

FORMULATION AND CHARACTERIZATION OF CHILLI LEAF EXTRACT (*Capsicum frutescens* L.) EXTRACT AS ANTI ACNE

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ABSTRACT

This study aims to formulate cayenne pepper leaf extract (*Capsicum frutescens* L.) as an anti-acne to spray preparation and to determine the effect of the formulation of cayenne pepper leaf extract (*Capsicum frutescens* L.) as an anti-acne on the characterization of spray preparations.

The method used in this study is experimental (laboratory experiments) based on differences in the concentration of carbopol bases in each formula. The carbopol concentrations were: Formula I (0.5%), Formula II (1%), Formula III (2%).

The results showed that in the characterization test of the spray preparation of cayenne pepper leaf extract (*Capsicum frutescens* L.) physically cannot be made in spray dosage form because the results obtained still leave color and are not clear when viewed from the terms of the preparation, but the physical stability of the preparation for formula I, formula II and formula III from the results of the parameters of the preparation characterization test, statistical data analysis with one sample T-Test where the significance value of P 0.05 indicates that there is an effect on the characterization of the preparation.

Keywords: Cayenne Pepper Leaves, Spray, Characterization

INTRODUCTION

The skin, including the elastic barrier which is found on the very outermost layer, also protects the body through environmental impacts, also includes the highest body organ and expands in size, which is 15% through body weight with an adult human skin area of 1.5 m² [3].

The skin is composed of three layers of tissue that have benefits as well as unsuitable criteria. The three specific layers are: the epidermis, the dermis, and the subcutaneous layer

The most common skin disorder in the world is acne (*acne vulgaris*), which is a chronic inflammatory disorder found in the pilosebaceous unit. Acne is also a multifactorial disorder that develops in the

sebaceous follicles. Pathophysiological acne is formed because there are 4 factors that greatly influence which are follicular hyperkeratinization, bacterial colonization of *Propionibacterium acnes*, increased sebum production, and inflammation [14].

Acne is a very major skin problem. According to various observations, about 85% of people get acne at the age of 12-25 years. In addition, when 25% of people initially get acne at the age of 25 years. In fact, acne is always very often faced by teenagers than in adults. Basically the problem of acne can reduce to disappear in line with increasing age. However, acne that appears in adolescence when it has not been properly treated or has not received proper treatment, it is more likely

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that certain acne will persist until the individual reaches the age of 40 years. In such problems, acne can generally leave scars that have not been treated quickly.

Acne (*acne vulgaris*) is a disorder caused by the inhibition of sebum flow through a pimple-shaped foreign body accompanied by moderate infection. The foreign body is also called a comedo. Furthermore, the root of the disorder is the excess sebum produced. The disorder generally occurs at the age of puberty or young adulthood when certain glands begin to be active. Acne is generally found on the face, where it is on the forehead, cheeks, and nose. In addition, acne is also present on the chest and back. Because especially acne can cause wounds to the skin, so that the handling is not appropriate can result in the formation of scar tissue in acne scars

Acne and acne have varied clinical patterns, starting with comedones, papules, pustules, to nodules with scar tissue, until they are called polymorphic dermatoses. Acne that appears on the face is always caused by individual hygiene and cleanliness of the environment. But the thing that is always done by all individuals in reducing and overcoming the formation of acne is to clean the facial area at least 3 times a day. Besides that, the most important thing is choosing facial cleansing soap in the removal of dirt on the surface of the skin, generally various facial cleansing ingredients are always added with one active substance or a combination of various active substances in an effort to eradicate bacteria due to acne.

Acne on the face arises due to pores that are caused by excessive oil, dead skin cells by infecting bacteria. Acne can also arise due to hormonal changes in the body. The impact of the formation of various acne causes acne to have various types that are not the same. Various types of acne are divided into two groups,

namely non-inflammatory acne (which does not cause swelling) and inflammatory acne (which causes swelling in the skin that is red). There are five types of acne that always appear on the face, namely blackhead blackheads, whitehead blackheads, papules, pustules and nodules. All types of acne have different types of healing to be effective.

Generally, herbal treatments include treatments that use natural products in a traditional way. In the traditional way, the leaves of cayenne pepper (*Capsicum frutescens L.*) can be used for alternative acne treatment through natural products. Cayenne pepper leaves are known to contain flavonoid substances that can overcome bacterial life. In the observational data carried out, the ethanol extract of cayenne pepper (*Capsicum frutescens L.*) leaves has antibacterial activity in the bacterial life of *Propionibacterium acnes* due to acne. 10-3 mg of clindamycin [1].

