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## Potential Formula D'Anlov as Food Preserve

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### Abstract

The use of chemicals as food preservatives needs to be reduced so that alternative natural preservative solutions are needed. The formula of binahong leaf powder and aloe vera gel (D'Anlov) can be used as an alternative to natural preservatives. Food and drinks in the form of donuts and dragon fruit juice are added to the mixture of binahong leaf powder and aloe vera gel with a composition of 1: 2; 2: 1; 2: 2. The organoleptic donuts and dragon fruit juice were tested by 25 trained panelists. Donuts and dragon fruit are stored within 1, 3, 5 days at 18°C, with daily observations to see the shelf life and analysis of the number of bacteria using the methods *Total Plate Count (TPC)* and *Most Probable Number (MPN)*. The content of saponins, flavonoids, quinones, steroids, monoterpenoids and sesquiterpenoids in binahong leaves and saponins in aloe vera obtained in D'Anlov has functioned as antibacterial so that donuts and dragon fruit juice become more durable. Addition of D'Anlov with a composition of 2: 1 in Donut making provides the best taste and has the longest shelf life at 18°C. Pure dragon fruit juice has the best taste even though it cannot hold it, while dragon fruit juice plus D'Anlov 2: 1 has the longest shelf life at 18°C.

**Keywords:** food preservatives, binahong leaf powder, aloe vera gel, organoleptic test, MPN, TPC

### Introduction

**Background:** Food Safety is a condition and effort needed to prevent food from the possibility of biological, chemical and other contaminants that can interfere, harm and endanger human health. The existence of food additives is one of the alternatives to improving the quality of food ingredients, nutritional value, taste, appearance and can reduce food pollution, especially against damage by microbes. One of the food additives used in reducing food damage is preservatives. Preservatives are generally classified into two, namely synthetic preservatives and natural preservatives. The results of the 2015 survey still found snacks at the State Primary School in the city of Surabaya that contained borax as a preservative that was banned in food<sup>(1)</sup>, although the percentage was small (0.29%), when compared to previous researchers<sup>(2),(3),(4),(5)</sup>. In 2013

there were still 4% of school children snacks samples with sodium benzoate preservative and inelible sorbic acid (TMS) and 8% sodium cyclamate sweetener. School Snacks Food contains borax there are 3% samples (cilok, sausage, crackers) and 1% samples on mung bean porridge and cimol are found in formalin<sup>(6)</sup>.

Food preservation generally aims to extend the shelf life of foodstuffs, inhibit decay and guarantee an initial quality of food to maintain its quality. Some preservatives can also serve as an enhancer of the attractiveness of the food itself, such as the addition of nitrite so that the meat processing looks fresh red. An attractive appearance usually makes consumers interested in buying.

In Indonesia, we often find plants of Binahong (*Anredera cordifolia* (Ten.) Steenis) and Aloe vera (Aloe vera Chinensis). Binahong plants are often used as ingredients for traditional medicines, while aloe vera for cosmetic products and basic ingredients for drinks.

The results showed that the leaves of binahong leaves (*Anredera cordifolia* (Ten.) Steenis) could extend the shelf life of white tofu for 6 days at room temperature<sup>(7)</sup>. Rofiatiningrum examines the use of *Aloe vera chinensis*

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which can inhibit the growth of *Penicillium sp* and *Monilia sitophila*<sup>(8)</sup>. The combination of the two plants is expected to produce better preservative properties than if the plants are used separately.

### Purpose

This study aims to analyze the effectiveness of the formula of binahong leaf powder and aloe vera gel (D'Anlov) as an alternative to natural preservatives in food and beverages.

### Method

The type of this research was experimental with a qualitative approach, carried out from March to September 2018 at the Department of Nutrition, Health Polytechnic of Surabaya. Tools and ingredients were blender, knife, bowl, sieve, spoon, aloe gel, salt, water, small basin, powder Binahong leaves dry.

The food in the form of donuts in the manufacturing process was added with a mixture of binahong leaf powder and aloe vera gel with a composition of 1: 2; 2: 1; 2: 2 and donuts with the original recipe without

the addition of a mixture of the binahong leaf powder and aloe vera gel. Donuts be tested for organoleptic tests using a rather trained panel of 25 people. Donuts are stored within 1, 3, 5 days at 18°C, with daily observations and analysis. *Total Plate Count* (TPC).

Drinks in the form of fruit juice were added to the mixture of binahong leaf powder and aloe vera gel with a composition. 1: 2; 2: 1; 2: 2. The original fruit juice without the addition of a mixture of binahong leaf powder and aloe vera gel will then be tested with an organoleptic test using 25 rather well trained panelists and then stored in 1, 3, 5 days at 18°C, with daily observations and number analysis bacteria with the method *Most Probable Number* (MPN) as well as *Total Plate Count* (TPC).

