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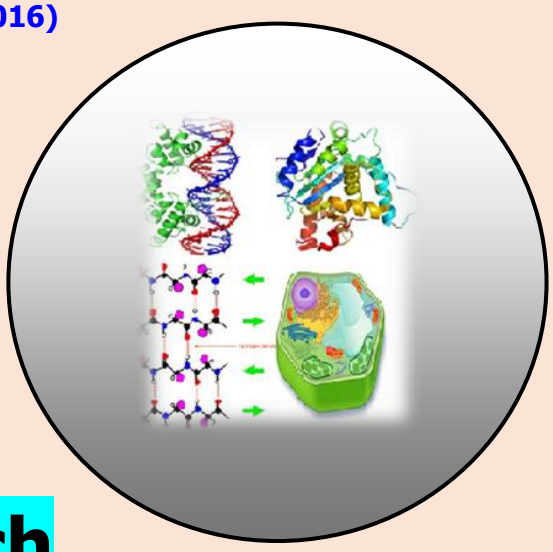

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REVIEW ARTICLE

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Studies the Resistance to Oxidation and the Changes Phases against the Characteristics of Physicochemical *Aloe vera* Gel

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ABSTRACT

Aloe vera gel is a potential material as raw material industry, this is because a very complex composition. However Aloe vera gel is very easily oxidized or unstable. Viscosity gel and the benefit are decreased at room temperature after 24-36 hours. This research aims to obtain information about the resistance to oxidation via nitogren gas treatment and antioxidants, as well as the influence of phase changes in an attempt to retain the characteristics of the physicochemical Aloe vera gel over time. This Study can be described a conclusion that the best storage conditions are sound-proofed temperature conditions (4 ± 1)°c. Environmental conditioning by administering nitrogen gas storage and antioxidant Buthylated Hydroxytoluene (BHT) 750 ppm for 4 weeks defending the nature physicochemical Aloe vera gel. Freeze drying process of Aloe vera gel that has filled gum Arabic 3 % generates a more homogenous powder and smaller and more.

Keywords: Aloe vera gel, Freeze Drying, Oxidation, Physicochemical and Powder.

INTRODUCTION

Cosmetics industry in Indonesia is currently more advanced and developed in tune with the needs of the community in using cosmetic products. Forms and types of cosmetics that spread the market varies greatly as *perfume, tonic, lotion, shampoo* and others who import goods is generally. Along with the development of such promotional benefits and use of the traditional herb of the plant materials for cosmetics is increasingly spread in the community. One of the herbs that are known to have efficacy and can be used as a raw material for cosmetics is the *Aloe vera* (*Aloe vera* Linn). Part of leaf of *Aloe vera* is beneficial for cosmetics are *Aloe vera* gel obtained from the inside of the leaves (leaf parenkim tissue) (Nataw, 1986). Agarwala (1977) added that the content of *Aloe vera* gel is very complex as polysaccharide, sugar reduction, tannins, organic acids, minerals, proteins, enzymes etc. *Aloe vera* gel containing glucomannan which according to Magnuson (1991) has the ability to keep the moisture of the skin. *Aloe vera* gels are unstable (Leung, 1977). Viscosity of the gel decreases at room temperature 24-36 hours. Moroni (1982) suggests that *Aloe vera* gel is very easy because they contain oxidized oxidase. The results of the oxidation will cause the color of the *Aloe vera* gel into a yellow to Brown and which will experience a decrease (Leung, 1977; Meadow, 1980 and Magnuson, 1991).According to Morsy (1991), fresh gel of *Aloe vera* leaf is biologically effective skin retain moisture

compared to gels that have long been kept. The gel will lose at most the potential of curative in treating skin diseases, radiation ultaviolet and burns in two hours after the extraction. But there are times when the gel may lose its potency against a particular case but still effective against the other. In the two hours after extraction if the gel is exposed to air or light then the color of the gel will turn pink and the next will be darker. Research results also obtained that in terms of the composition of Aloe gel is more effective if it is still three hours or immediately after extraction though without warming up. On the other hand if the gel is stored in dark condition their effectiveness as a cosmetic or medicinal ingredient is relatively still can be maintained more than 3 hours from the time of extraction or eight hours from the time of cutting the leaves. Based on this need may do research regarding aspects of the oxidation resistance and stabilization phases through changes so that the characteristics of the physicochemical *Aloe vera* gel can be maintained during storage. Get information about the resistance to oxidation through treatment with nitrogen gas and antioxidants, as well as the influence of phase changes in an attempt to retain the characteristics of the physicochemical *Aloe vera* gel over time.

