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*by* Luh Suriati

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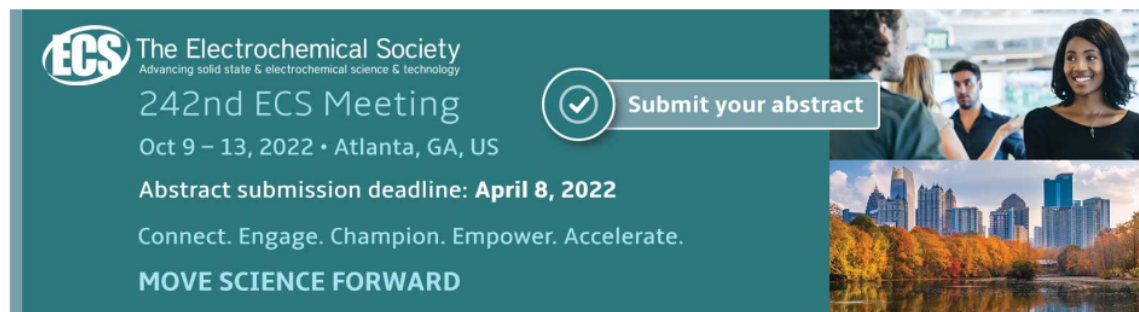
## Stability Aloe Vera Gel as Edible Coating

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## Stability Aloe Vera Gel as Edible Coating

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**Abstract.** Edible coating has long been known as an alternative to extend the fruit shelf life. One of the natural ingredients that can be used as an edible coating is an aloe gel which rich in functional components. The activity of aloe gel enzymes is very high. To maintain stability should be stored at the right temperature. The purpose of this research is to know the stability of aloe gel as an edible coating that is reviewed from treatment of temperature and length of storage. The study uses a complete randomized design of factorial patterns consisting of two factors: the first factor of the storage temperature (28°C and 7°C) and the second factor is storage time (0, 2, 4, 6, and 8 days). The observed variables include colour, pH, moisture, viscosity, and total microbes. The stability of the edible aloe gel coating is best obtained from the temperature treatment 7°C with the duration of storage 4 days.

Keywords: stability, gels, aloe vera, edible coating, storage temperature

### 1. Introduction

Aloe Vera is a plant that has been known since several decades. Aloe gel previously used as a medicinal product and cosmetics, has now been applied to the food industry. Aloe gel is composed of most of the water and the rest of the solids consist of carbohydrates (polysaccharides and monosaccharides). Polysaccharide Aloe gel consists of glucomannans as well as a small number of Arabinan and galactarates. Monosaccharides in the form of D-glucose, D-mannose, Arabinose, galactose and xylose [1]. Aloe gel also contains some minerals such as calcium, magnesium, potassium, sodium, iron, zinc, and chromium. Some of these vitamins and minerals can serve as a natural antioxidant forming, such as phenols, flavonoids, vitamin C, vitamin E, vitamin A, and magnesium. Aloe gel is very potential used in the food industry, one of which as an edible coating material [2]. The ability of the gel is maximally used in stable conditions. The results of the research [3] proved that aloe gel as edible coating can withstand the rate of respiration and some physiological changes due to the maturation of fruits and vegetables during storage.

According to [1] The stability of Aloe gel is strongly influenced by air, light, temperature, and microbes. If not handled properly for 24-36 hours the viscosity of Aloe gel decreases drastically close to the viscosity of water [4]. Storage temperature plays a role in maintaining the stability of Aloe gel [5]. Based on this it is necessary to do research on the stability of the edible Aloe gel coating is



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reviewed from the temperature and length of storage. The research aims to determine the temperature and length of storage for the proper stability of the Aloe gel edible coating.

**2. Research methods**

This study uses a factorial pattern complete random design consisting of two factors namely the storage temperature (28°C and 7°C) and the storage time (0, 2, 4, 6 and 8) days. The observed variables include color, pH, moisture content, viscosity, total microbial tests. The implementation of this research includes Aloe vera leaf washed with water and then done trimming and filleting. The aloe gel Fillet is washed with warm water to remove yellow zap, then homogenized for 1 minute. The next process is the addition of citrate acid 0.15% and heating at 70°C for 10 minutes. Aloe Gel is ready to be used as an edible coating.