Herbs with the longest life, erect, broadly branched, 0.5 – 1.5 m high. Leaves spread, always 2-3 together and then not according to height; stem 0.5 – 3.5 cm; The leaves are rounded like an egg, elongated or rounded like an egg to form a lanceolate, in a tapered base with a narrow tip 1.5-10 times 0.5-5.5 cm. The flowers are at the tips and visible in the armpits; stems erect in a nodding end, 1.5 – 2.5 cm. petals form a bell, in 5 smallest teeth, at the base of the fruit is enlarged. The crown forms a wheel, divided by 5 on, the crown is tapered. Purple anthers. Will bear fruit 2 (rarely 3). Buni fruit elongated oval, red taste more spicy.

Cayenne pepper leaves contain flavonoids as well as glycons, terpenoids with saponins [11].

Cayenne pepper leaves also contain nutrients such as vitamins A, B, C and other compounds such as capsaicin, carotene, essential oils and resins.

Extraction includes the withdrawal of a soluble chemical substance until it separates through a soluble product so that it is separated from the undissolved product in a liquid solvent.

Extraction is the stage of separating one of the compounds according to the comparison of its properties, especially its solubility in two solutions that are not always dissolved that is not the same. Primarily the extraction is carried out in the use of a solvent suitable for the combination solubility in combination with the other components, generally water as well as other organic solvents.

The purpose of the extract is in the withdrawal of the active substance as well as the separation of certain substances according to their unequal dissolution in several chemical combination solvents that exist in natural products either through plants, animals, and marine biota using these organic solvents.

The extraction method according to the presence or absence of heating steps can be divided into two types, namely cold extraction and hot extraction. Cold extraction, maceration and percolation but hot extraction, reflux, soxhlet, digestion, infusion and decoction.

Cayenne pepper (*Capsicum frutescens* L.) leaves can prevent some pathogenic bacterial life due to abnormalities.

Flavonoid compounds have activity as an antioxidant, anti-inflammatory and antibacterial. Flavonoid compounds can inhibit the growth of acne-causing bacteria.

Maceration includes extraction procedures that use a stationary solvent or in which there is a stirrer several times at room temperature. This procedure can be carried out by immersing the product in intermittent stirring. Initially, the immersion was carried out for up to 24 hours. The advantages of this method are that it is effective in substances that are

not heat resistant (degraded due to heat), the equipment used is relatively easy, affordable, and also quickly obtained.

A pharmaceutical dosage form used in a topical manner is spray gel. Spray gel is composed of two terms, namely gel or hydrogel which is not composed of 10-90% aqueous phase by weight of the preparation. However, the term spray is applied using a spray pump applicator that is guided in a combination of arrangements formed such as small or large solution droplets [5].

The main thing in the formulation of spray gel preparations is the viscosity. The preparation always has a small viscosity so that the spray applicator can be used.

The advantage of spray preparations compared to other preparations is to minimize contact between hands and preparations, because in general human hands are easily contaminated by germs and other microorganisms.

The stability of pharmaceutical preparations is one of the strengths of materials and preparations in maintaining the specified limits until the period of storage and use, their properties, and the criteria according to what they had when they were formed [15].

There are various causes that can affect the stability of pharmaceutical ingredients, such as stability through active products, interaction with active products with additional products, stages of formation, stages of packaging, as well as environmental conditions to transportation of materials, storage, handling, and the duration of the materials in formation to use. Environmental causes such as temperature, radiation, light, and air (generally oxygen, carbon dioxide and water evaporation) also affect its stability. Furthermore, the causes of the formulation, for example, the shape of the particles, the pH, the nature of the water and the nature of the solvent, which can

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affect the stability of pharmaceutical ingredients [15].

The instability of the medicinal ingredients has not resulted in a reduction to the point of loss of efficacy, the drug can turn into a poison, or change the appearance of the drug through pharmaceutical preparations (color, aroma, taste, consistency, etc.) so that it can harm the user. The instability of one of the pharmaceutical preparations can be detected by changing the physics, chemistry and appearance through one of the pharmaceutical preparations. The range of chemical conversion formed is determined by the rate of drug decomposition from the relationship between drug levels and duration, as well as according to the degree of degradation of a drug which, when viewed from a chemical point of view, drug stability can be identified through the presence or absence of reduced levels until stored [15].

