

# CHAPTER I

## INTRODUCTION

### 1.1 The Background of the Study

Facial skin, the most exposed part of the body, is also the most susceptible to various problems<sup>1</sup>. Research suggests that Indonesian women experience a range of facial skin concerns, including pigmentation, uneven skin tone, and signs of aging such as decreased elasticity, fine lines, and wrinkles<sup>2</sup>.

Indonesia's rich biodiversity and favorable climate provide fertile ground for a diverse range of plant life, including the widely cultivated tea plant (*Camellia sinensis*)<sup>3</sup>. Notably, tea is rich in flavonoid compounds, particularly flavanols, known for their antioxidant properties<sup>4</sup>. Green tea boasts the highest antioxidant compound content capable of reducing free radicals and offering protection against oxidative damage<sup>5</sup>. This has led to the exploration of plant-based antioxidants in cosmetics.

Using beauty products or cosmetics has now become a lifestyle for many people.<sup>6</sup> Cosmetics are products used to care for skin health and increase skin appeal. Serum is one rapidly growing cosmetic.<sup>7</sup> Serum is a cosmetic preparation that contains active ingredients with high concentration and low viscosity that can

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<sup>1</sup> Shinta Dewi Kusumaningrum and Izzati Muhimmah, (2023) "Analisis Faktor dan Metode untuk Menentukan Tipe Kulit Wajah: Tinjauan Literatur," *Jurnal Teknologi Informasi dan Ilmu Komputer* 10, no. 4: 753–62, <https://doi.org/10.25126/jtiik.20241046955>.

<sup>2</sup> Yaping Du et al., (2022) "Facial Skin Characteristics and Concerns in Indonesia: A Cross-sectional Observational Study," *Skin Research and Technology* 28, no. 5: 719–28, <https://doi.org/10.1111/srt.13189>.

<sup>3</sup> Riza Ibnu Fajar, Luh Putu Wrsiati, and Lutfi Suhendra, (2018) "Kandungan Senyawa Flavonoid dan Aktivitas Antioksidan Ekstrak Teh Hijau pada Perlakuan Suhu Awal dan Lama Penyeduhan," *Jurnal Rekayasa Dan Manajemen Agroindustri* 6, no. 3: 196, <https://doi.org/10.24843/JRMA.2018.v06.i03.p02>.

<sup>4</sup> Nadya Khadijah Wibowo, Marcellino Rudyanto, and Djoko Agus Purwanto, (2022) "Aktivitas Antioksidan Teh Hijau dan Teh Hitam," *Camellia* 1, no. 2: 48–55.

<sup>5</sup> Evan Andesmora, Muhadiono Muhadiono, and Iwan Hilwan, (2017) "Ethnobotanical Study of Plants Used by People in Hiang Indigenous Forest Kerinci, Jambi," *Journal of Tropical Life Science* 7, no. 2: 95–101, <https://doi.org/10.11594/jtls.07.02.02>.

<sup>6</sup> Muhammad Hamka, Naila Alfatari, and Dhani Ratna Sari, (2022) "Analisis Sentimen Produk Kecantikan Jenis Serum Menggunakan Algoritma Naïve Bayes Classifier," *Jurnal Sistem Komputer dan Informatika (JSON)* 4, no. 1: 64, <https://doi.org/10.30865/json.v4i1.4740>.

<sup>7</sup> Yanni D Mardhiani et al., (2018) "Formulasi Dan Stabilitas Sediaan Serum Dari Ekstrak Kopi Hijau (*Coffea Canephora* Var. *Robusta*) Sebagai Antioksidan," *Indonesia Natural Research Pharmaceutical Journal* 2, no. 2.

deliver a thin film of high active ingredients so that it is absorbed more quickly by the skin, providing a more comfortable effect and is easier to spread on the skin's surface because its viscosity is not too high.<sup>8</sup>

