

# CHAPTER I

## INTRODUCTION

### 1.1 Background

In the 5.0 revolution based on the latest annual air quality guidelines of the World Health Organization (WHO), Indonesia is ranked 17th in 2021 to have the highest pollution and free radicals in the world. Electrons that do not have a partner so they wander round looking for a partner that is nearby and this bond has an undesirable reaction, namely free radicals.<sup>1</sup> Free radicals can be caused by 2 factors, namely factors from within the body and outside the body. Factors from within the body are the metabolism of the human body while factors from outside the body are food preservatives, air or environmental pollution, and others.<sup>2</sup> Excessive free radicals will cause damage to the skin membrane (aging), skin cancer and others. High antioxidants are needed to rejuvenate the skin.<sup>3</sup>

Vitamin C and flavonols belong to the flavonoid group which are natural metabolites found in antioxidant compounds.<sup>4</sup> Electron compounds that can bind to free radical compounds and inhibit their oxidation reactions (antioxidants), so they can also inhibit damage to cells.<sup>5</sup> Antioxidant compounds can be an option to prevent premature aging by rejuvenating the skin, as well as a protector against reactive oxygen, oxidative stress and protecting against UV rays.<sup>6</sup> Nature provides

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<sup>1</sup>Yus, Octaviany, and Simanjuntak, "Effectiveness Test of Apple Peel Extract (*Malus Sylvestris*-Mill) Var. Rome Beauty on Sgpt Enzyme Levels of Ccl4 (Carbon Tetra Chloride) Induced Wistar Rats (*Rattus Norvegicus*)."

<sup>2</sup> Taofik Rusdiana, "Formulation and Stability of Serum Preparation from Green Coffee Extract (*Coffea Canephora* Var. *Robusta*) as an Antioxidant."

<sup>3</sup> Cahya and Fitri, "Formulation and Antioxidant Test of Black Cumin Oil-Based Facial Serum (*Nigella Sativa* L.) Using the Dpph Method."

<sup>4</sup>Annisa Harni Lestari, "Formulation and Antioxidant Activity Test of Cosmetic Serum Combination of Ethanol Extract of Gaharu Leaf (*Aquilaria Malaccensis* Lam.) and Candlenut Seed Oil (*Aleurites Moluccanus* (L.) Willd) with Dpph Method."

<sup>5</sup> Ariyanti, Handayani, and Yanto, "Formulation of Antioxidant Serum from Tomato Juice Extract (*Solanum Lycopersicum* L.) and Cinnamon Extract (*Cinnamomum Burmannii*) as Skin Care."

<sup>6</sup> Cahya and Fitri, "Formulation and Antioxidant Test of Black Cumin Oil-Based Facial Serum (*Nigella Sativa* L.) Using the Dpph Method."

humans with something natural, one of which is fruits. Peaches are one of the many fruit species that have high antioxidant content and are rich in vitamins.<sup>7</sup>

The fruit, which originated in Persia (Iran) at this time, has been cultivated and recognized by the Chinese state and is excellent among all countries to the European and American parts of the world.<sup>8</sup> The metabolic compounds contained in peaches are flavonoid compounds as superior compounds contained in them.<sup>9</sup> High antioxidant compound with 0.9% content<sup>10</sup> in the fruit makes this peach one of the signs of Allah's greatness in which there are favors that can be utilized by humans as a facial serum. Explained in His word in surah An-Nahl [16]: 11 which reads:

يُنْبِتْ لَكُمْ بِهِ الزَّرْعَ وَالزَّيْتُونَ وَالنَّخِيلَ وَالْأَعْنَبَ وَمِنْ كُلِّ الثَّمَرَاتِ إِنَّ فِي ذَلِكَ لَآيَةً لِّقَوْمٍ يَتَفَكَّرُونَ

*“With it (rainwater) He grows for you crops, olives, dates, grapes and all kinds of fruits. Indeed, in such is a sign (of Allah's greatness) for those who think.”*

Skincare products that help the absorption process further and contain more moisturizers and active substances are called serums. Serum is a preparation with a high concentration of active substances and a low viscosity, which can conduct the active substances through the skin surface by forming a thin film of active substances on the skin surface.<sup>11</sup> A topical preparation that is quickly absorbed into the skin so that it can protect the skin is needed to overcome cell damage due to free radicals, so antioxidants from natural ingredients such as fruits that have high are needed.