In addition to chemical changes, it is always determined to change one of the preparations by physical means. Physical causes such as heating, light, and humidity, may cause or shorten the chemical reaction. Physical stability includes evaluating the change in physical properties through one of the materials depending on the duration (storage period). The criteria through physical stability testing include organoleptic examination, pH, dispersion, viscosity, spray description / spray weight with homogeneity. However, microbiological stability is a permanent condition when one of the preparations is free from microorganisms or according to the requirements of the limit of microorganisms to that limit. There are several types of active medicinal compounds, Additional compounds are also various dosage forms, each of which has physico-chemical properties which often range in exposure to

microorganisms or always contains microorganisms that can affect the quality of the preparation because it has the potential to cause abnormalities, unwanted effects in the treatment and use of drugs including cosmetics. Until the stability is needed in balance and defense of the number and suppression of the life of microorganisms present in certain preparations until the desired duration range [15].

Therefore, the cayenne pepper leaf extract is always being developed into a pharmaceutical preparation, which forms a spray so that it can be applied very quickly to cure acne.

This study aims to formulate a leaf extract of cayenne pepper (*Capsicum frutescens L.*) into a spray preparation and also to determine whether the spray preparation of cayenne pepper leaf extract (*Capsicum frutescens L.*) can affect the characterization of the preparation.

RESEARCH METHODS

The research design used is random sampling. A sample collection procedure when all individuals in the population either individually or in groups are given the appropriate opportunity to select members of the sample.

The population in this study were all chili leaves of cayenne pepper (*Capsicum frutescens L.*) which were obtained in the district. Atinggola, North Gorontalo Regency. The sample of cayenne pepper (*Capsicum frutescens L.*) used as much as 5 kg.

The tools used in this research are rotary evaporator, mortar with pestle, universal pH, container (jars and bottles), pipette, measuring cup (pyrex), beaker (pyrex), porcelain cup, watch glass, test tube (pyrex).), stirring rods, analytical balances and vials.

The material used in this research is the leaves of cayenne pepper (*Capsicum frutescens L.*) taken from District

Atinggola, North Gorontalo Regency, Gorontalo Province, aluminum foil, methyl paraben, carbopol, propylene glycol, aquadegst, filter paper and 96% ethanol.

The sample used was cayenne pepper (*Capsicum frutescens* L.) the part needed was the freshest leaves, sample collection was carried out in the morning at 10.00-12.00 am by manually picking. Samples obtained as much as 5 kg. Cayenne pepper leaves (*Capsicum frutescens* L.) were obtained in the North Gorontalo Regency, Gorontalo Province.

The collected samples were then cleaned of dirt, by washing them with running water. Wet sorting is carried out which aims to reduce the dirt stuck to the leaves of cayenne pepper. Then the sample is chopped, the purpose of chopping a sample is to facilitate drying. Then the sample was dried in the wind and covered with a black cloth and not exposed to direct sunlight, the goal through drying is to reduce the water content in the sample. After the sample is dry, then dry sorting is carried out in order to sort out samples that are not suitable for use or damaged samples. The next step is the extraction of the sample.

The simplicia leaves of cayenne pepper (*Capsicum frutescens* L.) were weighed in the amount of 500 grams, put in a maceration container, soaked in 96% ethanol extract until the sample was completely wetted. Maceration was carried out for 2×24 hours at room temperature (20-25°C). Then the sample is filtered, separated between the residue and the filtrate using filter paper

The ethanol extract that has been produced is evaporated in a rotary evaporator to obtain a thick extract of cayenne pepper leaves (*Capsicum frutescens* L.)

Table 1. Spray formula design

Ingredients	Utility	Concentration		
		FI	FII	FIII
Cayenne pepper leaf extract	Active substance	25%	25%	25%
Carbo-pol	Gelling agent	0.5%	1%	2%
Methyl Paraben	Preservative	0.18%	0.18%	0.18%
Propylene glycol	Moisturizer	2%	2%	2%
Aqua-dest	Solvent	100% Ads	100% Ads	100% Ads

Modified from (Shafira et al, 2015)

Preparation of Spray Processing

All the ingredients were weighed, then the carbopol was first dispersed in cold distilled water and added with heated distilled water and then ground until the carbopol was completely dispersed (component 1), then methyl paraben was dissolved in propylene glycol and then the active compound (component 2) was added. Then component 1 is added little by little to component 2, then the remaining aquadest is added, then stirred until homogeneous.

