

## CHAPTER I INTRODUCTION

### 1.1 Background

Indonesia is a tropical climate country that bestows more sunlight. The Sun emits various rays, both visible (*visible*) and invisible. Sunlight with a 100-400 nm wavelength, called ultraviolet (UV) radiation, cannot be seen.<sup>1,2</sup> Moderate sun irradiation causes psychological and physiological effects, namely a comfortable and healthy feeling, can stimulate blood circulation, and increase the formation of haemoglobin. However, UV rays can also have side effects if exposed intensely, which can cause sunburn, redness of the skin, darkening of the skin, and long-term impact in the form of premature ageing and skin cancer.<sup>3</sup>

There are two ways to protect the skin from UV rays: first, physical protection using hats, umbrellas, shirts, and long-sleeved pants. Second, chemical protection uses *sun protectors* or sunscreens for UV protection, which can be in various forms, such as gels, creams, balms, and *nano preparations*. *Nano preparations* have the advantage of tiny molecules. The development of *nano preparations can be used as nanosprays* that have the advantage of delivering active substances in the form of excellent mist so that they form a wide, even and practical dispersion compared to other nanotechnologies.<sup>4</sup> Nanospray preparations are formulated by optimizing the conveyor system using vegetable oils. Vegetable oils that can be used include olive oil, VCO, and castor oil. Optimization was carried out to find out which vegetable oils have the potential to be best dispersed with the active substances of the preparation.

The natural ingredient around us with natural sunscreen content is shallot skin (*Allium cepa* L). Shallots are a group of spiced vegetables that are needed to

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<sup>1</sup> Siti Hapsah Isfardiyana, ; Sita, And Ririn Safitri, "Pentingnya Melindungi Kulit Dari Sinar Ultraviolet Dan Cara Melindungi Kulit Dengan Sunblock Buatan Sendiri" 3, No. 2 (2014): 126–33.

<sup>2</sup> Edlia Fadilah Mumtazah Et Al., "Pengetahuan Mengenai Sunscreen Dan Bahaya Paparan Sinar Matahari Serta Perilaku Mahasiswa Teknik Sipil Terhadap Penggunaan Sunscreen," Jurnal Farmasi Komunitas, Vol. 7, 2020.

<sup>3</sup> Azyyati Adzhani, Fitrianti Darusman, And Ratih Aryani, "Kajian Efek Radiasi Ultraviolet Terhadap Kulit," Bandung Conference Series: Pharmacy 2, No. 2 (July 27, 2022).

<sup>4</sup> Khusnul Khotimah And Ade Maria Ulfa, "Potential Spray Nanoemulsion Of Telang Flower (Clitoria Ternatea L.) Extract As Antioxidant Potential Spray Preparation Nanoemulsion Extract of Telang Flower (Clitoria Ternatea L.) As an Antioxidant," Indonesia Journal of Pharmaceutical Analysts, Vol. 8, 2023.

complement cooking spices to add flavour and enjoyment to food. However, shallot skin waste is still widely found at home. It is not used correctly, even though shallot skin has flavonoid compounds with the flavonol group of quartz flavonoids, which are helpful as sun *protectors*.<sup>5, 6</sup>

Allah SWT says in QS: Al-Baqarah verse 61:

وَإِذْ قُلْتُمْ يُمُوسَىٰ لَنْ نَّصْبِرَ عَلَىٰ طَعَامٍ وَاحِدٍ فَادْعُ لَنَا رَبَّكَ يُخْرِجْ لَنَا مِمَّا تُنْبِتُ  
الْأَرْضُ مِنْ بَقْلِهَا وَقِثَّائِهَا وَفُومِهَا وَعَدَسِهَا وَبَصِلَهَا ۖ قَالَ أَتَسْتَبْدِلُونَ الَّذِي هُوَ  
أَدْنَىٰ بِالَّذِي هُوَ خَيْرٌ ۚ اهْبِطُوا مِصْرًا فَإِنَّ لَكُمْ مَّا سَأَلْتُمْ وَضُرِبَتْ عَلَيْهِمُ الذَّلِيلَةُ  
وَالْمَسْكَنَةُ وَبَاءُوا بِغَضَبٍ مِّنَ اللَّهِ ۚ ذَٰلِكَ بِأَنَّهُمْ كَانُوا يَكْفُرُونَ بِآيَاتِ اللَّهِ  
وَيَقْتُلُونَ النَّبِيَّاتِ بِغَيْرِ الْحَقِّ ۚ ذَٰلِكَ بِمَا عَصَوْا وَكَانُوا يَعْتَدُونَ ﴿٦١﴾

And (remember) when you say, "O Moses! We cannot bear to eat only one kind of food, so ask your Lord to give us what the earth grows, such as vegetables, cucumbers, garlic, fennel beans and onions."

Based on this, shallots are a plant mentioned in Allah SWT's words and have many benefits for humans. They are used as sunscreen as a *nanospray* preparation with the optimization of the vegetable oil delivery system and *sun protection activity*. The analysis evaluated the quality of the *nanospray* preparation formula of shallot skin extract (*Allium cepa* L) as a form of sunburn protection on the facial skin.

