

**WATERLINE (WATERMELON SKIN NOODLES) AS AN
ALTERNATIVE ANTIOXIDANT INSTAN NOODLE PRODUCTS**

SKRIPSI

**Oleh:
NABILA ASHA RAHMITA
NIM. 18930053**



**PROGRAM STUDI FARMASI
FAKULTAS KEDOKTERAN DAN ILMU KESEHATAN
UNIVERSITAS ISLAM NEGERI MAULANA MALIK IBRAHIM
MALANG
2021**

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**Diajukan Kepada :
Fakultas Kedokteran dan Ilmu Kesehatan
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Untuk Memenuhi Salah Satu Persyaratan dalam
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**Oleh:
NABILA ASHA RAHMITA
NIM. 18930053**

**Telah diperiksa dan disetujui untuk diuji:
Tanggal: 5 April 2021**

**Mengetahui,
Ketua Program Studi**



**apt. Abdul Hakim, M. Pl., M. Farm
NIP. 19761214 200912 1 002**

PERNYATAAN KEASLIAN TULISAN

Saya yang bertanda tangan dibawah ini:

Nama : **Nabila Asha Rahmita**
NIM : **18930053**
Program Studi : **Farmasi**
Fakultas : **Kedokteran dan Ilmu Kesehatan**
Judul Penelitian : **Waterline (Watermelon Skin Noodles) as an
Alternative Antioxidant Instan Noodle Products**

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Malang, 15 Desember 2021
Yang membuat pernyataan



Nabila Asha Rahmita
NIM. 189930053

MOTTO

مَنْ جَدَّ وَجَدَّ

. "Barang siapa yang bersungguh-sungguh, Maka akan berhasil."

Proudly Present

LEMBAR PERSEMBAHAN

Alhamdulillahirobbil'aalamiin. Dengan senantiasa memanjatkan puji syukur kehadirat Allah SWT beserta Nabi Muhammad SAW sehingga dapat melaksanakan pencarian ilmu dan dapat menyelesaikannya dengan baik. Dengan rasa syukur yang mendalam, kupersembahkan tulisan karya ini kepada:

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memberikan manfaat serta menambah hasanah ilmu pengetahuan pembaca. Amin
yaa Rabbal 'Aalamiin...

Malang, 15 Desember 2021

Penulis

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DESCRIPTION OF THE PRODUCT

WATERLINE is an instant noodle product with a mixture of watermelon skin that works as an antioxidant. It is a useful food-processed product for the prevention of cancer, hypertension, and so on. Besides being a health benefit, it can reduce the excretion of watermelon skin by shaping it into a more valuable product.

ABSTRAK

Jumlah konsumsi mie instan di dunia menurut data World Instant Association (WINA) pada tahun 2019 meningkat 3,52% menjadi 103,62 miliar. Konsumsi mie instan di Indonesia mencapai 12,54 miliar pada tahun 2019 dan menduduki peringkat kedua dunia setelah China (WINA, 2019). Mie instan mengandung bahan kimia seperti MSG (Mono Sodium Glutamate) dan butil hidroksilanisol (BHA) yang menyebabkan kanker, asma, diare, obesitas, dan kerusakan jaringan otak. Menurut data Direktorat Jenderal Hortikula Kementerian Pertanian (2014), produksi semangka mencapai 653.974 ton dengan jumlah limbah kulit semangka 30% dari jumlah semangka. Limbah semangka ini belum dimanfaatkan secara maksimal. Hasil identifikasi tumbuhan yang dilakukan di Pusat Penelitian Biologi LIPI menunjukkan bahwa kulit semangka mengandung alkaloid, triterpenoid, flavonoid dan tanin yang dapat diolah menjadi mie yang memiliki nilai tambah. Oleh karena itu, dari permasalahan tersebut ditawarkan inovasi “Waterline (Mie Kulit Semangka) Sebagai Alternatif Produk Mie Instan Antioksidan” yang bermanfaat untuk menambah nilai tambah limbah kulit semangka, menciptakan diversifikasi pangan, dan bermanfaat bagi kesehatan. Metode yang digunakan dalam penelitian ini adalah ekstraksi. Pada akhirnya, inovasi ini diharapkan dapat diterapkan di Indonesia karena dapat mengurangi limbah kulit semangka dan memiliki nilai tambah yang tinggi.