Preparation of Physical Stability Test Organoleptic test

The organoleptic test was carried out by means of a spray preparation of cayenne pepper leaf extract (*Capsicum frutescens* L.) observed by naked eye such as color, odor, purity, separation and other changes that may be formed after formation [8].

pH test

Testing the pH of the spray preparation of cayenne pepper (*Capsicum frutescens* L.) leaf extract was carried out using universal pH paper. The expected pH of the preparation is based on the pH of the skin which is in the range of 4.5 - 6.5 [8].

Homogeneity test

The homogeneity test was carried out in a spray preparation of cayenne pepper leaf extract (*Capsicum frutescens* L.) by

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spraying all formulas on the surface of the slide and seeing the distribution of particles forming visually on the undissolved particles [8].

Spreadability test

This test is carried out on the skin area by spraying the upper arm through a distance of 3 cm. after spraying counting up to 10 seconds in checking whether the preparation is stuck or the droplets from the spray are dripping down [6].

Viscosity test

The spray preparation of cayenne pepper leaf extract (*Capsicum frutescens* L.) is put in a 100 mL beaker, then the same spindle is selected in each formulation, then the speed is set to 30 rpm which is immersed in the preparation until the equipment shows the viscosity value of the preparation. The viscosity value (cPs) produced in the viscometer equipment includes the viscosity value of the preparation [4].

Spray pattern test / spray weight

The spray preparation of cayenne pepper leaf extract (*Capsicum frutescens* L.) was sprayed in plastic sheets whose weight had been calculated and numbered at a spray distance of 10 cm, then the duration of drying was calculated using and weighing the weight.

Data analysis technique

In this study using information analysis techniques by SPSS. The statistical test used in this observation is the one sample t.test.

RESEARCH RESULT

Cayenne Pepper Leaf Extract

Samples of cayenne pepper (*Capsicum frutescens* L.) leaves produced as much as 3 g of dry extract and 50 g of thick extract were obtained.

Table 2. Yield Results

Sample	Simple Weight	Extract Weight	marinade
Cayenne Pepper	500 g	50 g	15.151%

Leaves
(*Capsicum frutescens* L.)

Source: Processed data (2021)

Table 3. Phytochemical Screening Results

Compound	Reagent (ml)	Results	Information
Flavonoids	NaOH (1 ml)	Yellow color	+ (Positive)
Tannins	FeCl ₃ (3 drops)	Formed blackish green color	+ (Positive)
Saponins	HCl	No foam is formed	- (Negative)

Source: Processed data (2021)

Table 4. Organoleptic Test Results

Days to-	Color	Smell	Texture
Formula I			
Number 1	Blackish green	Special extract	Slightly runny
14th	Blackish green	Special extract	Slightly runny
27th	Blackish green	Special extract	Slightly thick
40th	Blackish green	Special extract	Slightly thick
53rd	Blackish green	Special extract	Slightly thick
66th	Blackish green	Special extract	Slightly thick
Formula II			
Number 1	Blackish green	Special extract	Slightly thick
14th	Blackish green	Special extract	Slightly thick
27th	Blackish green	Special extract	Thick
40th	Blackish green	Special extract	Thick
53rd	Blackish green	Special extract	Thick
66th	Blackish green	Special extract	Thick
Formula III			
Number 1	Blackish green	Special extract	Thick
14th	Blackish green	Special extract	Thick
27th	Blackish green	Special extract	Very thick
40th	Blackish green	Special extract	Very thick

53rd	Blackish green	Special extract	Very thick
66th	Blackish green	Special extract	Very thick

Source: Processed data (2021)

Table 5. Homogeneity test results

Days to-	Formula I	Formula II	Formula III
Number 1	Homogeneous	Homogeneous	Homogeneous
14th	Homogeneous	Homogeneous	Homogeneous
27th	Homogeneous	Homogeneous	Homogeneous
40th	Homogeneous	Homogeneous	Homogeneous
53rd	Homogeneous	Homogeneous	Homogeneous
66th	Homogeneous	Homogeneous	Homogeneous

Source: Data processed 2021

Table 6. The results of the dispersion test

Days to-	Formula I	Formula II	Formula III
Number 1	Widespread	Widespread	Spread at 1 point
14th	Widespread	Widespread	Spread at 1 point
27th	Widespread	Widespread	Spread at 1 point
40th	Widespread	Widespread	Spread at 1 point
53rd	Widespread	Widespread	Spread at 1 point
66th	Widespread	Widespread	Spread at 1 point

Source: Processed data (2021)

Table 6. Viscosity test results

Viscosity Unit (cPs)			
Days to-	Formula I	Formula II	Formula III
Number 1	3.7	15.2	23.0
14th	4.1	16.3	24.3
27th	5.3	18.1	25.8
40th	6.8	19.4	27.2
53rd	7.8	20.6	29.1
66th	8.7	21.5	29.3