## 1.2 Research Question

The formulation of the problem in this study is:

- a. What are the results of evaluating the quality and characteristics of the formula for the *nanospray* preparation of shallot skin extract (*Allium cepa*

<sup>5</sup> Siti Rahayu Et Al., "Ekstraksi Dan Identifikasi Senyawa Flavonoid Dari Limbah Kulit Bawang Merah Sebagai Antioksidan Alami," Vol. 2, 2015.

<sup>6</sup> Agrippina Wiraningtyas And Sry Agustina Dan Uswatun Hasanah, "Penentuan Nilai Sun Protection Factor (Spf) Dari Ekstrak Kulit Bawang Merah," N.D.

*L.)? With the optimization of the vegetable oil transmission system as a form of sunburn protection?*

- b. What is the activity of sunscreen in *the most optimal* nanospray preparation of shallot skin extract (*Allium cepa* L) with optimization of vegetable oil delivery system as a form of *sunburn protection*?

### **1.3 Research Aim**

The objectives of this study are:

- a. This research aims to evaluate the formulation of *nanospray* preparations of shallot skin extract (*Allium cepa* L) with the optimization of vegetable oil delivery systems as a protective form of *sunburn*.
- b. This research aims to determine the activity of sunscreen in the formulation of *shallot skin extract nanospray preparations (Allium cepa L) by optimizing* the vegetable oil delivery system as a protective form of *sunburn*.

### **1.4 Research Benefits**

#### **1.4.1 Theoretical benefits**

The results of this study can be used as reference material for further research on the activity of sunscreen prepared *with shallot skin nanospray (Allium cepa L)* with the optimization of the vegetable oil delivery system as a form of *sunburn protection*.

#### **1.4.2 Practical Benefits**

The results of this research are expected to add to the treasure of science and increase the insight of readers, sunscreen users, and industry producers of large quantities of preparations.

## 1.5 Originality of Research

Research on the analysis of sunscreen activity in shallot skin extract (*Allium cepa* L) has been carried out by several researchers, as shown in Table 1 below.

**Table 1.** Originality of Research

Research Title	Research Methods	Variable	Result	Research Differences
Formulation and physical quality test of solid soap preparations with shallot skin extract ( <i>Allium cepa</i> L). <sup>7</sup>	Experimental research	<b>Dependent:</b> Formulation and physical quality test of solid soap preparations <b>Independent:</b> Shallot Skin Extract ( <i>Allium cepa</i> L)	Solid soap of shallot skin extract meets SNI and after 4 weeks of storage, pH test results fluctuate or are unstable	<b>Dependent:</b> Innovation of nanospray formulation as a form of <i>sunburn protection</i> <b>Independent:</b> Optimization of Vegetable Oil Delivery System and Extract of Shallot skin ( <i>Allium cepa</i> l)
Sunscreen innovation from garlic and shallot skin extracts as anti-dull, anti-acne, and <i>anti-aging</i> . <sup>8</sup>	Experimental research	<b>Dependent:</b> Sunscreen innovation as anti-dull, anti-acne, and <i>anti-aging</i> <b>Independent:</b> garlic and shallot skin extract	Obtained garlic skin has a higher percentage of yield than onion skin. 20% shallot peel extract has the most powerful anti-bacterial activity. There are no organoleptic changes at 21 days. F1 has the best spreads including O/W.	<b>Dependent:</b> Innovation of nanospray formulation as a form of <i>sunburn protection</i> <b>Independent:</b> Optimization of Vegetable Oil Delivery System and shallot skin Extract ( <i>Allium cepa</i> L)

<sup>7</sup> Adelya Youan Nurdiana, Elly Purwati, and Cikra Ikhda Nur Hamidah Safitri, "Formulation and Physical Quality Test of Solid Soap Preparation of Shallot Skin Extract (*Allium Cepa* L)," Proceedings of Mulawarman Pharmaceuticals Conferences 13 (April 10, 2021): 1–7.

<sup>8</sup> Arumsasi Putri Nugrahani et al., "National Seminar on Chemistry and Chemistry Education XIII Sunscreen Innovation from Garlic and Shallot Skin Extracts as Anti-dull, Anti-Acne, and Anti-Aging," N.D.

Research Title	Research Methods	Variable	Result	Research Differences
Formulation of allot skin extract gel preparation ( <i>Allium cepa</i> L.) as an anti-acne against the bacteria <i>Propionibacterium acnes</i> .	Experimental research	<b>Dependent:</b> Formulation of gel preparations as anti-acne against <i>Propionibacterium acnes</i> bacteria <b>Independent:</b> shallot peel extract ( <i>Allium cepa</i> L.)	The evaluation test of the gel preparation of shallot skin extract showed that it met the requirements of the gel preparation. The minimum inhibition concentration (KHM) of shallot skin extract was 5% with an average inhibition zone of 5.07mm. and the most effective shallot skin concentration is 10%	<b>Dependent:</b> Innovation of nanospray formulation as a form of <i>sunburn protection</i> <b>Independent:</b> Optimization of vegetable oil delivery system and shallot skin extract ( <i>Allium cepa</i> L.)

So, the latest from the following research is a *nanospray* preparation from shallot skin extract (*Allium cepa* L.) with optimization of vegetable oil delivery system as a form of *sunburn protection*.