ABSTRACT

The amount's consumption of instant noodles in the world according to data from the World Instant Association (WINA) in 2019 increased 3.52% to 103.62 billion. Consumption of instant noodles in Indonesia reached 12.54 billion in 2019 and ranked second in the world after China (WINA, 2019). Instant noodles contain chemicals such as MSG (Mono Sodium Glutamate) and butyl hydroxylanisol (BHA) which cause cancer, asthma, diarrhea, obesity and brain tissue damage. According to data from the Ministry of Agriculture Directorate General of Horticulture (2014), watermelon production reached 653,974 tons with the amount of watermelon leather waste was 30% of the watermelon. This watermelon waste has not been used maximally. The identification's results of plants carried out at the LIPI Biology Research Center showed that watermelon skin contains alkaloids, triterpenoids, flavonoids and tannins which can be processed into noodles that have added value. Therefore, from these problems the innovation offered "WSN (Watermelon Skin Noodles) as An Alternative Antioxidant Instant Noodle Products" that is useful to add value of watermelon skin waste, create food diversification, and have health benefits. The method that used in research is extraction. Eventually, this innovation is expected to be implemented in Indonesia because it reduces watermelon leather waste and has high added value.

مسد تخلص

فقَّال بـ يانات من الاتـ حاد الـ فوري الـ عالمي عام في عدد ارتـ فع سد تهلاك اسد تهلاك بـ لغـ ملـ يار إلى بـ نسبة العالم في الـ فوروية المعكرونة المرتـ بة اذ تلت عام في ملـ يار و إنـ دون يسـ يافـ في الـ فوروية المعكرونة في الـ ثانية بـ عد العالم الـ صـ ين على قـ وريـة الـ تـ حـ توي مـ ثـل كـ يمـ يائـ يـة مواد لـانـ يسـ ول هـ يـروك سـي و بـ و تـ يل إنـ تـاج بـ لغـ الزـراعة بـ و زـارة لـ لهـورتـ يـكـولـا الـ عامـة الـ مـديـرية الـ معـكرونة بـ يانات و بـ حسب الـ امـخ أنـ سـجة و الـ سـمنة و الـ إـسهال و الـ ربـ و الـ سرطـان تـ سـبب الـ تي الـ بطـيخ بـ نسـبة طـنـافـ ضـلات اسـد تـخـدام يـ تم لـم الـ بطـيخ قـ شرـات مـخلف من الـ أمـ ثـل و تـ لف بـ الـ شكل الـ بطـيخ انـ تـانـج مـعالـجـتـها الـ نـباتـات الـ تي أـجـريت في مـركـز الـ بـحـوث الـ بـيـولـوجـية أنـ قـ شر الـ بطـيخ يـ حـ توي عـلى و قـ لوـيدـات لـ تي يـمـكـن أـظـهـرت لـ تـعـرف عـلى لـ تصـبـح نـودلـز ذات قـ يـمة مـضـافة لـ ذلك من اـهـذ لـ مـشـاكل ، اتـ قـديـم يـ تم يـ تـكار "كـمـنـتـج بـ ديـل مـضـاد لـ الـكـ سـدة فـ وريـ" لـ لمـعـكرونة و هو مـ فـيد لـ ضـافة قـ يـمة مـضـافة إلـى مـخـلـفات قـ شر الـ بطـيخ ، و خـلق تـ نوع ، غـذائـي ، و مـ فـيد لـ لـصـحة الـ طـريـقة الـ مسـد تـخـدمـة في اـهـذ الـ بـحث الـ اسـد تـخـراج في الـ نـهاية ، من الـ مـأمـول يـ تم تـطـبـيق هـذا الـ ايـ تـكار في إنـدون يسـ يـا لأنـه هـي يـمـكـن أن يـ قـلـل من نـ فايات قـ شر الـ بطـيخ و له مـضـافة عـالـية .