MATERIALS AND METHODS

Research Methodology

The design of this study using Random Design Complete factorial experiment with three factors and repeat twice. So the combination treatment gained as much as 36 types. The first factor is the storage environment pengkondisisan with gas N_2: Without granting gas N_2 (N0) and with the grant of a gas of N_2 (N1). The second factor was the concentration of antioxidant *Buthylated Hydroxytoluene* (BHT):250 ppm (A1), 500 ppm (A2), 750 ppm (A3). The third factor is the long storage on (4 ± 1) ^{o}C which consists of: 1 week (M1), weeks (M2), weeks (M3), weeks (M4), weeks (M5), weeks (M6). To tell the difference between the treatments of gases N_2, the concentration of antioxidants and prolonged storage against the variable viscosity, total acid, pH and color used the analysis of diversity in two directions. If there are differences continued with multiple tests Duncant.

Conducting the Research

Research is conducted through several stages of research i.e. get method of cutting and spending the right gel, observations visually *Aloe vera* gel that is stored at the temperature (-10 ± 1) ^{o}C, temperatures (4 + 1) ^{o}C, room temperature without and with a sealed container. Next is the determination of the composition of fresh *Aloe vera* gel. Determination of the long warming *Aloe vera* gel the right thickness and observations done with the absorbance color gel that is heated at the temperature of 80^{o}C with a long warm-up is different. Determination of the influence of gas N_2 and the concentration of antioxidants in gel of *Aloe vera* that is stored for 6 weeks in temperatures (4 ± 1) ^{o}C. *Aloe vera* Gel from the best observations dried *freeze dryer*. *Aloe vera* powder drying results applied to the next in making beauty masks traditionally.

RESULTS AND DISCUSSION

Storage and Visual Observation of *Aloe vera*

The research obtained observations visually during the eleven days against *Aloe vera* gel that is kept at a temperature of (10 ± 1) ^{o}C (4 ± 1) ^{o}C, and the temperature of the room (with a closed and open containers) are presented in table 1. From table 1 it can be seen that *Aloe vera* gel that is kept at a temperature of (4 ± 1) ^{o}C until the end of the storage during the 11 days do not change, either the color, smell and appearance and not overgrown with fungus. The gel is stored at a temperature (4 ± 1) ^{o}C starts to look moldy on the 4th day, the color is blanch on the 8th day and water is reduced on day 10. Storage of gel at room temperature using a container that is closed on the 4th day of the amount of water grew the more texture mushy and start to grow mushrooms. While the colors start to change on day 8 to brownish. For gel is stored at room temperature in an open container, the mushrooms have started to look on the 2nd day, whereas on day 3 colors began to change somewhat Brown and start to smell. The longer storage is increasingly evident changes. Color gel turns from the chocolate into blackish on the 9th but the amount of water on the wane and eventually become dry gel on the 11th day. *Aloe vera* gel on the storage temperature (-10 ± 1)^{o}C until the end of the storage (11 days) visually looks good but after *thawing* process viscosity gel at temperatures (-10 ± 1)^{o}C i.e. 80 cp in the 4 lower than the gel stored temperature (4 ± 1)^{o}C 94 cp. The growth of the fungus in the gel is an indicator of the growth of microorganisms on materials. From the four different storage place, for the gel is stored at room temperature with an open vessel first overgrown fungus. This is because the *Aloe vera* gel direct contact with air and the temperature of the holding spur damage early.