### Findings

To analyze the effectiveness of using binahong leaf powder and aloe vera gel as an herbal preservative in food products, it can be seen the trend of the number of bacteria against time. From the research, the examination data *Most Probable Number* (MPN) from food products were stored for 1, 3, 5 days at 18°C as follows:

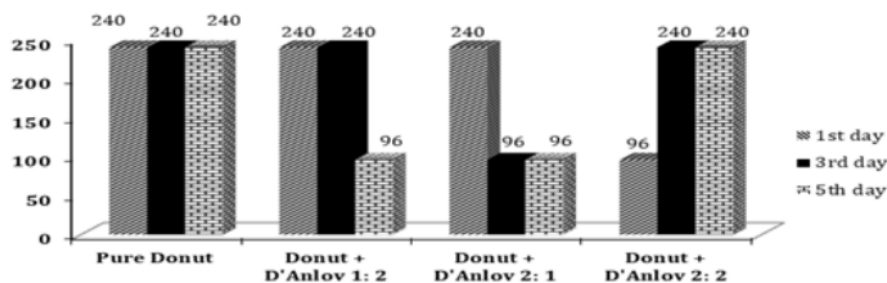


Figure 1. The results of the examination *Most Probable Number* (MPN) of food products stored for 1, 3, 5 days at a temperature of 18°C

From figure 1 obtained D'Anlov effectiveness in reducing the number of bacteria on the basis of examination donuts MPN is a composition of 2: 1

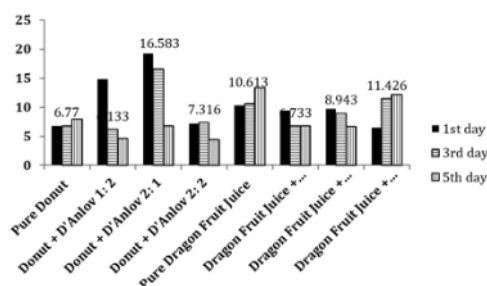


Figure 2. Test results *Total Plate Count* (TPC) / *Total Plate Count* (ALT) From food products stored for 1, 3, 5 days at 18°C

From Figure 2 it was found that D'Anlov's effectiveness in reducing the number of bacteria in donuts based on the TPC examination was 2: 1, while in dragon fruit juice was composition 1: 2. The purpose of the organoleptic test was to find out the panelists' response to donut products and dragon fruit juice that D'Anlov gave which was assessed through a score range of 1-5, with the results below:

**Table 1. Organoleptic test results on added donuts D'Anlov as a preservative**

Parameter	+ Pure Donut +	Donut + D'Anlov 1: 2	Donut + D'Anlov 2: 1	Donut + D'Anlov 2: 2
Aroma	4.13	3.33	3.87	3.20
Color	3.07	2.00	3.80	3.27
Flavor	3.93	3.47	4.20	3.67
Texture	2.67	2.47	3.47	2.93
Average Score	3.45	2.82	3.84	3.27

**Table 2. Organoleptic test results on Dragon Fruit Juice plus D'Anlov as preservative**

Parameters	Pure Dragon Fruit Juice	Dragon Fruit Juice + D'Anlov 1: 2	Dragon Fruit Juice + D'Anlov 2: 1	Dragon Fruit Juice + D'Anlov 2: 2
Aroma	3.47	2.93	3.00	2.60
Color	4.47	4.33	3.73	3.60
Flavor	3.73	3.07	2.93	2.93
Texture	3.53	3.47	3.40	3.60
Average Score	3.80	3.45	3.27	3.18

Description: Score 1 = dislike; score 2 = rather dislike; score 3 = neutral; score 4 = rather like; score 5 = likes

In tables 1 and 2 shows that the best organoleptic results are obtained from donuts plus D'Anlov 2: 1, while the best dragon fruit juice is pure dragon fruit

Donut and dragon fruit juice is stored at 18°C for 7 days with Observation results are as follows:

**Table 3. Observation of donut conditions based on storage at 18°C for 7 days**

Parameter	Pure Donut	Donuts + D'Anlov 1: 2	Donuts + D'Anlov 2: 1	Donuts + D'Anlov 2: 2
Days to 1				
Aroma	1	1	1	1
Texture	1	1	1	1
Color	1	2	2	2
mushroom	Negative	negative	negative	negative
Day 2				
Aroma	1	1	1	1
Texture	1	1	1	1
Color	1	2	2	2
mushroom	Negative	negative	negative	negative

Cont... Table 3. Observation of donut conditions based on storage at 18°C for 7 days

Parameter	Pure Donut	Donuts + D'Anlov 1: 2	Donuts + D'Anlov 2: 1	Donuts + D'Anlov 2: 2
<b>Day 3</b>				
Aroma	1	1	1	1
Texture	1	1	1	1
Color	1	2	2	2
mushroom	Negative	negative	negative	negative
<b>Day 4</b>				
Aroma	1	1	1	1
Texture	1	2	2	2
Color	1	2	2	2
mushroom	Negative	negative	negative	negative
<b>Day 5</b>				
Aroma	1	1	1	1
Texture	2	2	2	2
Color	1	2	3	3
Mushroom	positive	negative	negative	negative
<b>Day 6</b>				
Aroma	1	1	1	1
Texture	2	2	2	2
Color	2	2	3	2
Mushrooms	positive	negative	negative	negative
<b>Day 7</b>				
Aroma	1	1	2	1
Texture	3	2	2	2
Color	2	3	3	3
mushroom	Positive	negative	negative	negative

Description: Score 1 = Very good; score 2 = Good; score 3 = Good enough / mildly stinging aroma; score 4 = Not good / pungent aroma

From table 3 above it looks like pure donuts without D'Anlov experience mold growth on day 5 while donuts added by D'Anlov until day 7 are all in good condition even though there are only color changes.