CHAPTER I

PRELIMINARY

1.1. Background Issue

As the time evolve, technological advances are not only achieved by digital technology but also food technology. Various food innovations are continuously being developed by various food processing industries to create new food products in society and increase their productivity. Instant noodles are generally produced by the food processing industry with technology and provide various additives to preserve and give taste to these products (Savitri, 2009). The number of consumptions of instant noodles in the world according to World Instant Association (WINA) data in 2019 increased by 3.52% to 103.62 billion. In Indonesia, instant noodles are very popular with various groups, from children to the elderly. The reason is that the noodles taste delicious, practical, and satisfying. According to research in 2019, the consumption of instant noodles in Indonesia reached 12.54 billion, the second rank in the world after China (WINA, 2019). This is reinforced by data from Ministry of Health of the Republic of Indonesia, 6 out of 10 people in Indonesia consume instant noodles more than once a day (Ministry of Health of the Republic of Indonesia , 2013).

Instant noodles are often eaten by people because it is delicious, fast to serve, and the price is very affordable. However instant noodles are have little and unbalanced nutritional content (Astawan, 2003). One serving of instant noodles, amounting to 91 grams, can contribute energy of 420 kcal, which is 20 percent of the total daily energy requirement of 2000 kcal. The energy contributed by oil amounts to about 144 kcal. In addition, a packet of instant noodles contains food additives, such as MSG, sodium tripolyphosphate as a chewing agent, and sodium benzoate as a preservative and colouring agents that give instant noodles a yellow colour. In addition, instant noodles have a high sodium content. All of which become one of factors in the occurrence of hypertension (Kuroifah, 2014).

Watermelon (*Citrullus lanatus*) is one of the most abundant fruit in Indonesia. In the watermelon itself, there are substances that are very useful for the health of the human body, one of which is flavonoids which is useful as antioxidants. The high levels of

antioxidants in watermelon can be used to neutralize free radicals and reduce cell damage in the body (Rochmatika et al, 2012). Watermelon production according to data from the Ministry of Agriculture, Directorate General of Horticulture (2014), reached 653,974 tons with 30% of watermelon skin waste. This watermelon fruit waste has not been fully utilized.

Flavonoids are secondary metabolite compounds that are mostly found in plant tissues. They include phenolic compound group with a chemical structure of C6-C3-C6 (Redha, 2010). Flavonoids found in many plants function as antioxidants to neutralize free radicals so they can minimize the effects of damage to body tissues. Most free radicals enter the body from the external environment such as; from cigarette smoke, alcohol consumption, air pollution, and others.

Apart from flavonoids, there are also tannins. Tannin is a very complex secondary metabolite active compound. It consists of phenolic compounds that are difficult to separate and hard to crystallize and have antioxidant properties (Desmiaty et al., 2008). Other secondary metabolite compounds, namely triterpenoids and alkaloids which are widely found in dicot plants and have antioxidant properties.

One of the innovations we can do is adding value to watermelon (*Citrullus lanatus*) skin waste into antioxidant instant noodles. Watermelon skin (*Citrullus lanatus*) can be processed into instant noodles because it contains flavonoids, tannins, alkaloids, and triterpenoids which function as antioxidants, so they can neutralize free radicals. The product of these antioxidant instant noodles is hoped to be one of food diversification which is beneficial to health (protecting the body from free radical attacks).

Based on the problems described above, the writer formulated that the flavonoids content in watermelon (*Citrullus lanatus*) skin has the potential as an antioxidant in the form of instant noodles.

1.2. Formulation of the problem

- 1.2.1 How to make watermelon skin waste become valuable?
- 1.2.2 How waste watermelon skin can diversify food?
- 1.2.3 How can watermelon skin waste be processed to become food products with health benefits?

1.3. Research purposes

- 1.3.1 To find out how watermelon skin waste become valuable.
- 1.3.2 To find out watermelon skin waste as a form of food diversification.
- 1.3.3 To find out watermelon skin waste can be processed to become food products with health benefits.

1.4. Benefits of Research

- 1.4.1 To get experience in how to utilize Watermelon Skin (*Citrullus lanatus*) as Antioxidant Instant Noodles.
- 1.4.2 To become a source of reference for those who want to study more about how to utilize of Watermelon Skin (*Citrullus lanatus*) as Antioxidant Instant Noodles.
- 1.4.3 To give contribution to science and technology related to the utilization of watermelon skin waste.

CHAPTER II

THEORETICAL FRAMEWORK

2.1 Watermelon

Watermelon (*Citrullus lanatus*) is a vine known as popular fruit and favoured by people. This fruit is closely related to pumpkin (*Cucurbitaceae*), melon (*Cucumis melo*) and cucumber (*Cucumis sativus*). This watermelon comes from southern Africa, and spreads throughout the world including Indonesia, both in subtropical and tropical areas. Watermelon is seasonal and relatively fast producing. The fruit of watermelon is usually harvested to be eaten fresh or made juice (EP. Lembang, 2012).

