

**DETERMINING THE ANTHOCYANIN CONTENT  
AND DEVELOPING  
A CONCENTRATED FACE EMULSION  
UTILIZING PULP AND PEEL EXTRACT  
FROM *SYZYGIUM CUMINI* (L.)**

Nustha Kitprathaung  
Jirapa Pimpama  
Nophadon Luangpirom  
Veena Chantarasompoch  
Mukda Tosaeng  
Kanokporn Khemataechit

**1<sup>st</sup> International Conference on Multidisciplinary Research (ICMR2024)**



**16 May 2024 | Shinawatra University, Thailand**

# What is the problem?



People have been interested in reducing aging from prehistoric times to the present. This is a result of the aging process of human skin. The conditions that lead to wrinkles are signs of skin degeneration, which occurs as we age due to internal mechanisms known as intrinsic skin aging. Skin cells lose their ability to function as other systems do, which throws off the delicate equilibrium between skin cell development and breakdown. Then, the skin starts to degrade and wrinkles appear.



The tropical fruit lukwa (*Syzygium cumini* (L.) Skeels. found from Africa to Southeast Asia. The fruit of *Syzygium cumini* (L.) is high in phenolic compounds, vitamin C, and anthocyanins. Vitamin C is categorized as a biologically active molecule that aids in the fight against free radicals. Furthermore, studies on *Syzygium cumini* (L.) fruit have shown that it possesses an interesting anthocyanin content. The fruit *Syzygium cumini* (L.) has antioxidant qualities that the researcher is interested in investigating

## Conclusion

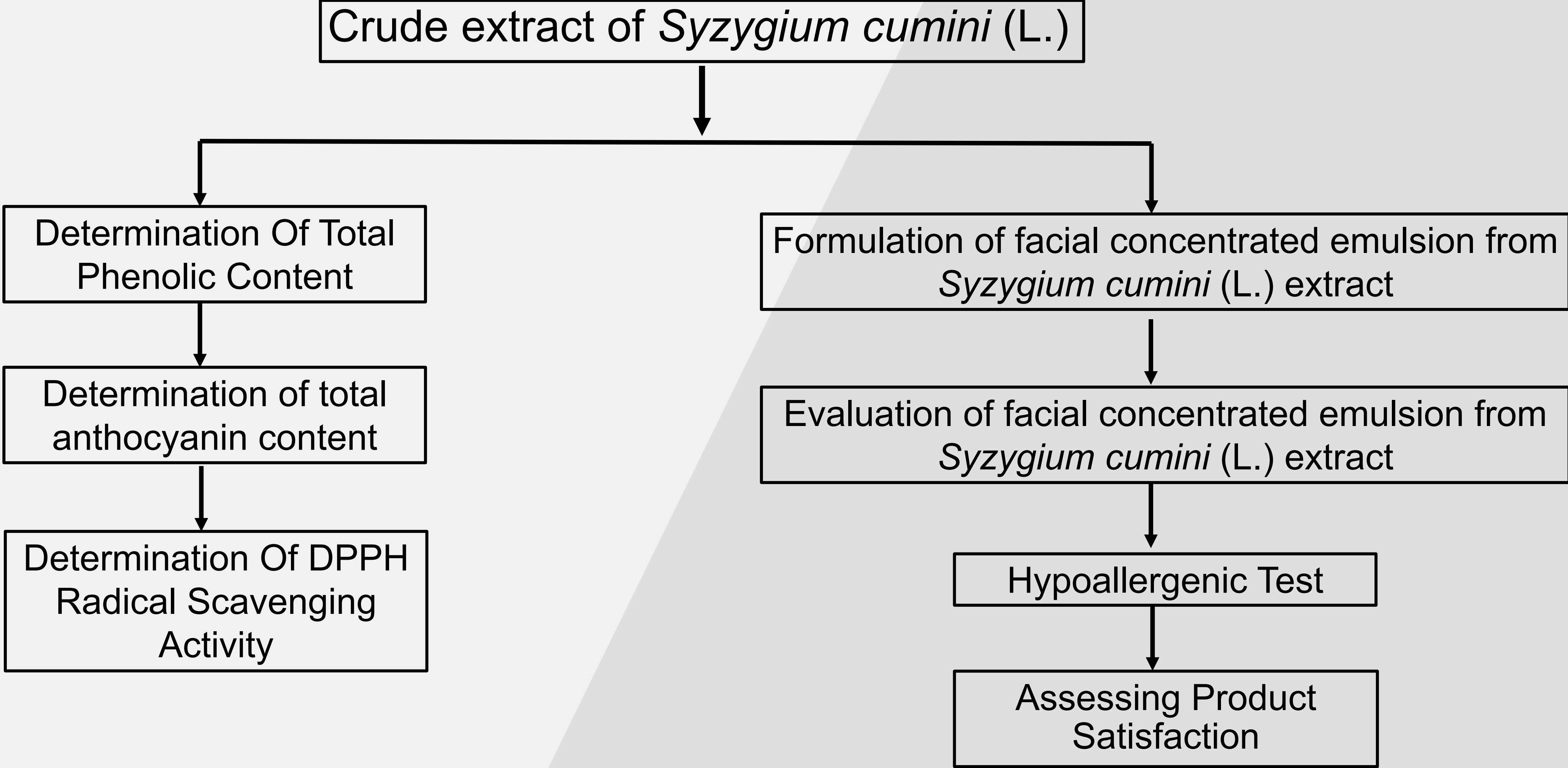
The researcher wants to find out the amount of anthocyanin is in the extract and then develop a concentrated emulsion product formulation that uses the extract to nourish the skin on the face.