Source: Processed data (2021)

Table 7. Test results of spray pattern

Spraying Unit/Spray Weight (g)			
Days to-	Formula I	Formula II	Formula III
Number 1	0.11	0.12	0.12

Days to-	Formula I	Formula II	Formula III
Number 1	0.14	0.7	0.17
14th	0.9	0.12	0.9
27th	0.10	0.10	0.9
40th	0.11	0.10	0.10
53rd	0.10	0.11	0.11
66th			

Source: Processed data (2021)

Table 8. pH test results

Days to-	Formula I	Formula II	Formula III
Number 1	5	5	5
14th	5	5	5
27th	5	5	5
40th	5	5	4
53rd	5	5	4
66th	5	5	4

Source: Processed data (2021)

DISCUSSION

Research on the formulation and characterization of a spray preparation of cayenne pepper (*Capsicum frutescens* L.) leaf extract as an anti-acne was carried out in the laboratory of Bina Mandiri University, Gorontalo. Samples of cayenne pepper (*Capsicum frutescens* L.) leaf were produced from Atinggola District, North Gorontalo Regency, Gorontalo Province, weighing 5 kg, the samples were washed and dried.

Based on the phytochemical screening carried out, the results obtained from cayenne pepper leaves contain tannin and flavonoid compounds.

Flavonoid compounds are secondary metabolites of polyphenols that are found widely in plants and have various biological properties and effects, including antioxidant, anti-inflammatory and antibacterial [10]. Based on the results of phytochemical screening, cayenne pepper leaves have the potential to be developed as an antibacterial. The ethanol extract of cayenne pepper (*Capsicum frutescens* L.) leaves has antibacterial activity against the acne-causing bacteria *Propionibacterium acnes* [1].

The extraction step was carried out in the maceration extraction procedure on a

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sample of dried simplicia leaves of cayenne pepper (*Capsicum frutescens* L.) in the amount of 330 g soaked in 7 liters of 96% ethanol solvent for up to 2×24 hours.

The results of the maceration were concentrated to obtain a thick extract of 50 grams, in order to obtain a yield of 15.151%. The yield is the amount of extract obtained from the extraction which is expressed in units of % (percent).

Spray gel is a topical preparation developed from a gel preparation. In this study, a spray preparation of cayenne pepper leaf extract (*Capsicum frutescens* L.) was used as an acne treatment with the mechanism of action of an anti-acne spray, namely by inhibiting the development of *Propionibacterium acnes* bacteria which can clog the production of excess oil (sebum) that occurs in the 2nd layer of the skin (dermis) to be precise in the sebaceous glands. The active compounds used in the research spray of cayenne pepper leaf extract are flavonoids.

Flavonoids can inhibit the growth of acne-causing bacteria with the mechanism of action of flavonoids inhibiting the function of cell membranes and disrupting the integrity of bacterial cells [16].

In the spray formulation of Cayenne pepper (*Capsicum frutescens* L.) leaf extract, 3 formulas were made in varying strength of carbopol base. Carbopol is a gelling agent that is more often used in cosmetic manufacturers because of its highest compatibility and stability. Carbopol is not toxic when applied to the skin. In this study, the basis for choosing different concentrations was to see if there was an effect on the characterization of the preparation [2]. The greater the strength of the carbopol used, it will affect the characterization of the preparation.

The stability of a preparation has many impacts that affect, for example stability through active products,

interacting with active products and additive products, processing stages, packaging stages with environmental conditions to the stages of storing, transporting, handling and the duration of the material from processing to use [15]. In this study, the test parameters carried out included: organoleptic testing, dispersion, pH, viscosity, homogeneity and spraying pattern / spray weight. Observations were made every 2 weeks for 66 days.

Organoleptic testing of a preparation is carried out by observing the color, texture and aroma of the preparation. From the results of organoleptic testing of the preparation, it can be interpreted that on the 66th day, the texture of the preparation in formula I changed from slightly liquid to slightly thickened, in formula II there was a change in the texture of the preparation from slightly thick to thick and for formula III there was a change the texture from thick to very thick, this is because in formula III the use of a carbopol base is too large, causing the texture of the preparation to be very thick. The odor produced from the three formulas was typical of the extract and until the 66th day there was no change in smell. In observing the color of the three formulations, up to the 66th day there was no color change, However, when applied, the preparation will leave a color mark and the shape of the preparation is not clear. As stated, where the criteria for a good spray preparation are when the results obtained from the dosage form are not cloudy, clear (transparent) and do not leave color marks [9].