2.1.1 Classification

| | |
|----------|--|
| Kingdom | : Plantae |
| Division | : Magnoliophyta |
| Class | : Magnoliopsida |
| Order | : Cucurbitales |
| Family | : Cucurbitaceae |
| Genus | : <i>Citrullus</i> |
| Species | : <i>C. lanatus</i> (A.Ramadhani,2014) |



2.1.2 Nutritional Content of Watermelon (*Citrullus lanatus*)

Watermelon (*Citrullus lanatus*) is a fruit with a lot of seeds and has an abundance of vitamins, such as significant vitamins A, B6 and C. Many contain lycopene, antioxidants, flavonoids, and amino acids. According to the Academy of Nutrition and Dietetics, the content contained in watermelon is very good for health. Antioxidants help prevent damage and cancer (S. Mariani, 2018)

2.1.3 Watermelon Skin (*Citrullus lanatus*)

Watermelon skin has a thickness of 1.5-2.0 cm. A piece of watermelon skin measuring 2.5 cm x 2.5 cm is known to contain about 1.8 calories. In addition, although the macro nutrient content in watermelon skin is not as much as in the pulp, one cup serving of watermelon skin can provide about 2% of the daily vitamin C requirement and 1% of the daily vitamin B6 requirement. The benefits of watermelon skin are very good for the skin, immune system, and nervous system health. The most extraordinary content in watermelon skin is flavonoids (Hardjono, 2009).

2.1.3.1 Flavonoid

Flavonoids are polyphenolic compounds found in many plants including watermelon, which function as antioxidants that are able to neutralize free radicals so that they can minimize the effects of damage to body tissues. Most of the free radicals enter the body from the external environment such as; from cigarette smoke, alcohol consumption, air pollution, and others. Flavonoids also have anti-inflammatory, anti-allergic and anti-viral properties, so they can provide protection against cancer, heart disease, and diabetes (Maulida, 2011).

2.1.3.2 Lycopene

Lycopene is a natural pigment (carotenoid) found in watermelons. This compound is able to prevent various degenerative diseases such as diabetes, heart disease and cancer (M. Novita, 2010).

2.2 Antioxidants

Antioxidants are compounds that can inhibit oxidation reactions by binding to free radicals and highly reactive molecules. One form of reactive oxygen

compounds is free radicals, these compounds are formed in the body and triggered by various factors (Winarsi, 2007).

2.2.1 The Role of Antioksidan

Antioxidants have a very important role for the health of the human body because their function can inhibit and neutralize oxidation reactions involving free radicals. The inhibition mechanism of antioxidants usually occurs during initiation or propagation reactions in the oxidation reaction of fats or other molecules in the body by absorbing and neutralizing free radicals or decomposing peroxides (Zheng and Wang, 2009).

2.2.2 Types of Antioxidants

There are two types of antioxidants, namely natural antioxidants and synthetic antioxidants

2.2.2.1 Natural Antioxidants

Many natural antioxidants are found in plants, vegetables and fruits (Winarsi, 2007). The increase of consumption of natural antioxidants found in fruits, vegetables, flowers, and other parts of plants is able to prevent degenerative diseases. The micronutrient content in fruit, vegetables and other plants such as vitamins A, C, E, folic acid, anthocyanins, phenolic compounds and flavonoids can be used as a substitute for consumption of synthetic antioxidants. This is supported by the results of research conducted by Parwata that the content of phenolic compounds, carotenoids and vitamin C in Nectarines, Peaches and Plum Cultivars which can be used as natural antioxidants (Parwata, 2016).

2.2.2.2 Synthetic Antioxidants

Synthetic antioxidants are butyl hydroxyanisol (BHA), butyl hydroxytoluene (BHT), propylgallate, and ethoxyquin (Cahyadi, 2006). The results of Amarowicz's (2000) study stated that the use or exposure of synthetic antioxidants for a long time is not a good antioxidant because it can cause side effects in the form of inflammation to liver damage and increases the risk of carcinogenesis in experimental animals.