# The aims of the study:

- To study the anthocyanin content in *Syzygium cumini* (L.) extract by using pH Differential Method
- To study the antioxidant capacity of *Syzygium cumini* (L.) extract
- To study and Develop a formulation of concentrated emulsion for facial care from flesh and bark extracts and 4) to test the efficacy and satisfaction of the concentrated emulsion from *Syzygium cumini* (L.) extract.



# Our Solution



# Our Solution



## Preparation Of Plant Extracts

Fresh *Syzygium cumini* (L.) obtained from Ban Khlong Yee-Poon, Bang Len Subdistrict, Lat Bua Pak Tha District. Nakhon Pathom Province, Thailand. Separate the seeds and the pulp and peel. Use only the pulp and peel, then chop them finely and then was macerated in 0.1 % hydrochloric acid in ethanol for 24 hours then filtered through Whatman® No.4 paper. The supernatant was evaporated under rotary evaporator. The extracts were kept at 4°C until used.



## Determination of total anthocyanin content

A pH-differential method was adopted for total anthocyanin content determination. Briefly, the extracts were weighed and dissolved in distilled water; 1 mL of the sample was mixed with 9 mL of potassium chloride (pH = 1.0) and 9 mL of sodium acetate (pH = 4.5), then incubated with aluminum foil wrapping for 20 min at room temperature. Then, the absorbance of the mixtures was measured at 320 and 700 nm. The total anthocyanin content, expressed as milligram cyanidin-3-glucoside equivalents per liter, was calculated as follows



# Our Solution



## Determination Of Total Phenolic Content

The total phenolic content was determined by the Folin-Ciocalteu method. The extracts were dissolved in methanol at various concentrations (0.1- 5.0 mg/ml), then the extract solution (0.5 ml) was mixed with the Folin-Ciocalteu reagent (0.25 ml) and 20% sodium carbonate (1.25 ml). After mixing and standing at room temperature for 30 min, the absorbance was measured at 765 nm. The total phenolic content was expressed as mg gallic acid equivalent/g dried extract.



