

## PRESENTATION

### Antioxidant Activity and Quality Test of Faloak syrup (*Sterculia quardifida R.Br.*)

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#### Abstract

**Background:** Faloak is commonly used by the people of Kupang-East Nusa Tenggara to treat several diseases including hepatitis, hypertension, increasing stamina and recovery after childbirth. Scientifically known faloak bark contains alkaloids, flavonoids, terpenoids and phenols. People usually use faloak by boiling faloak bark until they are brick red and then consumed. Preparation of faloak bark can be prepared in other dosage forms such as instant and syrup. It aims to overcome the scarcity of raw materials for faloak tree bark, practical in use and not easily damaged in storage. Preparation of faloak in instant dosage form has been done but faloak syrup has not been made. **Objective:** To determine the antioxidant activity of syrup faloak based on  $IC_{50}$  values and quality tests based on organoleptic assessment and water content. **Method:** Sample was taken from faloak bark and then extracted by masetation modification method using hot water without boiling directly. Faloac extract then added sugar to make faloak syrup with concentration 25%, 75% and 100%. Faloak syrup was then carried out by organoleptic test, water content and continued with qualitative identification of the compounds of active substances contained in the faloak syrup and then tested against DPPH (1,1-diphenyl-2-picrylhydrazyl) as free radicals and measured at a wavelength of 517.4 nm using UV-VIS spectrophotometer. **Result:** 75% of the organoleptic syrup test results chose very much towards the color of the syrup, as many as 60% of the panelists chose to be very like of the syrup smell but 50% of the panelists chose not to like the faloak syrup flavor. Water content test results obtained 5.16% meet the Indonesian National Standard 01-4320-1996 which is <20%. The faloak syrup had antioxidant activity very weak with concentration 25%, 75% and 100% have  $IC_{50}$  respectively: 1370 ppm  $\pm$  34,39; 1281,33 ppm  $\pm$  SD 49,49 and 1042 ppm  $\pm$  SD 42,93. **Conclusion:** Faloak syrup is necessary by adding ginger to increase antioxidant activity and has a taste that consumers like. **Keywords:** Faloak Syrup, Antioxidants, DPPH Method

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## Introduction

Free radicals are one form of reactive oxygen compounds, which are known as compounds that have unpaired electrons. High levels of free radicals in the body can trigger the emergence of various degenerative diseases so that our bodies need an important substance called antioxidants (Winarsi, 2007).

Antioxidants are chemicals to protect cells and body tissues from damage due to oxidation attacks by free radicals (Astawan, 2012) and can neutralize free radicals (Hariyatmi, 2004). Sources of antioxidants are synthetic and natural. Synthetic antioxidants have unclear side effects so that natural antioxidants can be used as alternatives (Fatimah et al., 2008).

Faloak is one of the plants known by the people of NTT which grows wild in forest areas, as well as around settlements that grow on rocky soil. Kupang people use faloak as a traditional medicine based on empirical experience to treat typhus, ulcers, liver (liver disorders), increase stamina (relieve fatigue or fatigue after heavy work), menstruation, recovery after giving birth.

The chemical components of faloak bark (*Sterculia quardifida* R.Br.) include: flavonoids, terpenoids and alkaloids (Ngara, 2005). Groups of secondary metabolites known to be useful as antioxidants are flavonoids and terpenoids (Christensen et al. Cit.

Tringali, 2001). Flavonoids are antioxidant compounds that have proven to have very strong biological effects, inhibit clumping of blood cell chips, stimulate the production of nitric oxide (NO) to dilate blood vessels, and also inhibit cancer cell growth (Winarsi, 2007).

The Kupang people prepare the skin of the faloak tree by boiling it to brick red. The cooking water is taken every morning, afternoon and evening after eating for approximately 2 weeks. The faloak tree extraction is constantly feared that it can cause scarcity because the regeneration of tree bark takes a long time.

