 4.5-6 above. On this test of newer some formulations can also shows analytical data on pH-value. Any skin formulations which affects skin that doesn't usable or not marketed anymore. The pH-value mostly on herbal skin preparations for its bioactivity on skin. The pH-value changes then skin can be changes or side effects also can shows some defects on products. This kind of test must be performed to avoid any kind of skin affects. Skin in the largest organ of the body & skin sensitivity is most important to focus on any kind of applying any products. So the reason of this test for the better effectiveness on human skin. Given all pH-value data of figures on this test of all preparations.



Formulation 1

Formulation 2



Formulation 3

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All the preparations shows tentative results upon pH-strips value was nearly 6 which match with skin pH-value.

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CHAPTER:THREE

RESULTS & DISCUSSION

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

3.1. Results & Discussion:

This study aimed to identify functional cosmetics available from natural herbal sources. The entire valuable work has been promoted in all experiments, and all data analysis has been clearly identified and can be successfully completed in a fixed time, centrally and as a technical method. The purpose of this study was mainly focused on medicinal herbal cosmetics without any side effects. The seaweed *Caulerpa racemosa* have sufficient melanin inducing , antioxidant & antibacterial and antifungal effects, and the most important role is to provide the body with more antioxidants. The great way for these plants is to make 3 types of formulations as unique methods for emulsion bases. Review all data analysis, and most importantly complete mouse tail edema studies to understand further and future innovative formulations of these products.

All these herbal-derived preparations provide sufficient value for these ongoing studies. We hope that these most wanted precious herbal products will get the best regards.

3.1.1 Study on all preparations:

This research aims to meet people's needs and change the market by transforming herbs into functional active cosmetics by relying on synthetic cosmetics. First, avoid formulas that use the basic concept of emulsion type (o / w) (see Table 2.1) because it is more oily to the skin, and there are also some modifications to the regular formula for better handling. Because seaweed *Caulerpa racemosa* contains more bioactive compounds, these formulas can change the skin and change the most needed and demanding drying standards. When a formula can retain skin inflammation, dry skin, and other serious skin problems, these innovative formulas will directly affect the human body on the skin, thus acting on the innovative formula. Bioactive formulations are needed to make the changes naturally eliminate skin problems.

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

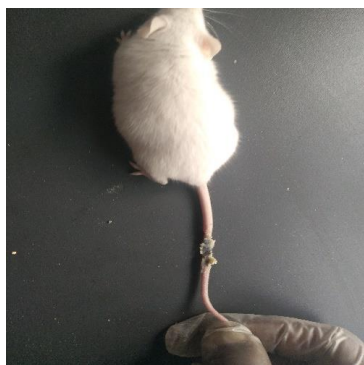
3.1.2 Mice skin response upon using all formulations:

Significant analysis of common herbaceous plants to make better formulas to be used as herbal or functional dairy herbs. Their significance Herbal preparations were changed in cosmetic herbs. Above the formulations, the mouse tail appears as a positive control like infection skin test. Medicated medications such as formulations were a great demand for functional effects rich day by day these innovative formulation studies provide good results mice tail inflammation accurately. The formulas show an anti-inflammatory effect mice tail. As follows:

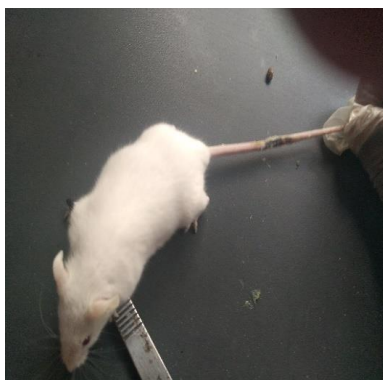
❖ Formulation 1:



Control (day 1)



Applied (day 1)



Control (day 3)
©Daffodil International University



Applied (day 3)

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
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❖

❖ **Formulation 2 :**



Control (day 1)



Applied (day 1)



Control (day 3)



Applied (day 3)

❖ **Formulation 3 :**



ity



**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**

Control (day 1)



Applied (day 1)



Control (day 3)

Applied (day 1)

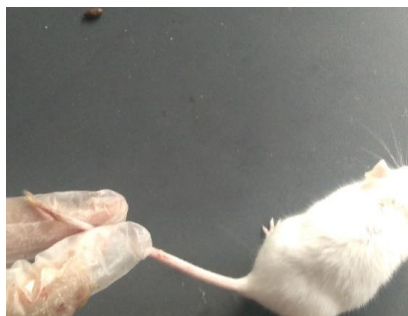
3.1.3. Mice skin response upon using formulation 2: (Astringent / blood clotting effect) :