## Determination of DPPH radical scavenging activity.

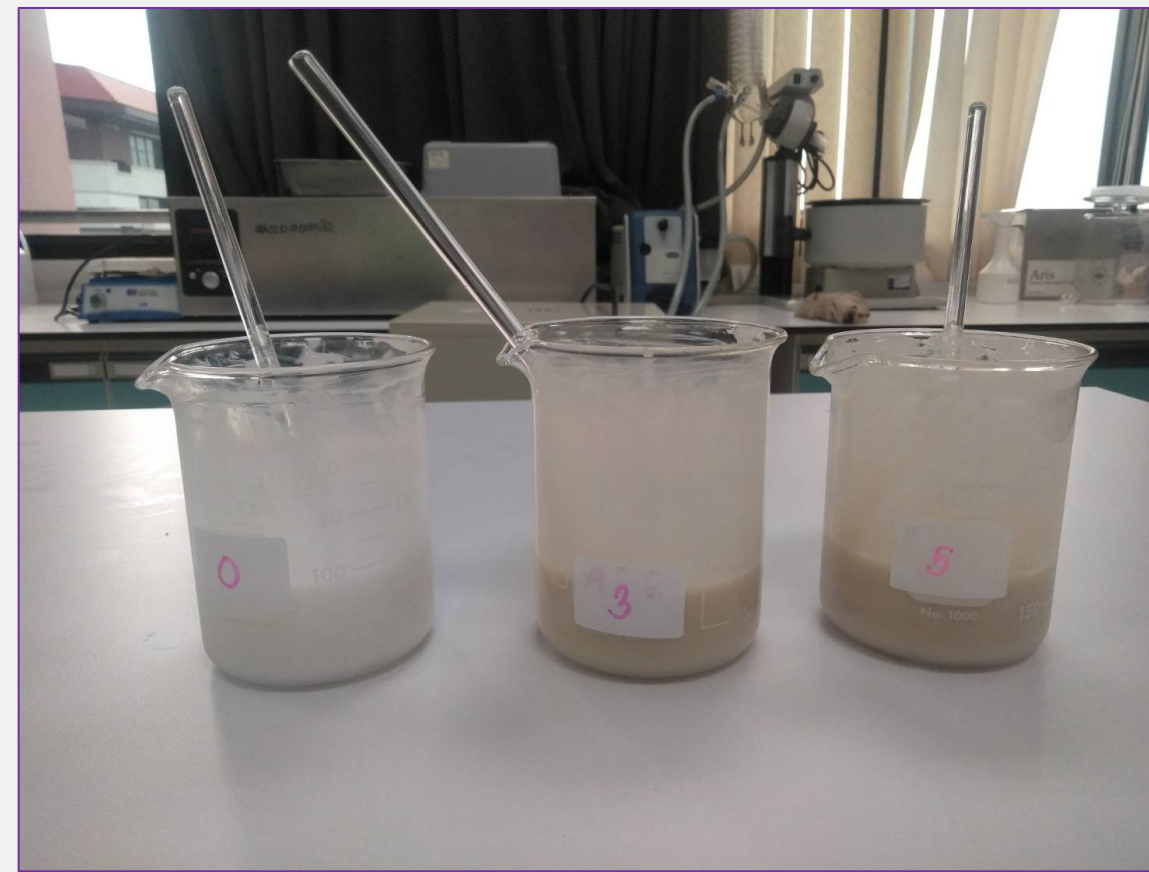
The free radical scavenging activity was determined by the method. The extract was dissolved in methanol at various concentrations (0.1-5 mg/ml), then 2.8 ml of each extract solution was mixed with 0.2 ml of DPPH solution (1 mM in methanol). After incubation at room temperature for 30 min, the absorbance was measured at 517 nm. The negative (methanol) and positive (vitamin C) controls were run in parallel.



# Our Solution



Formulation of facial concentrated emulsion from *Syzygium cumini* (L.) extract



## Hypoallergenic Test

The formula that is stable and has good antioxidation test for allergies in the arm area of 15 subjects by Closed Patch Test method. Sheet 1 contains controlled substances (saline), and another sheet is a serum formulation used. Test sample on the inner upper arm for 24 hours. After 24 hours, remove the patch and notice if irritation occurs and record the results.



# Our Solution



## **Assessing Product Satisfaction**

A total of 15 volunteers were selected for the age of 35-55. All volunteers were given samples. The 1st bottle was a controlled bottle without extract and the 2<sup>nd</sup>, 3<sup>rd</sup> bottle contains a formula extract. The volunteers use it for 2 weeks and then observe the changes. After that, a satisfaction questionnaire was obtained from using the serum containing *Syzygium cumini* (L.) extract.



## **Evaluation of facial concentrated emulsion from *Syzygium cumini* (L.) extract**

The product's stability test at room temperature, 4 °C, 50 °C and Heat-Cool Cycle.