In this study, homogeneity testing was carried out in the way the preparation was sprayed on a glass slide. The homogeneity requirement cannot be contained in a coarse product that can be felt [13]. The purpose of homogeneity testing is to see a particle from the preparation has been distributed. And the

test results showed that the three formulas were homogeneous for storage, this matter was marked that there were no particles or coarse grains that could be touched when the preparation was sprayed onto the glass slide. It is the same as stated, where a preparation can be said to be homogeneous if there are no coarse grains when the preparation is smeared on a glass slide [15].

The results of the dispersion test were carried out by means of a spray sprayed at a distance of 3 cm applied directly to the skin of the upper arm during the test time of 10 seconds and did not flow downwards. The higher the dispersion power produced, the greater the strength of the active compound in spreading and contacting the skin [12]. From the results of observations of the dispersion until the 66th day, it shows that formulas I and II have a wide spread, while those for formula III do not spread, they only accumulate at one point. This is caused by the use of carbopol with a concentration that is too high in formula III, and is also influenced by the viscosity value of the preparation that is too high. It is the same as what was stated, where when the viscosity value and the use of carbopol of a preparation are too large, it will affect the distribution of preparations [1]. A good requirement or criterion for a spray preparation is when the preparation can be sprayed evenly and form small particles [3].

Viscosity is a test of preparations carried out to show whether or not a preparation is easy to spray. The greater the viscosity of the flow, the higher the resistance [7]. The results of the viscosity test showed that the three formulas had different viscosity values in formula II (15.2 cPs, 16.3 cPs, 18.1 cPs, 19.4 cPs, 20.6 cPs, and 21.5 cPs) and formula III (23.0 cPs, 24.3 cPs, 25.8 cPs, 27.2 cPs, 29.1 cPs and 29.3 cPs) have high viscosity

values. This is caused by the use of carbopol that is too large.

Testing of spraying pattern/spray weight was carried out by spraying on paper at a distance of 10 cm, formulas I, II and III showed various spray weight data. There are variations in the spray that forms through the spray preparation the effect through the spray range as well as the viscosity of the preparation [12]. The viscosity value of the preparation can affect the spraying pattern on the preparation [11].

Semisolid preparations whose application through the skin is always the same as the skin's pH, which is pH 4.5-6.5. When the pH of the preparation is very acidic it can cause the skin to wrinkle and become damaged, when the preparation is very alkaline it can cause the skin to peel and dry out [1]. The pH test of the preparation was carried out with universal pH paper dipped in the preparation. From the results of the pH test, it shows that the formulas I and II have a pH value of 5 which is in accordance with the requirements because it covers the skin pH interval. While the formula III shows that the 1st day to 27th day of storage has a pH value that meets the requirements but on the 40th day of storage the pH value decreases. This is caused by the use of too large a concentration of carbopol base, as stated, ie the greater the concentration of the base used, the lower the pH value of the preparation [16]. The ideal pH value according to the requirements for topical preparations so as not to irritate the skin must be in accordance with the skin pH, which is in the range of 4.5-6.5 [13].

From the results of the stability test parameters obtained, the statistical test one sample t.test was carried out. However, initially a one sample t test was carried out. The first test was carried out One-Sample Kolmogorove-Smirnov knowing if the information is distributed

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optimally and uniformly. The data generated in this test is stated that the data has been distributed normally and uniformly.

In the one sample t.test test, the viscosity value is $0.000 < 0.05$, the spray pattern/spray weight is $0.002 < 0.05$ and pH $0.000 < 0.05$. significant to the characterization of the preparation.

In this case, H₀ is rejected and H₁ is accepted, meaning that there is a significant impact on the characterization of the preparation by the difference in the concentration of carbopol base in each formula.

CONCLUSION

Based on the results obtained, conclusions can be drawn where:

1. Cayenne pepper leaf extract (*Capsicum frutescens L.*) cannot be made in spray preparations because the results obtained from the physical form of the preparation can leave color and are not clear.
2. The formula of cayenne pepper (*Capsicum frutescens L.*) leaf extract on various carbopol base strengths, namely: 0.5%, 1% and 2%. From the results obtained that the formula of cayenne pepper leaf extract (*Capsicum frutescens L.*) can affect the characterization of the preparation.

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- Pembelajarannya. Agenda Studi Pendidikan Biologi*
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