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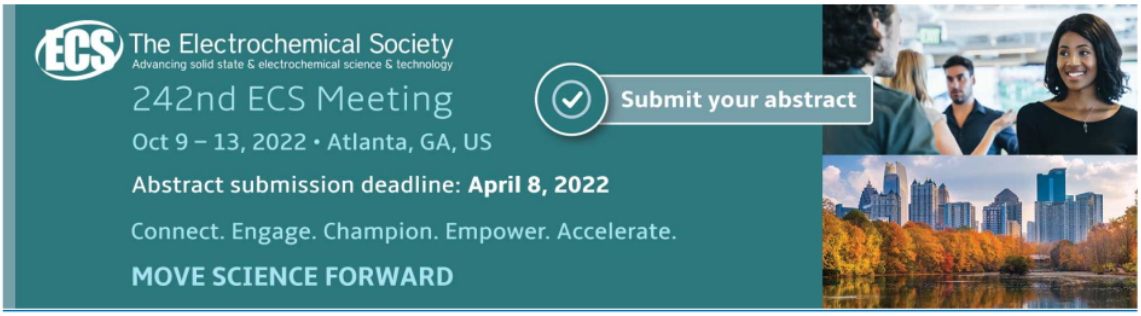

Characteristic fillet of aloe vera gel as edible coating

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Abstract. This research aims to know the influence of storage temperatures against characteristics fillet of Aloe Vera that is potential as an edible coating. This study used a randomized complete design. Colour fillet Aloe Vera clear white initially when stored at room temperature turns pink on day 2. While stored at cool temperatures the color change on day 4. The gel is stored at cool temperatures have pH and moisture content are relatively stable, decreased severity is also lower compared to the store at room temperature. Aloe gel fillet show change of characteristic beginning at day 4 when gel is stored at ambient temperatures. A decrease in activity is also evident when the fillet stored refrigerated, even though the rate of activity loss is greatly reduced. The losses of activity appear to be result of enzymatic activity after the leaf is removed from the plant. The characteristic of fillet Aloe Vera gel that storage at cool temperatures better than storage at room temperature, and decreased with the longer storage It can be seen from color characteristics change, lower weight loss, decreased water content and pH of relatively more stable.

1. Introduction

Some natural ingredients can be used as edible coatings and preservatives one of these is Aloe Vera gel [1]. Aloe Vera gel potentially applied as an edible coating because it consists of polysaccharides containing many functional components [2]. It is estimated more than 75 bioactive compounds contained within the leaves of the Aloe Vera [2,3]. Aloe gel has the ability of antioxidant and antimicrobial properties that is able to inhibit the damage of postharvest [1,3,4].

Aloe Vera gel has a natural structure that is able to keep the moisture and the exchange of water-soluble components so that it can increase the time save the fruits [1,4,5]. Aloe Vera extract polymer has the potential to be used as a biomaterial due to various advantages such as oxygen permeability, antioxidant power, biodegradability, and low-toxicity effects [2,3]. Aloe Vera gel can make layers such as wax [4], inexpensive and easily applied [2].

Aloe Vera has morphological traits stem of bright green leaves with irregular white spots. Leaf weight average per stem of about 0.5-1 kg. The stem of the Aloe Vera plant consists of three parts. The first layer is the mucilage is part of cell parenchyma of Aloe Vera leaf that is clear and does not feel called gel [3,5-8]. Gel before it is extracted for use as edible coating first separated from the leaves in the form of fillets gel. The gel consists of a variety of polysaccharides, minerals, proteins, ß-sitosterol 100, long chain hydrocarbons, and Esther [7]. The second part is the exudate is composed of mucus is yellow (yellow zap) and slime is not colored. Yellow sap contains various components such as anthraquinone and its derivatives, barbaloin and aloe-emodin, and a laxative effect which gives the glycosides [2,6]. While the mucus does not contain various types of colored phenolic component, which

acts as an antioxidant to inhibit free radicals and the concentration of fat and is able to inhibit enzyme activity. The third part is the outer layer of the shell is composed of cells, have a protective function [2].

The new fillet of Aloe Vera gel is not colored, thick, slimy and clear with the connective networks [2]. One of the main factors that affect the functional properties fillet of the Aloe Vera gel is handling the leaves after harvest. Six hours after harvesting the freshness of the leaves before being taken to the processing unit are relatively fixed if kept at a temperature of 8^{o}C [9]. The leaves are washed with a disinfectant to eliminate dirt and bacteria on the surface.