Faloak can be prepared in instant dosage form or syrup with the aim to overcome the scarcity of raw material, practical in its use and not easily damaged in storage. Preparation of faloak in the form of syrup preparations needs to be done so that the community has other choices in using faloak.

The types of drinks available in the form of syrup preparations are a type of beverage that has a long lasting and more practical power in its presentation (Utami, 2008). Faloak syrup that has been produced needs to be measured for antioxidant activity using the DPPH method (1,1-diphenyl-2-picrylhydrazyl) in vitro as well as dosage quality test.

## Methods

### 1. Types of research

This type of research is descriptive research

### 2. Place and time of research

This research was conducted at the Pharmacognosy Laboratory and Instrument Laboratory of the Department of Pharmacy at the Kupang Ministry of Health Polytechnic, and The study was conducted in May-November 2015

### 3. Research variable

The variable in this study was a single variable, namely the antioxidant activity of faloak syrup on DPPH (1,1-diphenyl-2-picrylhydrazyl) expressed by IC<sub>50</sub> and faloak syrup quality.

### 4. Operational definition

- a. The bark of the faloak tree is part of a brownish faloac plant that is taken from bark that is not too old from Penfui-Kupang.
- b. Faloak syrup is a solution obtained from soaking faloak powder using hot water and then added as much as 60% sugar with a concentration of 25%, 75% and 100%
- c. Antioxidant activity is the ability of faloak syrup to reduce DPPH free radicals (1,1-diphenyl-2-picrylhydrazyl) based on IC<sub>50</sub> value.

### 5. Analysis of results

The results of absorbance measurements using a UV-VIS spectrophotometer were used to calculate the percentage of DPPH free radical reduction.

% of DPPH free radical reduction is calculated using the formula:

$$\% \text{ Reduction} = \left[ \frac{\text{Sample absorbance}}{\text{Absorbance blank}} \right] \times 100\%$$

The antioxidant activity of DPPH (Percent of damping) free radical reduction of faloak syrup was analyzed and each IC<sub>50</sub> count was calculated using linear regression analysis.

## Results and Discussion

Faloak syrup is a brownish solution and sweet taste. Syrup faloak is made by soaking the faloak thread using hot water. Maserate is added by 60% sugar for each syrup concentration of 25%, 75% and 100%. The faloak syrup obtained was tested for quality including organoleptic test, air content test, qualitative and measuring antioxidant activity using a UV-VIS spectrophotometer.

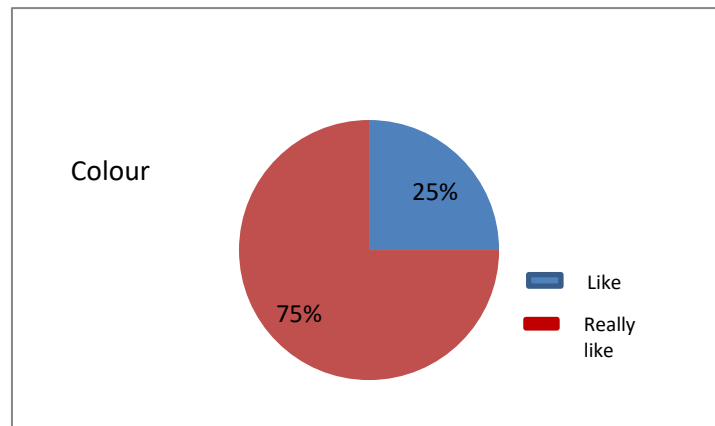
### A. Organoleptic Test

Organoleptic testing is a method of measuring, assessing, or testing the quality of commodities by using the sensitivity of the human senses, namely the eyes, nose, mouth and fingertips. Organoleptic test was conducted to determine the level of consumer preference for faloak syrup products. Products with high benefits or efficacy,

but if they have a smell, taste, aroma and color that are not liked by consumers, the benefits of these products are not achieved. The organoleptic test carried out included an assessment of the indicators of color, smell, and taste given to 20 panelists.