According to Desrosier (1969) some of the factors that influence the type and extent of damage to materials caused by the microorganism is the moisture content, oxygen levels, other components, degree of contamination and the presence of an inhibitor of growth substances.

Table 1. The Observations Visually Fresh *Aloe vera* Gel.

Day	Temperature (-10 ± 1) ^{o}C	Temperature (4 ± 1) ^{o}C	The closed container of room temperature	Room temperature container open
1	Frozen, color unchanged, solid	Watery, color unchanged, mushy	more water, color unchanged, mushy	Watery, color unchanged, mushy
2	Frozen ,color unchanged, solid	Watery, color unchanged, mushy	more water, color unchanged, mushy	Watery, color unchanged, mushy, Moldy
3	Frozen, color unchanged, solid	Watery, color unchanged, mushy	more water color unchanged mushy	Watery, color Brown, soggy, smelly mushroom growing
4	Frozen, color unchanged, solid	Watery, color unchanged, mushy, little mushrooms	more water, color unchanged, more mushy, little mushrooms	Watery, more chocolate, soggy, smelly mushroom
5	Frozen, color unchanged, solid	Watery, color unchanged, mushy, little mushrooms	more water, color unchanged, more mushy, mushroom growing	Watery, brown color, soggy, smelly mushroom
6	Frozen, color unchanged, solid	Watery, color unchanged, mushy, Moldy	more water, color unchanged, more mushy, mushroom growing	reduced water, color more chocolate, soggy, smelly mushroom
7	Frozen, color unchanged, solid	Watery, color unchanged, mushy, Moldy	more water, color unchanged, more mushy mushroom growing	reduced water, more chocolate, soggy, smelly mushroom
8	Frozen, color unchanged, solid	Watery, pale, mushy, Moldy	more water, brownish color, more mushy, mushroom growing	no watering, more chocolate, more soggy, smelly mushroom
9	Frozen, color unchanged, solid	Watery, pale, mushy, Moldy	more water, brownish color, more mushy mushroom growing	no watering, blackish brown soggy, smelly mushroom
10	Frozen, color unchanged, solid	reduced water, pale mushy, Moldy	more water, brownish color, more mushy mushroom growing	no watering, blackish brown, soggy, smelly mushroom
11	Frozen, color unchanged, solid	reduced water, pale, mushy, Moldy	more water, brownish color, more mushy mushroom growing	no watering, blackish browna bit dry, odor mushroom

Fastest color change occurs in the gel are stored at room temperature with open container. This is because the *Aloe vera* gel contains carbohydrates i.e. glucomannan and contact with oxygen and temperature of storage supported by money spurred the discoloration process. On the oxidation of carbohydrates, usually cause changes of colour and flavour. The color change that occurs is usually Brown or Sorrel and can also be gray or yellow (Stuckey, 1981). The oxidation of carbohydrates by various types of enzymes such as peroxidase and catalase reaction often called Browning enzimatis. The reaction is always marked by a change of taste and smell. To prevent this reaction is usually done warming up for inactivate enzyme. Enzimatis Browning reaction depends on oxygen levels and the pH of the medium. Texture gel decreases quickly (the more mushy) occurred on the *Aloe vera* gel is stored at room temperature with an open container. Moroni (1982) stated that the gel viscosity temperature will be greatly decreased when stored at room temperature. Storage of gel after 24 – 36 hours at room temperature showed decreased viscosity close to water. A decrease in viscosity due to the presence of polysaccharide hydrolysis by enzymes that have high activity.

Change the color of the aspirants to the *Aloe vera* gel chocolate can also cause flavor or smell unpleasant and the loss of some amino acids such as lysine as many as 5.27 – 6.74% of the total amino acids existing (Anonimous, 1988in Suryowidodo1980). Therefore to avoid changes to the nature of the physicochemical of Aloe gel is need for process stabilization. This process includes the addition of substance preservative, antioxidant, coagulant and so on. In addition the use of hot likes blancing, needed also in the prevention of color change.