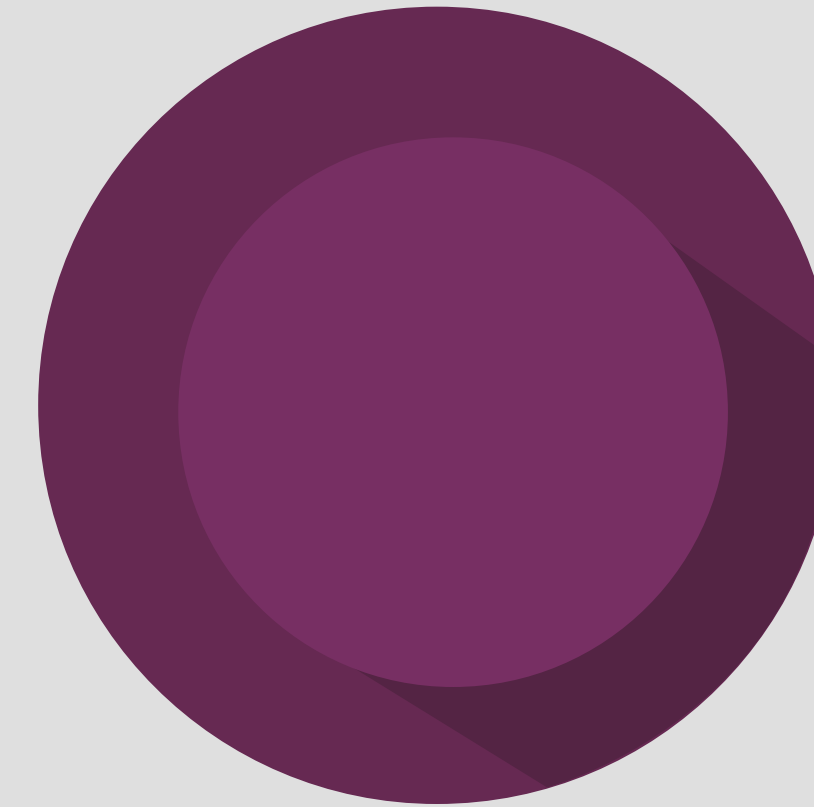


# Conclusions and Recommendations



## Determination of total anthocyanin content

By comparing the pH 1 KCl-HCl buffer solution with the pH 4.5 acetate buffer solution, the experiment results have been examined to determine the amount of anthocyanin by the pH Differential method. It was determined that the *Syzygium cumini* (L.) fruit extract contained 150.54 mg/L of malvidin-3,5-diglucoside and 167.44 mg/L of pelargonidin-3-glucoside anthocyanin.



## Determination Of DPPH Radical Scavenging Activity

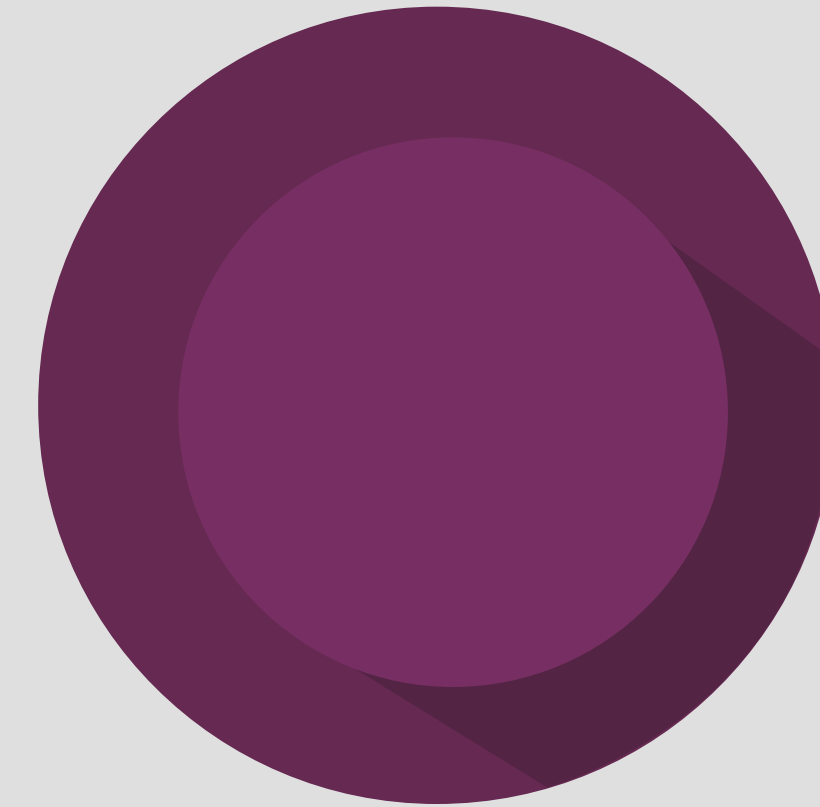
According to an experiment comparing the antioxidant activity of standard compounds containing vitamin E, it was found that pulp and fruit peel extracts had an effective antioxidant activity with an  $IC_{50}$  value of  $1.204 \pm 0.629 \mu\text{g/mL}$ . The  $IC_{50}$  value of vitamin E is  $66.35 \pm 1.97 \mu\text{g/mL}$ . Compared to vitamin E, it has a 55-fold higher antioxidant potency. The fruit extract has a total phenolic value of  $7.35 \mu\text{g/mL}$  in relation to the gallic acid standard.

# Conclusions and Recommendations



## **Determination Of DPPH Radical Scavenging Activity**

According to an experiment comparing the antioxidant activity of standard compounds containing vitamin E, it was found that pulp and fruit peel extracts had an effective antioxidant activity with an  $IC_{50}$  value of  $1.204 \pm 0.629 \mu\text{g/mL}$ . The  $IC_{50}$  value of vitamin E is  $66.35 \pm 1.97 \mu\text{g/mL}$ . Compared to vitamin E, it has a 55-fold higher antioxidant potency. The fruit extract has a total phenolic value of  $7.35 \mu\text{g/mL}$  in relation to the gallic acid standard.