## 1. Color

Faloak syrup has a brownish color and the organoleptic test showed that the average panelist chose really like with the largest percentage of 75% as in figure 1

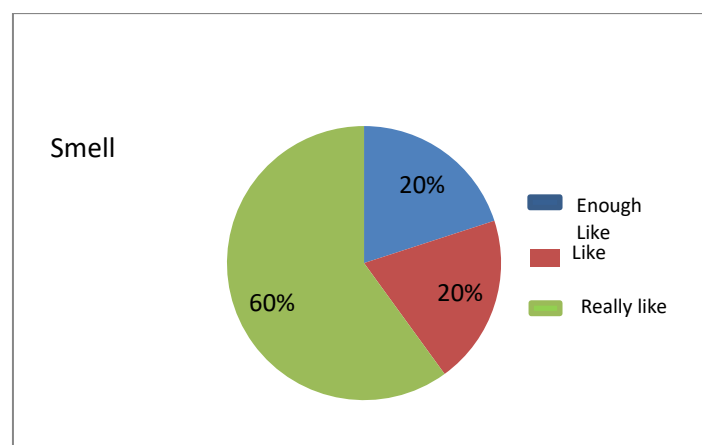


**Figure 1. Percentage of Color Category Organoleptic Tests**

## 2. Smell

Syrup faloak has a distinctive faloak aroma. The organoleptic test results of faloak syrup aroma showed that the average panelist chose the least

percentage with 50%, while the panelists who liked the smell of faloak syrup were only 10%. Panelists who are accustomed to using cooking spices in dishes prefer to add ginger in the faloak syrup preparation.

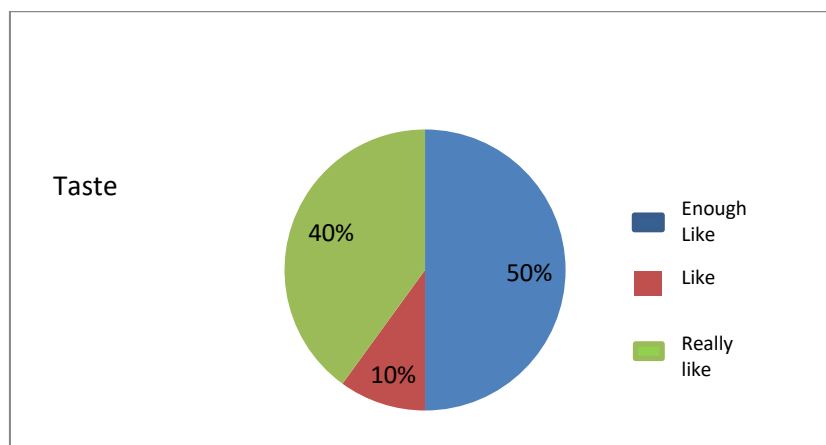


**Figure 2. Percentage of Smell Category Organoleptic tests**

### 3. Taste

Faloak syrup has a soft and sweet taste, where the compilation is drunk more sugar because the concentration of sugar

added to each formula is as much as 60%. The organoleptic taste test showed that the average panelist was very like of the largest percentage of 50%.



**Figure 3. Percentage of Taste Category Organoleptic Tests**

### B. Test for Water Content of Faloak Syrup

Water content measurement is important to know the water content in syrup. Water can cause microbial growth that can damage food ingredients so that the product becomes unsafe for consumption. Measurement of water

content is done by ordinary drying method or by using an oven. The first thing to do is to place the container first, then add the sample and put it in the oven. After that it is cooled in the desiccator and weighed. Drying and weighing are carried out until a constant weight is obtained.

**Table 1. Water Content of Faloak syrup**

Sample	water content
	(%)
	Faloak syrup
I	4,5
II	5,1
III	4,8
IV	5,6
V	5,8
Average	5,16

Based on the results was found that the water content in faloak syrup was 5.16%. According to SNI 01-4320-1996, the maximum water content contained in syrup is 20%. If the level exceeds the standard it will cause the product to be susceptible to microbes so that it will not last long in storage.