Fresh *Aloe vera* Gel Composition

Data on the initial composition of the *Aloe vera* gel as shown in Table 2. From table 2 clearly visible that the main composition of Aloe gel is water that is 98.46%. It is supported by the opinion of Morsy (1991) which States that the moisture content of *Aloe vera* gel can reach 98.0-99.5%. Whereas Omelia (1993) that gel *Aloe vera* gel states 98% of liquid containing the chemical compound bioactive which include ions, organic molecules and polysaccharides. In addition to the water composition of the gel *Aloe vera* gel which is very important for cosmetics is a carbohydrate that is the form of glucomannan. Glucomannan is compounds of carbohydrates that can help skin retain moisture, making it excellent for cosmetic needs such as moisturizer, hand and body lotions, shampoos etc (Magnuson 1991). According to Moroni (1982) a combination of glucomannan, organic acids, amino acids and minerals that cause the Aloe gel good for cosmetics.

Table 2. Composition and properties of Fresh *Aloe vera* Gel.

The composition of the	The total number of
Water	98.46%
Carbohydrates	1.08%
Protein	0.036%
Fat	0.29%
Ash	0.21%
Ph	4.8
Total Acid	0.33 ml/100 g
Viscosity	275 cp
Color (absorbance at π = 320 nm	0, 174

Observation of the Viscosity and color *Aloe vera* Gel As a function of time Warming

On the research of viscosity testing is also done from the *Aloe vera* gel is heated at a temperature of 80^{o}C with a different warming long as seen Table 3. The purpose of warming at 80^{o}C is to reduce or suppress the activities of fenolase are very instrumental in the changing nature of the physicochemical *Aloe vera* gel. Supported by the opinion of Dimick *et al.* (1951) the heating at a temperature of 80^{o}C with a long warming can suppress activity fenolase.

Table 3. Viscosity of *Aloe vera* Gel on a Long Warm-up is different.

Long time warming up at 80^{o}C (minutes)	Viscosity (cp)
0	275
5	397
10	448
15	466
20	607

From table 3 and seen that the longer the warming gel viscosity of the resulting greater. This is because the longer the warm up then the greater the amount of water evaporated. Supported by the opinion of Whitney (1969) that the water that is in the gel terimobilisasi gel mechanically only by way of warming up. Fennema (1976) stated that the gel has a variation on the degree of hardness, elasticity and fragility, that it all depends on the type and concentration of the ingredients of the gel-forming, salt content, pH and temperature. Observation on *Aloe vera* gel color temperature 80^{o}C with different warming long done at the 20th minute. To-40, 60, 80, 100 and 120. Observation results data can be seen in Table 4. The longer warming up to 15 minutes produces the color absorbance is getting smaller, but in 20 minutes of heating value increases again.

This is likely caused by warming 80^{o}C for 15 minutes is capable of inactivate oxidase so that the oxidation process that results in the degradation of color can be inhibited. Warming 20 minutes produces the color absorbance greater than 15 minutes of warming. This is likely due to warming tang too long resulting in chlorophyll in chloroplasts as complex protein will result in spite of chlorophyll into fast is broken (Meyer, 1978). While according to Eskin et al, (1971) if warming progresses, acid-acid will be released, because the chlorophyll regardless of a completely with the protein membrane around the chloroplasts or because it becomes more permeable. The acid reacts with the chlorophyll will form brown feofitin, occur due to acid-sour existed before warming up.

Table 4. The color of the Gel of *Aloe vera* with a warming Time and Different TimeObservations (absorbance at π= 320 nm).

Warm-uptime (minutes)	Time observations (minutes)					
	20	40	60	80	100	120
5	0291	0290	0297	0299	0299	0297
10	0237	0251	0254	0255	0255	0253
15	0215	0215	0214	0216	0215	0213
20	0456	0339	0339	0345	0344	0342

Moisture Content

From research done to the *Aloe vera* gel given gas N_2 and the concentration of antioxidants during storage, resulting in an average value of moisture content between a combination treatments that is not too much different, namely ranges from 98.69 to 99.96%. This is likely due to the oven methode is used for this analysis calculates all of the water in *Aloe vera* gel, be it air bound physically, chemically or free water.