In the filleting, the green outer layer removed to the fillet gel. A filleting operation must be finished before 36 hours after harvested [2]. The stability of Aloe gel is highly influenced by air, light, heat and especially by microbes, if not immediately stored in the refrigerator. If the gel is direct contact with the air and light colour into clear pink and eventually become brown [3]. Hot and very light catalyzes this reaction, besides the sugar content is also very influential. The older age of the Aloe Vera plant and reduced the sugar content will be changed to a less active polysaccharide [5]. According to Hu et al., Aloe Vera is aged 3 years to have inhibitory activity is the most powerful free radicals i.e. 72.19% [10].

In addition to having an excess of Aloe Vera also has a weakness that is easy to be watered [11,12]. The thickness of the gel of Aloe Vera water viscosity approaching dropped dramatically when stored at room condition [1]. Based on this research was conducted to find out the characteristics of the discoloration, loss of weight, water content and pH of the fillet of the gel that is stored at cool and room temperature, before the gel is extracted for use as an edible coating.

2. Research methods

This research used a Randomized Complete Design with two factors and twice of Deuteronomy includes: The first factor is the storage temperature of fillet Aloe Vera gel that is composed of cool temperatures and room temperature. The second factors prolonged storage consisting of 1 day, 2 days, 3 days, 4 days, 5 days, 6 days, 7 days, 8 days. The treatment of the combination into 16, with repeats twice so that the retrieved 32unit experiment. Implementation of research started from making of Aloe Vera gel. Optimization of the technique of washing to remove the yellow zap that can degrade the quality of the fillet gel. To prevent contaminated gel. The leaves of Aloe Vera intact the newly harvested must be handled with caution that can decrease of microbes outside leaves [7]. After that is done for filleting separate fillets gel from the skin of the leaf.

The observed parameters include changes in weight, moisture content, pH, and color, followed by determination of shelf life, to know the durability of fillet Aloe Vera gel during storage at a temperature of cold and room temperature for 8 days. Data from the measurement results are statistically tested using methods of media processing with SPSS.

3. Results and discussion

3.1. Color

From the results of observation of the visible colors that fillet gel clear white initially when stored at room temperature more rapidly changing colors. The change that is pink on the 2nd day and Brown on day 5. The fillet while stored at cool temperatures on day 4 was already starting to change the pink and until day 8 well-formed brown color, as shown in Table 1. Cold storage can reduce enzyme activity, so the color changes in aloe gel fillets are longer.

This change also caused a downturn due to an enzyme that still had high activity and the hydrolysis of polysaccharides was followed by a change in color be darkened [1]. The presence of quinones and anthraquinones in *Aloe Vera* gel in the presence of light will cause the color change gel to become pinkish and finally form a brown color [3]. The process of change is known with the browning reaction that can occur in enzymatic and non-enzymatic. In addition to brown discoloration can also cause an unpleasant flavor and the loss of amino acids such as lysine of the total amino acids [7].

Table 1. The color fillet of aloe vera gel on cool and room temperature.

Day	Storage temperature	
	Cool	Room
1	Transparent White	Transparent White
2	Transparent White	Transparent White
3	Transparent White	Clear Pink
4	Clear Pink	Clear Pink
5	Clear Pink	Watery Brown
6	Clear Pink	Watery Brown
7	Clear Pink	Watery Brown
8	Clear Pink	Watery Brown

3.2. Weight

From the results of the analysis show that fillet of Aloe Vera gel that is stored at room temperature has decreased the weight of the higher compared with that stored in the cold temperatures, as shown in Table 2. This is because the cold temperature storage can sustain the loss of quality ingredients including weight. While at room temperature trends for the occurrence of a change of the chemical composition.

Table 2. Weight fillet of aloe vera gel on cool and room temperature.

Day	Storage Temperature	
	Cool	Room
1	25.510	25.540
2	25.505	25.528
3	25.498	25.470
4	25.495	25.398
5	25.494	25.246
6	25.454	25.169
7	25.451	25.083
8	25.418	25.015

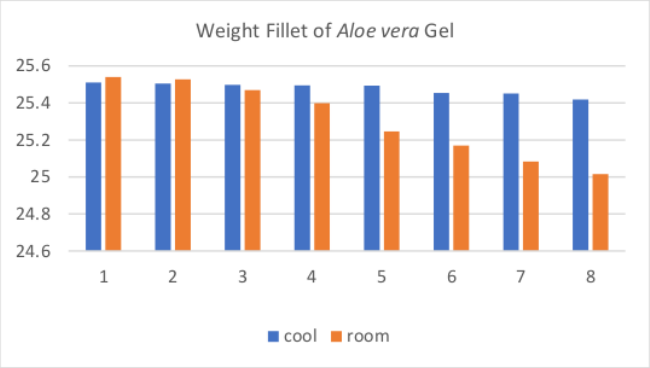

Figure 1. Weight fillet of aloe vera gel on cool and room temperature.