### C. Qualitative Test of Faloak syrup

Compounds that act as antioxidants, one of which is flavonoids. Faloak syrup has been tested qualitatively for its chemical content using color reaction as in table 4. This test aims to ensure that the faloak syrup preparation process does not damage the active content.

**Table 2. Qualitative identification of syrup Faloak chemicals**

No	Compound content	Color reaction	Test result	Information
1	Flavonoids	Orange red to orange red	Orange red	+
2	Triterpenoid	Change in several colors	A color change occurs	+

Qualitative identification results can be seen that the faloak syrup sample is positive containing flavonoids and triterpenoids which act as antioxidants.

The antioxidant syrup faloak activity test used the DPPH method with the principle of loss of purple due to the reduction of DPPH due to antioxidants. The lost purple intensity was measured using visible spectrophotometry at a wavelength of 517, 4 nm with DPPH absorbance of 1.082 ppm. According to Gandjar and Rohman (2007) the determination of the wavelength of a test solution needs to be done because one of them is around the maximum

wave display, the shape of the absorbance curve is flat and in that condition the Lambert-Beer law is fulfilled ie the absorbance is 0.2 to 0.8. Tests carried out on 3 syrup concentrations, namely: 25%, 75% and 100% with each series of test solution concentrations of 500 ppm, 1000 ppm, 1500 ppm, 2000 ppm, 2500 ppm to be reacted with DPPH free radicals with time on each each concentration for 30 minutes.

The ability of faloak syrup can be seen from the reduced intensity of purple from the DPPH solution that has been added. The reduced intensity of the color of the DPPH solution can show that

there is a reaction between the hydrogen atom released by the test material and the DPPH radical molecule so that the yellow compound 1,1-diphenyl-2-picrylhydrazil is formed. The greater the concentration of the test material, the stronger the yellow color will be. Reducing the purple intensity of DPPH solution can be quantitatively calculated from the reduced absorbance of the solution. The greater the concentration of the test material, the less absorbance is read, which means the activity of the

test material in capturing the radical DPPH is getting bigger.

The results of the research conducted on 3 syrup concentrations showed that the higher the concentration of faloac syrup, the smaller the IC<sub>50</sub> value showed that the antioxidant activity was stronger where as the lower the concentration of faloak syrup, the greater the IC<sub>50</sub> value this showed weaker antioxidant activity as in table 3.

**Table 3. Relationship of Syrup and IC50 Concentrations**

No	Syrup concentration (25%)	Average (IC <sub>50</sub> )
1	25	1370 ppm ± 34,39
2	75	1281,33 ppm ± 39,49
3	100	1042 ppm ± 42,93

From the table above, it can be seen that faloak syrup at each concentration has antioxidant activity with very weak intensity and based on statistical tests using ANOVA, the three concentrations have no significant difference in reducing DPPH free radicals. The low antioxidant activity of faloak syrup needs to be improved by adding ginger as well as in instant making. The addition of ginger in instant making can increase antioxidant activity and increase the taste that consumers like (Tenda, 2017).

## Conclusion

Faloak syrup (*Sterculia quardifida* R.Br.) as a result of extraction using powder maceration without boiling using the DPPH method (1,1-difenyl-2-picrylhydrazyl) has a very weak antioxidant activity where concentrations of 25%, 75% and 100% respectively have antioxidant activity of: 1370 ppm ± 34.39; 1281.33 ppm ± SD 49.49 and 1042 ppm ± SD 42.93. 75% of the organoleptic syrup test results chose very much towards the color of the syrup, as many as 60% of the panelists chose to be very fond of the syrup smell but 50% of the panelists chose not to like the faloak syrup flavor. The results of faloak

syrup water test results obtained 5.16% meet the Indonesian National Standard 01-4320-1996 which is <20%.

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