Total Acid

Based on the results of the analysis show that the diversity of factors concentration of antioxidants and retention as well as the interaction between these three factors provide a very real influence. While the factors influence nitrogen gas give effect are not real to the total acid, *Aloe vera* gel. The average value of the acid *Aloe vera* gel on each treatment can be seen in Table 5. The greater the concentration of antioxidants causes the lower total acid. This is because the greater the concentration of antioxidants added getting bigger H + number of removed, so the oxygen oxidation process led to more and more tied up. Thus the smaller the probability of hydrolysis of carbohydrates by enzymes into acid-organic acids. Supported by the opinion of Winarno (1984) stating that antioxidant BHT is primary or antioxidants antioxidants-breaking the chain. By removing H + antiosidan can inhibit the occurrence of oxidation process, because the oxygen is bound by antioxidants. According to Jackob (1951), antioxidants are very easily oxidized so that before the material is then oxidized antioxidants in advance with regard to oxygen. The longer storage the greater total acid *Aloe vera* gel is produced, and its increase looks very sharp after the 4th week. This is because the lower storage increasingly the ability of antioxidants to prevent the oxidation process so that the more likely occurrence of breakdown of carbohydrates becomes simpler components including acid-acid organic. Joshi and Bartakke (1974) acid-malic and citric acid type and concentration in gel, his condition varies depending on the conditions of its storage.

pH

The awarding of the nitrogen gas gives *Aloe vera* gel pH values higher than without nitrogen, as shown in table 5. Where did Zimmerman (1974) the giving of an inert gas such as nitrogen can reduce the amount of oxygen so that the oxidation process that resulted in the formation of acid and lowers the pH value can be prevented. The addition of antioxidants can also increase the pH of the gel, it is related to the variable total acids. The greater the concentration of antioxidants which are added the lower the total acid is generated so that the gel pH has increased. As we know the pH is minus the logarithm of concentration of H +.The longer storage, pH of Aloe gel is getting low. This is because the longer the storage increasingly possible occurrence of oxidation process despite being given antioxidant or nitrogen gas. Fennema (1976) States that 100 ppm BHT can maintain the stability of the material up to 36 days. This led to the oxidation process decipherment – unravelling the composition of *Aloe vera* gel into the components including simpler organic acids can lower the pH value. According to Eksin *et al* (1971) an increased amount of acid or decreased value of pH during storage is also possible due to microorganisms activity which can be a component of carbohydrates make convection acid.

Table 5. The average value of Total acids, pH, viscosity, color in *Aloe vera* Gel on each Treatment of Nitrogen, antioxidants and storage.