2.3. Instant Noodles

Instant noodles are the most popular food in Asia. About 40% of wheat flour consumption in Asia is used for making instant noodles. In Indonesia in 1990, the use of wheat flour for making instant noodles reached 60-70%. This shows that instant noodles are the most popular food in Asia, especially Indonesia until now. In Indonesia, instant noodle products are a food that is widely used as a substitute for rice. This noodle product is made of wheat flour which comes from wheat (A. Novalita, 2009).

CHAPTER III

RESEARCH METHODS

3.1. Research Procedures

This research was conducted on:

3.1.1 Research Time and Location

3.1.1.1 Time

Preparation of research papers in October - November 2019.

3.1.1.2 Location

The research was conducted in:

1. Researcher's residence, Jl. Ir. Soekarno No. 1 Dadaprejo, Batu City
2. Researcher's residence, Jl. MT. Haryono 6/896 Dinoyo
3. Organic Chemistry Laboratory, Faculty of Science and Technology
UIN Maulana Malik Ibrahim

3.2 Research Methods

3.2.1 Literature Method

The literatures used were taken from the internet and relevant books.

3.2.2 Experimental Method

We conducted experiments on the Utilization of Watermelon (*Citrullus Lanatus*) As Antioxidant Instant Noodle.

3.2.3 Laboratory Methods

That was by taking the results of data or evidence conducted in the Laboratory Organic Chemistry, Faculty of Science and Technology, UIN Maulana Malik Ibrahim Malang.

3.2.4 Interview Method

Interview method is conducting interviews with residents around UIN Maulana Malik Ibrahim Malang.

3.2.5 Documentation Methods

That was by taking data results in the form of pictures.

3.3 Research Equipment and Materials

3.3.1. Research Tools

1. Sonicators
2. Blender
3. Analytical balance
4. Erlenmenyer 250 ml
5. Lead
6. 25 ml pycnometer
7. Rotary Evaporator
8. Basin
9. Noodle milling equipment
10. Spoon
11. Sieve
12. Baking tin
13. Oven
14. Knife
15. Plastic

3.3.2 Research Materials

1. Watermelon Skin (*Citrullus Lanatus*)
2. Ethanol 70%
3. Wheat flour
4. Tapioca flour
5. Water
6. Aquades
7. Kitchen salt
8. Eggs

3.4 How Research Works

3.4.1 How the preliminary test works

3.4.1.1 Extracting Watermelon (*Citrullus Lanatus*) Skins

In this stage, the researchers extracted the flavonoids from the skin of watermelon (*Citrullus Lanatus*). This watermelon skin (*Citrullus Lanatus*) is actually an alternative raw material for making antioxidant instant noodles. Because the instant noodles have synthetic content and

are harmful to human health, the researchers took the initiative to extract the skin of watermelon (*Citrullus lanatus*) as an antioxidant instant noodle. This stage is done by collecting waste from the skin of watermelon (*Citrullus Lanatus*) as much as 20 grams, wash the watermelon (*Citrullus lanatus*) skin until clean, then cut into small pieces and oven at 50°C for 3 hours. Pulverize and enter 200 mL of 70% ethanol solvent into a round bottom flask. After that, extract by sonication method for 30 minutes, then concentrate the filtrate with a rotary evaporator. Then weigh and calculate the yield and determine the feasibility.

3.4.1.2 Making Antioxidant Instant Noodles From Watermelon (*Citullus Lanatus*) Skin

The method of making antioxidant instant noodles from watermelon (*Citullus lanatus*) skin starts from mixing the extract, tapioca flour, wheat flour, water, salt, and eggs until evenly distributed. Then add a little water until the dough is smooth. After the dough is formed, the dough is then rolled up to obtain a thin sheet that matches the size of the noodles and uses a stainless steel-coated steel pool mill. Final pasta dough thickness is about 1.2 - 2 mm. The purpose of grinding is to refine gluten fibers and make dough sheets. The dough that has been formed into a thin sheet from the results of the grinding is then cut to length with a knife. Furthermore, it is cut crosswise to a certain length in order to obtain a distinctive noodle shape.