## **Evaluation of facial concentrated emulsion from *Syzygium cumini* (L.) extract**

From evaluating the product's stability at room temperature,  $4 \text{ }^{\circ}\text{C}$ ,  $50 \text{ }^{\circ}\text{C}$  and Heat-Cool Cycle. It was found that the three formula products had the same pH level and a thick liquid consistency without any layer separation. Both the color and scent are the same.

# Conclusions and Recommendations



Three formulations were developed from the investigation and development of concentrated emulsion solutions for facial skin care using *Syzygium cumini* (L.) fruit extract: one with a controlled formula that included no additional extracts, Formula 1 with 3% *Syzygium cumini* (L.) fruit extract, and Formula 2 with 6% *Syzygium cumini* (L.) fruit extract.

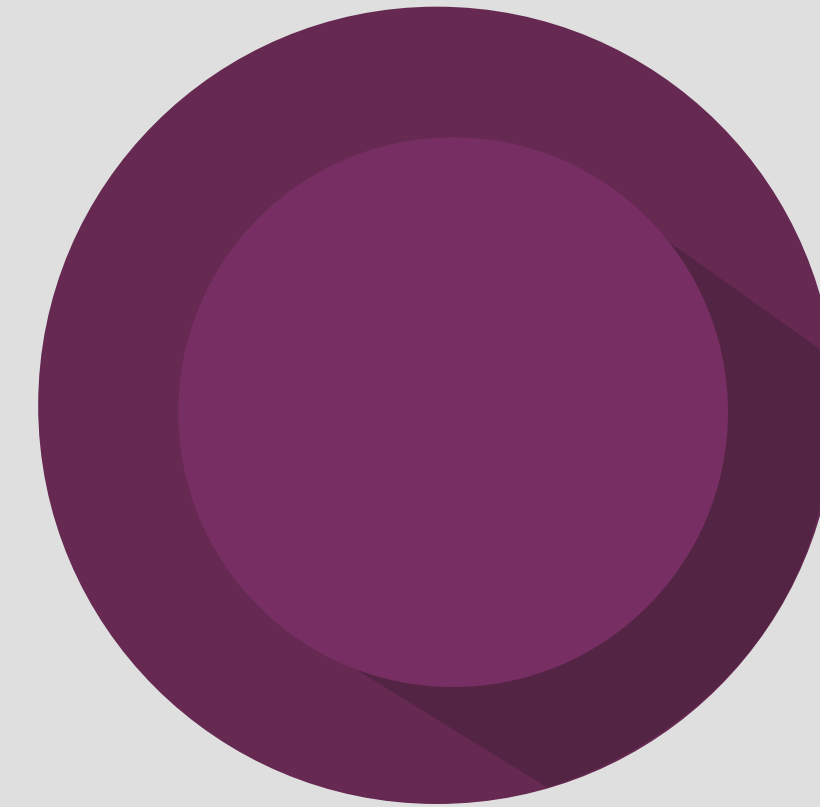
These are the outcomes: Control group concentrated emulsion product for nourishing facial skin, with a pH of 6, thick, white liquid texture, and mild scent. pH-valued concentrated emulsion product for nourishing face skin: Formula 1. has a viscous, thick feel and is equal to 6. The second concentrated face emulsion solution has a thick liquid texture, a pH of 6, and a mild smell. It is light yellow in color. It has a pale golden hue. The scent is mild.

# Conclusions and Recommendations



## **Hypoallergenic Test**

From the close patch test of 15 volunteers for 24 hours by covering the plaster sheet with all formulas in the upper arm area, it was found that after removing the test sheet, no irritation occurred. Redness and swelling in volunteers.



## **Assessing Product Satisfaction**

From the close patch test of 15 volunteers for 24 hours by covering the plaster sheet with all formulas in the upper arm area, it was found that after removing the test sheet, no irritation occurred. Redness and swelling in volunteers.

# Conclusions and Recommendations

This study established that concentrated emulsion face skin care products made from *Syzygium cumini* (L.) fruit extract addition to having the potential to develop into an industrial-scale cosmetic, the item that is manufactured could serve as a model for future cosmetics that incorporate *Syzygium cumini* (L.) fruit extract.

# Further study

The reason for this is because the fruit's extract, which includes anthocyanin, may be used to skin and hair care products, particularly sun protection ones.

# Contact



**Nustha Ktpathaung**

+ 66 8 1803 2703



Nustha.ki@ssru.ac.th