Treatment	Total acid (ml/100 g)	notation	pH	notation	Viscositycp	notation	Color	notation
N0A1M1	1.75	klm	4.7	a	26.4	hij	0.75	hij
N0A2M1	1.75	klm	4.8	a	70.6	efgh	0.65	klm
N0A3M1	1.38	n	4.8	a	181.0	b	0.60	lmn
N1A1M1	1.73	klm	4.7	a	89.6	def	0.48	op
N1A2M1	1.70	klm	4.7	a	96.8	def	0.48	op
N1A3M1	1.63	lmn	4.9	a	223.8	a	0.44	p
N0A1M2	1.95	ijkl	4.6	a	30.4	ghij	0.83	fg
N0A2M2	2.00	ijk	4.7	a	59.0	fghi	0.68	jkl
N0A3M2	1.63	lmn	4.7	a	131.6	cd	0.65	klm
N1A1M2	2.03	hijk	4.6	a	29.2	hij	0.58	mn
N1A2M2	2.00	ijk	4.7	a	86.0	ef	0.48	op
N1A3M2	1.63	lmn	4.7	a	163.0	bc	0.46	p
N0A1M3	2.13	hij	3.9	a	6.4	j	0.95	e
N0A2M3	1.85	jkl	4.6	a	26.4	hij	0.77	ghi
N0A3M3	1.88	jkl	4.7	a	97.4	def	0.66	klm
N1A1M3	2.33	gh	4.6	a	21.0	ij	0.65	klm
N1A2M3	2.03	hijk	4.6	a	71.6	efgh	0.61	lmn
N1A3M3	1.80	jkl	4.7	a	112.0	de	0.54	on
N0A1M4	2.45	g	3.8	a	3.2	j	1.11	d
N0A2M4	2.03	hijk	4.5	a	12.6	j	0.83	fg
N0A3M4	1.90	jkl	4.5	a	39.2	ghij	0.70	ijk
N1A1M4	2.50	fg	4.6	a	8.2	j	0.68	jkl
N1A2M4	2.25	ghi	4.6	a	22.4	ij	0.64	klm
N1A3M4	2.00	ijk	4.7	a	74.2	efg	0.61	lmn
N0A1M5	3.00	de	3.7	a	3.5	j	1.40	b
N0A2M5	2.50	fg	4.5	a	16.0	ij	0.96	e
N0A3M5	2.50	fg	4.5	a	28.8	hij	0.94	e
N1A1M5	3.00	de	4.4	a	5.0	j	0.79	fgh
N1A2M5	2.50	fg	4.6	a	14.0	ij	0.78	fgh
N1A3M5	2.50	fg	4.7	a	60.0	fghi	0.76	ghi
N0A1M6	4.83	a	3.7	a	2.4	j	1.50	a
N0A2M6	3.15	cg	4.3	a	19.0	ij	1.37	b
N0A3M6	2.88	de	4.4	a	23.2	ij	1.24	c
N1A1M6	4.15	b	4.2	a	9.4	j	0.95	e
N1A2M6	3.38	c	4.2	a	18.6	ij	0.94	e
N1A3M6	2.78	ef	4.6	a	27.6	hij	0.86	f

Description: * the notation of the different treatment combinations shows the difference between the very real

Viscosity

Based on the results of the analysis of the diversity of factors suggests that the giving of the nitrogen gas, antioxidants and long storage of submitted a very real influence. Interaction of nitrogen with antioxidants factors as well as the interaction between these three factors provide a very real influence. While antioxidant interaction with long storage and nitrogen interaction with the storage page gives only the influence of viscosity against real *Aloe vera* gel. The average value of viscosity gel *Aloe vera* can be seen in table 5.Granting of nitrogen gas in the *Aloe vera* gel produce higher viscosity grades compared with gas without nitorgen.

This is because nitrogen gas can press so that the amount of oxygen the oxidation process that results in a decrease in the viscosity can be avoided. Rooney (1981) stated that the omission or reduction of oxygen can physically do with blowing gas that is inert before packing life. Meanwhile, according to Lindsay (1985) the type of gas that is often used is the nitrogen gas. The greater the amount of antioxidants that added *Aloe vera* gel viscosity resulting the higher, or the average thickness of the gel of *Aloe vera* on the concentration of antioxidants 750 ppm concentration greater than 250 ppm and 500 ppm. This is because the antioxidant based on the principle of his work is the BHT antioxidant containing phenol grup and aromatic amines react with free radicals formed a radical antioxidant more stable so that the thickness of the gel relative can be maintained (Taylor, 1980). *Aloe vera* gel nature unstable and very easily influenced by air, light, heat and microbes (Anonimous, 1980 *in* Suryowidodo, 1988). The longer storage, *Aloe vera* gel viscosity decrease. Decreased viscosity after the fourth week is relatively constant, but the average overcomes lower than the viscosity of fresh *Aloe vera* gel. This is because the longer the storage of the greater chance of fluid out of the three dimensional structure of the gel, which is highly correlated with a decrease in pH that occurs in *Aloe vera* gel. Glicksman (1969) stated that the thawing cross-ties involving the dismantling of the gel by involving chains of polymers of carbohydrates. Where did Fennema most polysaccharides have a reactive functional groups form carboxylic. Hydroxyl carboxylic polysaccharides undergo ionization reaction become the ion-ionnya of-COOH-COO became$^-$ and H + (Pederson, 1978). With declining pH then the number of H + ions is increased so that the balance shifted reaction so that the cluster-COO^- be protonated. The result of this process the starting style electrostatic has occurred. At pH too low there will be an awful lot of carboxylic ion-neutral, so no deny will consequently happen decrease viscosity. Viscosity is a measure of the relative to the movement of the fluid resistance of the parts. Besides pula Glicksman (1984) stated that some gel during storage or release of liberation events shows medium dispersed spontaneously even at high humidity and low temperatures are called sineresis.