According to Perera, reduced weighting occurs due to evaporation of water contained in the materials [13]. Figure 1 shows that the fillet which is stored at cold temperatures experienced weight loss smaller

than at room temperature. Aloe gel fillet storage on a cool temperature slows down the change in weight was reduced due to the low temperature on the speed of water vapour decreases.

3.3. Moisture content

Moisture content fillet of Aloe Vera gel has increased until the 3rd day of storage after it declined again, as shown in Table 3 and Figure 2. This is because during the three-day storage occurs a discharge of water from the structure of the gel, and then evaporate back after day 4. Moisture content stored on the fillets cool temperatures is more stable than at room temperature.

Table 3. Moisture fillet of aloe vera gel on cool and room temperature.

Day	Storage temperature	
	Cold	Room
1	96.00	95.85
2	99.29	99.66
3	99.60	99.48
4	98.16	99.19
5	99.09	99.26
6	99.30	99.56
7	99.15	99.48
8	98.86	99.35

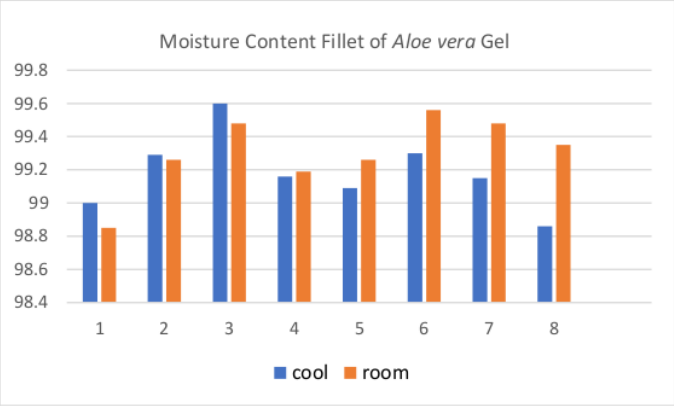

Figure 2. Moisture content fillet of aloe vera gel on cool and room temperature.

As a crucial step to preserve biological activity, the gel should be cooled below 5°C in 10 to 15 sec following the gel extraction. Rapid cooling leads to enzymatic and microbial deterioration of the gel, but also aids in reducing the microbial counts in the product [7].

3.4. pH

pH fillet of Aloe Vera gel relatively stable that is stored at cool temperatures, ranging between 3,94-4,55. The fillet that is stored at room temperature, the pH value of experiencing fluctuations declined until the 4th day then increased again until the day to 8, as shown in Table 4 and Figure 3. The importance of physico-chemical modifications including the degree of acidity detected in dehydrated Aloe Vera parenchyma depends on temperature used during the storage [7].

Table 4. pH Fillet of aloe vera gel on cool and room temperature.

Day	Storage temperature	
	Cool	Room
1	4.55	4.41
2	4.24	4.38
3	4.21	4.21
4	4.00	5.04
5	3.94	6.55
6	4.30	6.79
7	4.26	5.13
8	4.08	3.93

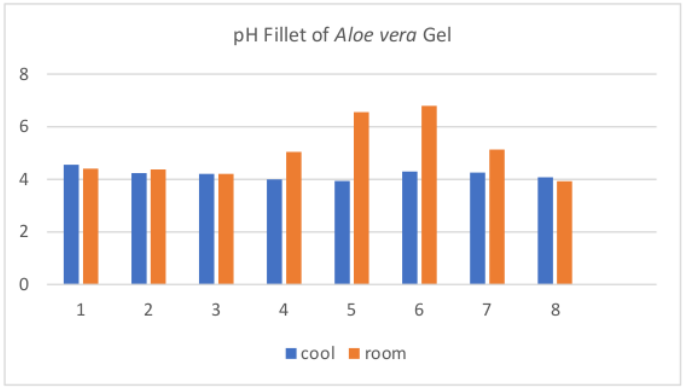

Figure 3. pH fillet of aloe vera gel on cool and room temperature.

Aloe gel fillet show change of characteristic beginning at day 4 when gel is stored at ambient temperatures. A decrease in activity is also evident when the fillet stored refrigerated, even though the rate of activity loss is greatly reduced. The losses of activity appear to be result of enzymatic activity after the leaf is removed from the plant. In fact, it has been shown that the gel, once extracted from the leaf, has greater stability than gel which is left in the leaf. This means that shipping of leaves, even at refrigerated temperatures, will result in loss of biological activity [7].

4. Conclusion

The characteristic of fillet Aloe Vera gel that storage at cool temperatures better than storage at room temperature. It can be seen from color characteristics change, lower weight loss, decreased water content and pH of relatively more stable. The longer the stored characteristic fillet of Aloe Vera gel declined. A sharp decline occurred on day 4 that stored at room temperature or cool temperatures.

Acknowledgments

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