Conducting physical quality tests on the preparation can ensure that serum quality remains in accordance with applicable standards and requirements<sup>9</sup>. One key factor influencing a serum's physical quality is the thickener<sup>10</sup>. The type and concentration of thickener significantly impacts the stability and overall effectiveness of the product.<sup>11</sup> Facial serums are typically emulsions requiring emulsifiers and thickeners to maintain stability. Additionally, rheology modifiers are often included to provide desired texture and spreadability, and Xanthan gum is the most commonly used for serum Thickener.<sup>12</sup>

This study focuses on xanthan gum, a popular thickener in serums and topical formulations, due to its safety, stability, and compatibility with various ingredients. Additionally, xanthan gum offers consistent viscosity across a wide range of pH and temperature conditions, with thickening properties that readily work in both hot and cold water.<sup>13</sup> Studies by Aprilia (2022) and Setiawan (2023) explored xanthan gum concentrations of 0.5% and 0.5%-2%, respectively, in facial serum formulations.<sup>14</sup>

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<sup>8</sup> Wahyuni Ester Loe, Mamik Ponco Rahayu, and Dewi Ekowati, (2022) "Formulasi Sediaan Serum Ekstrak Etanol Kayu Secang (*Caesalpinia sappan* L.) sebagai Antioksidan," *Life Science* 11, no. 2: 177–83.

<sup>9</sup> Ni Made Dharma Shantini Suena, Herleeyana Meriyani, and Ni Putu Udayana Antari, (2020) "Uji Mutu Fisik Dan Uji Hedonik Body Butter Maserat Beras Merah Jatiluwih," *Jurnal Ilmiah Medicamento* 6, no. 1, <https://doi.org/10.36733/medicamento.v6i1.843>.

<sup>10</sup> Neng Fitria and Antonius Padua Ratu, (2022) "Karakteristik dan Stabilitas Sediaan Serum Ekstrak Buah Kersen (*Muntingia calabura* L.) dengan Variasi Konsentrasi," *Jurnal Farmamedika (Pharmamedica Journal)* 7, no. 1: 17–27, <https://doi.org/10.47219/ath.v7i1.140>.

<sup>11</sup> Yuli Edy Saputra, Nur Aini Dewi Purnamasari, and Galuh Octaviani Palupi, (2023) "Formulasi dan Evaluasi Mutu Fisik Serum Nanofitosom Myricetin," *Jurnal Ilmiah Farmasi Farmasyifa* 6, no. 1: 85–92, <https://doi.org/10.29313/jiff.v6i1.10253>.

<sup>12</sup> Tejal Shirish Shejul and Kiran Kudale, (2023) "Facial Serum: Its Formulation, Usage, Special Ingredients, Various Types and Benefits," *International Journal of Pharmaceutical Research and Applications* 8, no. 2, <https://doi.org/10.35629/7781-0802680692>.

<sup>13</sup> Chairunnisa Aprilia, Muhammad Faisal, and Fajar Prasetya, (2022) "Formulasi dan Optimasi Basis Serum Xanthan Gum dengan Variasi Konsentrasi: Formulation and Optimization of Xanthan Gum Serum Base with Variations of Concentration," *Proceeding of Mulawarman Pharmaceuticals Conferences* 15: 30–34, <https://doi.org/10.25026/mpc.v15i1.613>.

<sup>14</sup> Putri Alissa Setiawan, Dina Rahmawanty, and Destria Indah Sari, (2023) "Formulasi dan Evaluasi Sifat Fisik Sediaan Serum Wajah Ekstrak Daun Singkong (*Manihot esculenta*) dengan Variasi Konsentrasi Xanthan Gum," *Jurnal Pharmascience* 10, no. 2: 394, <https://doi.org/10.20527/jps.v10i2.15214>.

Motivated by the need for high-quality serums and the effectiveness of xanthan gum, this research project investigates the **“Formulation And Physical Quality Test Of Green Tea (Camellia Sinensis) Extract Serum Preparation With Variations In Gelling Agent Xanthan Gum Concentration”**

## **1.2 Research Problems**

The formulation of the problem in this research:

1. What are the results of the physical evaluation of green tea extract serum preparations using xanthan gum as a thickener?
2. What is the optimal xanthan gum concentration for achieving the desired physical qualities in a green tea extract serum preparation?