**3. Result and discussion**

**3.1. Color**

Based on the results of the analysis showed that the time of storage, temperature and interaction is very real effect to the color of the Aloe gel. The temperature treatment of 28°C to day 8 has a smaller color value than the temperature of 7°C. The treatment of temperature 28°C was unable to retain color during storage. Aloe gel stored at 7°C is relatively more awake and its color. This is due to the temperature of the enzymatically process resulting in the degradation of color can be avoided. Aloe gel stored at 5°C RH 90% provides the best results in maintaining the color level of the gel [6]. The average value of the color of Aloe gel on temperature treatment and storage time can be seen in table 1, visually the color can be seen in table 2.

**Table 1.** Color (L \* A \* b \*) of Aloe gel on temperature treatment and storage time

Storage time (day)	Temperature	
	28°C	7°C
0	11,92	19,19
2	11,39	26,62
4	9,46	26,08
6	6,33	24,85
8	6,23	24,09

**Table 2.** Visual color of Aloe gel

Storage time Day	Close Container	
	28°C	7°C
0	white	white
2	white	white
4	yellow	white
6	yellow	yellow
8	yellow	yellow

### 3.2 pH

Based on the results of the analysis showed that the treatment of storage time, temperature and interaction is very real. The pH of Aloe gel at 28°C ranges between 2.02-2.18 while at 7°C temperature of 2.02-6,80. The gels stored at 28°C temperature are relatively lower than the temperature of 7°C. This is due to the temperature of the enzymatically process 7°C that spur acid formation does not occur. The value of pH at the beginning of storage is at the range of 2, due to the addition of citrate acid which is acidulants to inactivation of enzymes so that the gel remains stable. Supported by the opinion [6], pH of aloe gel is acidic between 4-5. The average value of pH aloe gel at temperature treatment and storage time can be seen in table 3.

**Table 3.** pH of Aloe gel at temperature treatment and storage time

Storage time (day)	Temperature	
	28°C	7°C
0	2,06	2,02
2	2,09	2,15
4	2,16	3,88
6	2,05	3,42
8	2,09	6,80

### 3.3 Water content

Based on the results of the printing analysis showed that the treatment of storage time, temperature and the interaction gives a very noticeable effect on the water content of aloe gel. The water content of Aloe gel at 28°C temperature treatment ranges between 94,79-96,90% while at 7°C 96,18-99,46%. Water is one of the important components that affects the quality of food ingredients during storage. Water content at a temperature of 28°C is lower than the temperature of 7°C. This is because faster evaporation process occurs with increasing temperature [8]. The average value of the water content of Aloe gel on temperature treatment and storage time can be seen in table 4.

**Table 4.** Water content of the Aloe gel (%) due to temperature treatment and storage time.

Storage time (day)	Temperature	
	28°C	7°C
0	95,03	98,27
2	99,51	96,26
4	95,12	99,08
6	94,86	99,44
8	95,13	99,33

### 3.4 Viscosity

The viscosity of Aloe gel has increased during storage 8 days at the temperature of 7°C (84, 85psi). This is because as long as the water storage in the gel is reduced due to evaporation, the gel becomes thicker. The structure of aloe gel for 8 days is still seen rigid. Supported by the opinion [5], which says that Aloe gel contains glucomannan which is able to form a cross linking bond that affects its viscosity. The average value of the viscosity of Aloe gel at temperature treatment 7°C during storage can be seen in table 5.

**Table 5.** Viscosity of aloe gel at temperature treatment 7°C (psi)

Storage time (day)	Viscosity
0	50,10
2	71,20
4	80,80
6	83,70
8	84,85

#### **Total microbial test**

Results total microbial testing on Aloe gel overall is eligible to be used as an edible coating because there is no microbial found during storage of 8 days. According to [6], aloe vera contains bioactive compounds that have abilities as antimicrobial and antioxidant. Applying Aloe gel as an edible coating is able to maintain quality and extend the shelf life of the coated product. According to [7], the in-leaf antioxidant and antimicrobial compounds of Aloe gel are phenolic compounds that many have a ketone and hydroxy group capable of capturing free radicals through its free electrons.

#### **4. Conclusion**

Based on the results can be concluded that the stability of edible Aloe gel is best at the temperature treatment of 7°C during 4 days storage with a color value of 26.08, pH 4.07, water content 98.17% and viscosity 80.80 psi. But until the 8th day Aloe gel can be preserved and still look fresh. Need advanced research on edible coating of Aloe gel with the addition of additive material so as to extend the life of the bait.

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