Color

Based on the results of the analysis show that the diversity of these three factors, namely nitrogen gas, antioxidants and retention as well as all interactions between factors gives a very real influence against the colors of *Aloe vera* gel. Average of Aloe gel colours can be seen in table5.The awarding of the nitrogen gas produces a lower color values compared to without nitrogen gas. This is because the granting of nitrogen can reduce the presence of oxygen surrounding materials. The greater the antioxidant that also generates added value for the color that is getting low. According to Zimmerman *et al* (1974) the use of an inert passage can reduce oxygen levels aerial (*space head*) 1 – 2%. But it's still not good enough to protect against damage to the product. BHT antioxidant is effective enough to prevent oxidation and reduce degradation of the materials or the color formation of purpurin brownish (Fennema, 1976). Formation of purpurin can be prevented by removing oxygen or minimize oxygen with the addition of antioxidants (Clydesdale *et al*. 1976)

The longer storage of the resulting color absorbance is getting bigger (ugly). This is because the greater the chance for the occurrence of color degradation. Eskin et al (1971) States that the speed of oxidative degradation increases in line with length of time added blancing and storage. Joslyn and MacKinney (1938) States that the speed of the degradation of chlorophyll into a brownish green feofitin is the first order reaction against the concentration of acid. Green color quickly turns into brownish becouse heating and storage. It is also associated with increased total acids and pH value of gel isdecrease. According to Clydesdale *et al* (1976) acidification caused by chlorophyll loss of ions magnesium and lorofilid forming feotifin and feoforbid. While Eskin*et al* (1971) States the most likely reaction is a substitution of magnesium towards H + complex in feofitin form porpirin which is brown. Increased absorbance color is also caused due to chlorophyll oxidation process that starts with the oxidation of C10 into hydroxy followed by disconnection of the ring forming a kind of purpurin (Clydesdale *et al*, 1976)

The Observations of Powdered Aloe Gel after Drying using the *Freeze Dryer*

Observation on Aloe powder made against before and after freeze drying. The observations can be seen in table 6.In freeze drying we recommend *Aloe vera* gel filler material added (Agarwala 1997). The filler material used is gum Arabic with a concentration of 3% (Susanto, 1990). *Aloe vera* powder that is produced in the form of fine powders and dry, whereas without a gum producing powder berserat-serat and rather humid and somewhat difficult to ground. The addition of gum on the *Aloe vera* gel produce pH and viscosity are lower, because the gum is a salt that is slightly acidic so it can contribute acidity in *Aloe vera* gel. Where the higher degree of acidity would cause a decline in elecrostatic style on the structure of the gel so that viscosity will decrease (Fennema, 1976).

Whereas after freeze drying process, *Aloe vera* powder added gum produces viscosity gel is larger compared to the powder without gum. This is because the structure of three dimensional coused *Aloe vera* gel in the form along with the gum in the process of freeze drying is not experiencing a structure form shrink but porous. So in the process of rehydration is able to capture more water and structure of three dimensional images are more powerful with the gum. In accordance with the nature of the gum that is a water-soluble polysaccharide. All polisajarida are soluble in water to produce a thick solution because of the large molecular size (Whistler and Daniel, 1985). The style defends refused coulomb of charge-the negative charge being dispersed throughout the molecule polysaccharide tends to straighten the molecule (the polymer), produces a solution with a high viscosity (Hidgeand Osman, 1976). From the results of observations about solubility shows that *Aloe vera* powder soluble in water and alcohol. While the ratio between *Aloe vera* powders produced with raw materials used suggests that with fillers give lower powder ratio. It means to obtain 1 g powdered *Aloe vera* needed raw materials are lower than with no fillers. The filler material will act as seeds for crystallization fluid be *Aloe vera* powder (Susanto, 1990).