## **1.3 The Objective of the Study**

The objectives of this study are:

1. To find out the results of the physical evaluation of green tea extract serum preparations using xanthan gum as a thickener.
2. To determine the optimal xanthan gum concentration for producing a green tea extract serum preparation with superior physical qualities.

## **1.4 The Significance of the Study**

### **1.4.1. Theoretical Implications**

The findings of this study can contribute to the advancement of scientific knowledge in the field of cosmetic formulation, particularly regarding serum preparations. These results may serve as a valuable reference for future research, inspiring further exploration and innovation in this area.

### **1.4.2. Practical Implications**

The outcomes of this study can offer practical guidance for researchers and cosmetic formulators interested in developing green tea extract serum preparations. Specifically, the study provides insights into the selection of appropriate thickeners, such as xanthan gum, and their optimal concentrations for achieving desired physical qualities in these formulations.

## **1.5 Research Authenticity**

As illustrated in the accompanying table, several researchers have conducted studies on serum preparation formulations. This current research aligns with the

existing body of knowledge and contributes to the ongoing exploration of serum formulation techniques.

**Table 1.1 Authenticity Research**

Research Title	Rresearch Method	Variables	Results	Research Differences
Formulation and Evaluation of Physical Properties of Cassava Leaf ( <i>Manihot esculenta</i> ) Extract Facial Serum Preparations with Variations in Xanthan Gum Concentration <sup>15</sup>	Experimental	Dependent Variable: Results of Serum Preparation Evaluation  Independent Variable: Cassava Leaf Extract with Xanthan Gum Variation	Variations in xanthan gum concentration affect the results of organoleptic tests, viscosity, spreadability, and serum adhesion.	Independent variable: Green tea extract with variations of Xanthan Gum



<sup>15</sup> Putri Alissa Setiawan, Dina Rahmawanty, and Destria Indah Sari, (2023) “Formulasi dan Evaluasi Sifat Fisik Sediaan Serum Wajah Ekstrak Daun Singkong (*Manihot esculenta*) dengan Variasi Konsentrasi Xanthan Gum,” *Jurnal Pharmascience* 10, no. 2: 394, <https://doi.org/10.20527/jps.v10i2.15214>.

Formulation and Optimization of Xanthan Gum Serum Base with Variations of Concentration <sup>16</sup>	Experimental	Dependent Variable: Serum formulation  Independent Variable: Optimum concentration of xanthan gum	All three formulas have good values according to the standard requirements for organoleptic, homogeneity and pH tests.	Independent Variable: Green tea extract with xanthan gum concentration
The Formulation and Antioxidant Test of Facial Serum Preparation of Ethanol Extract of Miana Leaf ( <i>Coleus scutellariodes L. Benth.</i> ) <sup>17</sup>	Experimental	Dependent Variable: Serum preparation formulation  Independent Variable: Miana leaf extract	The ethanol extract of miana leaves ( <i>Coleus scutellariodes L. Benth.</i> ) has antioxidant potential in serum preparations at concentrations of 0.5%, 1%, and 1.5%.	Dependent Variable: Serum preparation formulation  Independent Variable: Green tea extract with varying concentrations of xanthan gum

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<sup>16</sup> Chairunnisa Aprilia, Muhammad Faisal, and Fajar Prasetya, (2022) “Formulasi Dan Optimasi Basis Serum Xanthan Gum Dengan Variasi Konsentrasi: Formulation and Optimization of Xanthan Gum Serum Base with Variations of Concentration,” *Proceeding of Mulawarman Pharmaceuticals Conferences* 15: 30–34, <https://doi.org/10.25026/mpc.v15i1.613>.

<sup>17</sup> Prayitno Setiawan, (2023) “Formulasi dan Uji Antioksidan Sediaan Serum Wajah Ekstrak Etanol Daun Miana (*Coleus scutellariodes L. Benth.*),” *Jurnal Ilmiah Fitomedika Indonesia* 2, no. 1: 50–59.