Table 4 Observation of the condition of dragon fruit juice based on storage at 18°C for 7 days

Parameter	Pure Dragon	Fruit Juice Dragon Fruit Juice + D'Anlov 1: 2	Naga + D'Anlov 2: 1	Fruit Juice Naga + D'Anlov 2 Juice : 2
<b>Day 1</b>				
Aroma	1	1	1	1
Texture	1	2	1	2
Color	1	1	1	1
<b>Day 2</b>				
Aroma	3	2	2	2
Texture	2	2	1	2

Parameter	Pure Dragon	Fruit Juice Dragon Fruit Juice + D'Anlov 1: 2	Naga + D'Anlov2: 1	Fruit JuiceNaga + D'Anlov 2 Juice : 2
Color	2	1	1	1
<b>Day 3</b>				
Aroma	4	2	2	2
Texture	3	4	2	4
Color	4	2	2	4
<b>Days 4</b>				
Aroma	4	4	2	4
Texture	4	4	3	4
Color	4	4	2	4
<b>Day 5</b>				
Aroma	4	4	4	4
Texture	4	4	4	4
Color	4	4	4	4

From table 4 you can see that dragon fruit juice which coupled with D'Anlov 2: 1, still looks good until day 4, compared to others who have suffered damage.

### Discussion

Plants can synthesize various types of bioactive compounds that can act as anti-microbes, such as phenol compounds and their derivatives, terpenes, and terpenoids, alkaloids, polypeptides and steroids<sup>(16),(17)</sup>. Microbial effects arise by causing damage to the structure and function of cell membranes. Substances in plants can affect microbial cells through various mechanisms, including attacking phospholipid bilayers from cell membranes, disrupting enzyme systems, interacting with genetic material from bacteria, and forming fatty acids hydroperoxidase caused by oxygenase from unsaturated fatty acids<sup>(9)</sup>.

Aloe vera (*Aloe vera*) is reported to contain mono and polysaccharides, tannins, sterols, organic acids, enzymes, saponins, vitamins, and minerals. Aloe vera also contains anthraquinone complexes including aloe emodin, aloin, barbaloin. Other substances contained in aloe vera are saponins which have the ability to clean and are antiseptic<sup>(9),(10)</sup>.

Phytochemical test results conducted by Cowan, binahong leaf extract contains polyphenols, alkaloids, and flavonoids. Flavonoid types obtained from the results of isolation and identification of fresh powder

and dry powder of binahong leaves ethanol extract are flavonol<sup>(10)</sup>, and have the capacity as antioxidants. Binahong leaves contain flavonoids, saponins, and steroids /triterpenoids<sup>(11)</sup>. According to research conducted by Astuti et al<sup>(12)</sup>, binahong plants contain saponins in all parts of plants, triterpenoids and steroids, and tannins<sup>(13)</sup>.

Binahong leaves contain saponins, flavonoids, quinones, steroids, monoterpenoids and sesquiterpenoids. The results of the study of isolation of saponin triterpenoids from binahong leaves are known as bousingoside A1<sup>(15)</sup>. Kurniawan et al. managed to isolate binahong leaf alkaloids. Alkaloid isolates that have been isolated from binahong leaves contain betanidine compounds ( $C_{18}H_{16}N_2O_8$ ) which are not cytotoxic. These groups of compounds are bioactive compounds in plants, so they are also thought to be potentially antibacterial<sup>(14)</sup>.

The best organoleptic test results using somewhat trained panelists obtained the best results on donuts plus D'Anlov 2: 1, and pure dragon fruit juice. After storing at 18°C for 1 to 7 days, looking pure donuts without D'Anlov experienced mold growth on day 5 while the donuts added by D'Anlov until the 7th day were all in good condition even though there were only color changes. Likewise, dragon fruit juice coupled with D'Anlov 2: 1, still looks good until day 4, compared to others who have been damaged.



It is suspected that the content of saponins, flavonoids, quinones, steroids, monoterpenoids, and sesquiterpenoids in binahong leaves and saponins in aloe vera obtained in D'Anlov has functioned as antibacterial so that the donuts and dragon fruit juice become more durable.

### Conclusion

After the study concluded that the addition of D'Anlov 2: 1 in the manufacture of donuts provide the best taste and has the longest shelf life at a temperature of 18°C. pure dragon fruit juice has the best taste although no shelf life, while the dragon fruit juice which added D'Anlov 2: 1 has the longest shelf life at a temperature of 18°C.

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**Conflict of Interest-** No

**Source of Funding-** Authors

**Ethical Clearance-** Yes

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