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<sup>7</sup> “Prunus Persica (L.) Batsch (Rosaceae),” In Indonesia Horticultural Innovation, Technology And Science Genetic Resources Of Potential Subtropical Fruit Crops, 1st Print, December 2019 (IPB Printing Press, Bogor - Indonesia, T.T.).

<sup>8</sup> “Prunus Persica (L.) Batsch (Rosaceae),” Dalam *Indonesia Horticultural Innovation, Technology And Science Sumber Daya Genetik Tanaman Buah Subtropika Potensial*, Cetakan 1, Desember 2019 (Percetakan IPB, Bogor - Indonesia, T.T.).

<sup>9</sup> Juciano Gasparotto Daniel Pens Gelain, “Effects of different products of peach (Prunus persica L. Batsch) from a variety developed in southern Brazil on oxidative stress and inflammatory parameters in vitro and ex vivo,” ©2014 JCBN, t.t.

<sup>10</sup> Abderrahmane Mokrani dan Khodir Madani, “Effect of Solvent, Time and Temperature on the Extraction of Phenolic Compounds and Antioxidant Capacity of Peach (Prunus Persica L.) Fruit,” *Separation and Purification Technology* 162 (April 2016): 68–76.

<sup>11</sup> Taofik Rusdiana, “Formulation and Stability of Serum Preparation from Green Coffee Extract (Coffea Canephora Var. Robusta) as Antioxidant.”

Safety considerations for serum preparations, with the selection of natural ingredients as a source of antioxidants are also due to the use of natural ingredients in topical preparations classified as the right choice and affordable, and obtained from renewable sources. This serum preparation is included in the cosmetic category.<sup>12</sup> According to the regulation of the minister of health of the Republic of Indonesia No. 220 / Menkes / Per / X / 1976 on September 6, 1976 cosmetics are materials or mixtures of materials to be rubbed, placed, poured, sprinkled, or sprayed on parts of the body, inserted into the skin, used by the body or parts of the human body to clean, maintain, increase attractiveness or change appearance.

Based on the explanation above, researchers are interested in making a facial serum formula with peach and testing the antioxidant activity. This research is the latest research and no researcher has examined this research before.

### **1.2 Problem Statement**

Based on the above background, the problem formulation in the study can be made, as follows:

1. What are the physical quality characteristics of peach extract facial serum preparation?
2. What is the antioxidant effectiveness of peach extract facial serum preparation?

### **1.3 Research Objectives**

Based on the problem formulation above, the following research objectives can be obtained:

1. Knowing the physical quality characteristics of peach extract facial serum preparation
2. To determine the antioxidant effectiveness of peach extract face serum preparation.

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<sup>12</sup> Farhamzah Dan Aeni Indrayati, "Formulasi, Uji Stabilitas Fisik Dan Kompatibilitas Produk Kosmetik Anti-Aging Dalam Sediaan Serum Pudding."

## 1.4 Benefits of Research

### 1.4.1 Theoretical Benefits

The results of this research can be used as:

- a. New literature and insights into antioxidant activity in serum from peach fruit
- b. New literature and insights regarding serum formula with peach fruit

### 1.4.2 Practical Benefits

The results of this research are expected to produce:

- a. Cosmetic product, i.e. facial serum with peach as antioxidant
- b. Increasing the useful value of peaches.

## 1.5 Research Authenticity

**Table 1. Research Authenticity**

<b>Title of Research</b>	<b>Research Methods</b>	<b>Variable</b>	<b>Result</b>	<b>Research Differences</b>
Formulation and Stability of Serum Preparation from Green Coffee Extract (Coffea Canephora Var. Robusta) as Antioxidant <sup>13</sup>	Experimental	<b>Independent:</b> Green Coffee Extract (Coffea Canephora Var. Robusta) <b>Dependent:</b> effectiveness of antioxidants	The IC50 values of green coffee extract serum preparations (Coffea canephora var. Robusta) F1, F2, and F3 were 68.89 µg/ml, 64.33 µg/ml, and 55.33 µg/ml, respectively.	<b>Independent:</b> Variation of active substance

<sup>13</sup> Taofik Rusdiana, "Formulation and Stability of Serum Preparation from Green Coffee Extract (Coffea Canephora Var. Robusta) as Antioxidant."