Table 6. The Observations Of *Aloe vera* Powder.

Variable	*Aloe vera* Gel		*Aloe vera* Gel + Gum	
	Before Freeze drying	After Freeze drying	Before Freeze drying	After Freeze drying
Form Of The Product	-	Fibrous powder	-	Fine powder
Moisture Content (%)	98.51	11.69	95.95	5.18
Ph	4.9	4.8	4.7	4.5
Viscosity (cp)	479	74	235	85
Solubility: -Water -Alcohol	- -	Soluble Soluble	- -	Soluble Soluble
Ratio powder/gel	-	1:148	-	1:59

Observations *Aloe vera* Gel application As *Aloe vera* Beauty Mask

Utilization of *Aloe vera* gel as a cosmetic products are very diverse, one of which is a mask of beauty. Where the mask acts to maintain the skin's moisture, tightens and reduces smudges black on skin and. Simple formulations and ready-made according to Morsy (1991) is *Aloe vera* gel added flour and a few drops of lime juice. Based on the research done to determine the amount of flour is added to produce a good *Aloe vera* mask, observations can be seen in table 7.

Table 7. Observations awarding of Flour on the *Aloe vera* Gel for *Aloe vera* Beauty Mask.

Variable	Fresh (+ % flour)			Dry (+ % flour)		
	gel + 25%	gel + 35%	gel +45%	gel + 25%	gel + 35%	gel + 45%
Moisture Content	76.82 %	73.09 %	72.94 %	12.17 %	9.84 %	9.03 %
pH	5.4	5.5	6.0	4.5	4.8	4.9
Ratio powder/gel	-	-	-	1:4.6	1:3.5	1:2.7

Description: All treatments are added with 1 ml of liquid lime

Table 8. The Observations of *Aloe vera* Beauty Mask.

Variable	gel + 45% Flour	Gel + 3% Gum + 45% Flour
Moisture Content (%)	72.94	71.93
pH	6.01	5.05
Viscosity (cp)1	724	622
Long drying in the face (minutes)	15	20

Description: All the treatments added 1 ml lime juice

From the observations is obtained that the greater the amount of flour is added to the water levels and the ratio of *Aloe vera* mask powder and raw *Aloe vera* gel required is lower. This is because rice can also act as a filler material so as to gain ground after the drying process can be greater. While the resulting pH by the addition of rice flour is higher, this is because the flour has a pH that approximates neutral. The addition of flour produces 45% of pH 6.0. According to Henry (1979) cosmetic products should have a neutral pH so that no skin irritation to consumers. The observations of *Aloe vera* mask formulation in table 8indicates that the granting of gum on a mask that does not freeze dried with dryer produces a higher water content, pH and lower viscosity. This is because the gum is an ingredient that is slightly acidic, so it can affect the pH and will ultimately affect the thickness and moisture content. *Aloe vera* mask added gum dries takes longer compared to that without gum. This is because with the addition of gum will add to the polysaccharide in the material, so the water is immobilization more difficult to be removed.

CONCLUSIONS AND SUGGESTIONS

Conclusion

From the discussion above, it can be drawn a conclusion that the best storage conditions are sound-proofed temperature conditions (4 ± 1)^{o}c. environmental Conditioning by administering nitrogen gas storage and antioxidant *Buthylated Hydroxytoluene* (BHT) 750 ppm for 4 weeks defending the nature fisikokimia *Aloe vera* gel. Freeze drying process of *Aloe vera* gel that has filled gum Arabic 3% generates a more homogenous powder and smaller and more.

Suggestions

Aloe vera Gel should be stored in a sealed container light-proof and in temperatures (4 ± 1) ^{o}C.

To prevent the oxidation process and maintain the properties of the *Aloe vera* gelphysicochemical should use nitrogen gas and the antioxidant BHT 750 ppm and a maximum of 4 weeks storage.Further research needs to be done in order to get any type of emulsifier and antioxidant.

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