3.4.2 How to Measure Results

1. Measuring the density of the extract is done by:

Specific gravity of the sample =

$$\frac{\text{Weight of ethanol standart solution in pycnometer (g)}}{\text{Volume of distilled water in pycnometer (ml)}}$$

2. Find the yield extracted by:

$$\text{Immersion sample} = \frac{\text{Experimental Value}}{\text{Theoretical Value}} \times 100\%$$

3. Determine the remaining ethanol content in the extracted compound by :

$$y = ax + b$$

$$x = \frac{y-b}{a}$$

Note :

Sample ethanol concentration (%)

Density of sample ethanol (g / mL)

4. Determine the feasibility of the sample by comparing the results of the literature with the calculation analysis that the researcher did.

Based on our research, it can be concluded that the content of watermelon skin (*Citrullus Lanatus*) in the form of flavonoids can be used for making antioxidant instant noodles.

CHAPTER IV

DISCUSSION

4.1 Factors cause watermelon skin (*Citrullus lanatus*) can be used as antioxidant instant noodles

In the watermelon skin, there are flavonoids and other secondary metabolite compounds that play active roles as antioxidants.

4.2 Tools and materials used in producing watermelon skin (*Citrullus lanatus*) as antioxidant instant noodles

The tools and materials used can be obtained easily in the laboratory. The tools used are sonicator, blender, analytical balance, erlenmeyer 250 ml, lead, 25 ml pycnometer, rotary evaporator, basin, noodle mill, spoon, sieve, baking sheet, oven, knife, and plastic. While the ingredients used are watermelon skin (*Citrullus lanatus*), 70% ethanol, tapioca flour, water, distilled water, table salt and eggs.

4.3 The Mechanism of producing Watermelon (*Citrullus lanatus*) Skin as Antioxidant Instant Noodles

The first step is extracting watermelon (*Citrullus lanatus*) skin by collecting 20 grams of waste from the skin of watermelon (*Citrullus lanatus*). The second is washing the watermelon (*Citrullus lanatus*) skin until clean, then we cut watermelon skin into small pieces and oven it at 50°C for 3 hours. An oven is carried out so that the water contained in the watermelon skin is not extracted. Then pulverize and enter 200 mL of 70% ethanol solvent into a round bottom flask. 70% ethanol solvent is used because it is non-toxic and dangerous so that the antioxidants to be extracted are expected to be applied to food ingredients. After that, extract by sonication method for 30 minutes, sonication method is used to streamline time. Then concentrate the filtrate with a rotary evaporator, in order to obtain pure secondary metabolite compounds. Then weigh and calculate the result and determine the feasibility.

The second stage is making instant noodles with several steps; namely the mixing step, which aims to get an even dough and a homogeneous paste. Mix the extract, tapioca flour, wheat flour, water, salt and eggs until evenly

distributed. Then add a little water until the dough is smooth. After the dough is formed, the dough is then rolled up to obtain a thin sheet that matches the size of the noodles and uses a stainless steel-coated steel pool mill. For the final pasta dough thickness is approximately 1.2 - 2 mm. The purpose of grinding is to refine gluten fibers and make dough sheets. The dough that has been formed into a thin sheet from the results of the grinding is then cut to length with a knife. Furthermore, it is cut crosswise to a certain length in order to obtain a distinctive noodle shape.

4.4 The Effectiveness of Utilizing Watermelon (*Citrullus lanatus*) Skin as Antioxidant Instant Noodles

The making of antioxidant instant noodles from watermelon skin (*Citrullus lanatus*) is more effective and advantageous than synthetic instant noodles circulating in the community. The making of antioxidant instant noodles from watermelon skin (*Citrullus lanatus*) is a new innovation and useful for reducing synthetic instant noodles that are often consumed by the public, and the producing process takes a relatively short time so it is better than instant noodles produced by factories.

4.5. Hypothesis

Based on the above description, the writer propose hypothesis that the use of watermelon skin (*Citullus Lanatus*) as an antioxidant instant noodle with assumptions as follows:

- 4.5.1 The existence of factors that cause watermelon (*Citrullus lanatus*) skin can be used as antioxidant instant noodles
- 4.5.2 The existence of tools and materials used in the utilization of watermelon (*Citrullus lanatus*) skin as antioxidant instant noodles
- 4.5.3 The existence mechanism of utilizing watermelon (*Citrullus lanatus*) skin as antioxidant instant noodles
- 4.5.4 The effectiveness of the utilization of watermelon (*Citrullus lanatus*) skin as antioxidant instant noodles

Based on that data, the hypothesis presented in substation is acceptable

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