<b>Title of Research</b>	<b>Research Methods</b>	<b>Variable</b>	<b>Result</b>	<b>Research Differences</b>
Formulation and Antioxidant Test of Black Cumin Oil-Based Facial Serum (Nigella Sativa L.) Using the Dpph Method <sup>14</sup>	Experimental (Antioxidant testing)	<b>Independent:</b> Black Cumin Oil (Nigella Sativa L.)  <b>Dependent:</b> Antioxidant activity test with DPPH method	black cumin formula sequentially has IC50 values of 2557.346 ppm, 1142.882 ppm, and 1844.923 ppm.	<b>Independent:</b> Variations of Peach Fruit Extract Facial Serum Formula
Formulation, Physical Stability and Compatibility Test of Anti-Aging Cosmetic Products in Serum Pudding Preparation <sup>15</sup>	Experimental	<b>Independent:</b> Serum Pudding Preparation  <b>Dependent:</b> Physical stability and product compatibility test	formulas that do not use perfume give good stability and compatibility results.	<b>Independent:</b> Facial serum preparation
Formulation of Antioxidant Serum Combination of Ceremai and	Experimental	<b>Independent:</b> Combination of Ceremai Fruit Extract and	the best IC50 value is 75.44 ppm. F1 serum contains 0.76 g EBC and 0.5 g EKBS while F2 is twice of F1	<b>Independent:</b> Variation of active substance

<sup>14</sup> Cahya and Fitri, "Formulation and Antioxidant Test of Black Cumin Oil-Based Facial Serum (Nigella Sativa L.) Using the Dpph Method."

<sup>15</sup> Farhamzah and Aeni Indrayati, "Formulation, Physical Stability and Compatibility Test of Anti-Aging Cosmetic Products in Serum Pudding Preparation."

<b>Title of Research</b>	<b>Research Methods</b>	<b>Variable</b>	<b>Result</b>	<b>Research Differences</b>
Watermelon Peel Extracts <sup>16</sup>		Watermelon Rind <b>Dependent:</b> Antioxidant activity test		
Antioxidant Serum Formulation from Tomato Juice Extract (Solanum Lycopersicum L.) and Cinnamon Extract (Cinnamomum Burmannii) as a Skin Care Product <sup>17</sup>	Experimental (Antioxidant testing)	<b>Independent:</b> Tomato Juice Extract (Solanum Lycopersicum L.) and Cinnamon Extract (Cinnamomum Burmannii) <b>Dependent:</b> Physical stability and favorability test	Organoleptic tests that have been carried out show changes on days 9 to 21. The pH stability results obtained from 3 serum samples showed the results in the 2nd week there was a change in pH in preparations stored at room temperature (15-30 ° C). Serum favorability test results for texture were 93.3% in formula 1. Color 97% in formula 1 and aroma 83.3% in formula 2.	<b>Independent:</b> Variations of physical stability and effectiveness tests



<sup>16</sup>Eneng Elda Ernawati, Yunahara Farida, and Shelly Taurhesia, "Formulation of Antioxidant Serum Combining Ceremai Fruit Extract and Watermelon Peel," *Pharmaceutics Magazine* 6, no. 5 (December 6, 2021).

<sup>17</sup> Ariyanti, Handayani, and Yanto, "Formulation of Antioxidant Serum from Tomato Juice Extract (Solanum Lycopersicum L.) and Cinnamon Extract (Cinnamomum Burmannii) as Skin Care."

Title of Research	Research Methods	Variable	Result	Research Differences
Effect of solvent, time and temperature on the extraction of phenolic compounds and antioxidant capacity of peach (Prunus persica L.) fruit <sup>18</sup>	Experimental (Antioxidant testing)	<p><b>Independent:</b></p> <p>Extraction of phenolic compounds and antioxidant capacity of peach (Prunus persica L.) fruit</p> <p><b>Dependent:</b></p> <p>solvent, time and temperature</p>	<p>The best extraction conditions were 33 60% acetone without acidification for 180 min at 25°C. Based on these optimized conditions, 34 highcontent of TPC, DPPH-RSA and FRP of peach extracts were obtained with values of 35 363 GAE/100g, 48% percentage of inhibition and 317 AAE/100g,</p>	<p><b>Independent:</b></p> <p>Pelarut dan kuantitas sampel</p>



<sup>18</sup> Mokrani dan Madani, “Effect of Solvent, Time and Temperature on the Extraction of Phenolic Compounds and Antioxidant Capacity of Peach (Prunus Persica L.) Fruit.”