Mice tail was cut



Cream was applied immediately



Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

Observation: All the tested mice were given potentially effect on burn healing & and also in anti-inflammation. Here, According to Table 2.1 Preparations of all formulations methods would be apply on mice to get results as through biological skin test. All mice were completely alive and test will be continued for further clinical if anyone could try this innovative trial further for better results. Formulation no. 2 gives more positive result than all the 3 formulations. All the tested mice were given potentially effect on antibacterial and also in anti-inflammation. Here, According to Table 2.1 Preparations of all formulations methods would be apply on mice to get results as through biological skin test. All mice were completely alive and test will be continued for further clinical if anyone could try this innovative trial further for better results. According to Table no 2.1 all preparations of herbal formulas mice tail edema were given dramatically one by one:

3.1.2 Human skin response upon using all formulations (melanin inducing effect on burn skin):

Seaweed which are neglected by common people in everyday life especially in Bangladesh. Not more people know about the herbal activity of it on one’s skin as a bioactive medicated treatment. *Caulerpa racemosa* rich with many active ingredients, vitamins and minerals and also phytochemicals those have action on skin problems. Most common herbaceous plant active in different site through the world as fertilizer most commonly, so on. Naturally *Caulerpa racemosa* seaweed is used on various ways on skin But Uncertainty people know about that these formulations could be more accurately results on skin defects or problems. That’s the reason to do something new as innovative way of formulation upon these common

Herbaceous plant known to people as well as all. Natural way of treatment were take time as much as people uses them. But commercially herbal products were more active to treat a diseases. These were formulated for the first time in herbal or as a functional cosmetics related. So further study could give better way to do some more active works on herbal products.

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
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❖ **Formulation 1:**



Before



After a month

❖ **Formulation 2:**



Before



**Every pictures shows the skin reflectiveness upon using this formulations of herbal active
produ**

Formula no 2 gives positive melanin inducing effect on burn human skin. This study Also collect information on the irritation, itching like symptoms also not exists on these formulations known by this people model of these formulations. So on this winter season this formulation base may be the

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**

best for results for reduce dryness of skin especially formula 2 all above modification of herbal preparations of products.

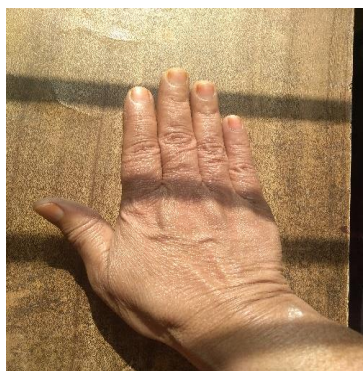
Nowadays the popularity of herbal medicine is increasing day by day. if we do something exceptional work by using most common and cheapest herbal plants to do something newer than ever using on various purpose upon study on it as an effective way people can uses much better products on their skin without any fears. Over millions herbals products were found to be perfect for using on skin but some are bioactive to give results perfectly and take place on people minds. More valuable products give more valuable markets upon best using on herbal bioactive products like many other brands products but commercially active at less cost and more available products can also actively work on people skin thoroughly each day work and also functionally active. So target on people skin these formulations definitely upon activity can further changes on markets of herbal products.

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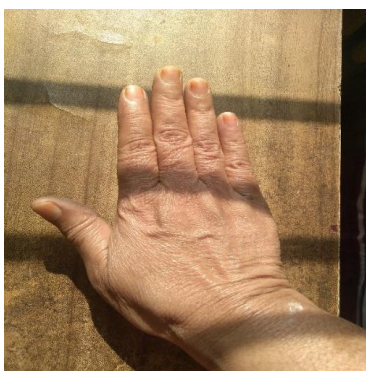
(Formulation2):



Control (day 1)



Applied (day 1)



Control 15 day



Applied 15 day

CHAPTER:FOUR

CONCLUSION

Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed “*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity

Conclusion:

Because of the reduction in the use of synthetic or chemically active cosmetics and the reduction of popular products that have no effect on the skin, for the first time a more conscious study of the increased use of available herbal plants in these herbal bioactive compounds (such as these products)). With these herbal active products, there is no other research in the field. Therefore, in this study, the biological activity and human skin measurement results are further perfectly displayed, and the problems related to human skin of these preparations can get better thinking than people. According to the formula research of this project, Formula 1 may have potential anti-oxidant and anti-inflammatory activities at the same time, as the active ingredients of seaweed *Caulerpa racemosa* can both be considered effective in burn healing on mice tail, antimicrobial and also gives astringent effect on research. Then, formula 2 was modified into a formula that gives more positive result quickly and was perfectly mixed with human skin reactivity because there was more oil phase than water phase. We know that our body has phospholipid bylayer. W/O seaweed cream penetrates really well and retain on the burn surface for a prolonged period of time.. After the formula 3 is modified by using the equal amount of both water and oil phase & the formulation ingredients was also changed. it also has anti-inflammatory and antioxidative properties, and shows a proper effect when the mice tail, and has potential effects.

CHAPTER: FIVE

REFERENCE

**Preparation of Functional Cosmetics Containing Common Bangladeshi Seaweed
“*Caulerpa racemosa*” for Melanin Inducing & Antioxidant Activity**

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