Antioxidant Activity on Sarrabba is based on the Proportion of Red Ginger Extract (*Zingiber Officinale* Roscoe) and Cinnamon Extract (*Cinnamomum Verum* J. Presl)

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**Abstract**

This study aims to evaluate the antioxidant activity, total phenol, yield and evaluation of the panelists' preference level including color, taste and aroma of instant sarrabba. Sarrabba is processed into an instant drink to extend the shelf life of the sarrabba drink and is practical. The research method used was a completely randomized design (CRD) method with 4 treatment levels of the proportions of red ginger extract and cinnamon extract namely A (100% : 0%), B (95% : 5%), C (90% : 10%) ) and D (85% :15%) with 3 repetitions. The analytical method used in this research is the Folin Chiocalteau method for the total phenol test, the DPPH (1,1-diphenyl, -2 picrylhydrazyl) method for the antioxidant activity test. The results showed that the IC50 of instant sarrabba ranged from 662.13 - 886.93 ppm and total phenol ranged from 2.21 - 6.75 mgGAE/100 g sample. Treatment of the proportion of 100% red ginger extract and 0% cinnamon extract had the strongest antioxidant activity with IC50 of 662.13 ppm and total phenol with a value of 6.75 mgGAE/100 g simple.

**Keywords**—Antioxidant Activity, Cinnamomum Verum J. Presl, Sarrabba, Zingiber Officinale Roscoe

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**Introduction**

Sarrabba is a drink traditional typical Indonesian made from basic ingredients spices, leaves, fruit or other plant parts contains certain bioactive compounds so that it has functional properties can beneficial for health body (Zulfayan et al, 2018).

Sarrabba is consumed because it tastes sweet and slightly spicy and usually more widely consumed by the public in during cold weather (Benedict, 2019). Sarrabba can be used as a drink which can warm the body because it contains ginger and pepper (Husain et al, 2018). By general, material main which is used in making sarrabba is ginger, brown sugar, coconut milk and a little pepper/pepper powder (Qibtiya, 2019).

Red ginger acts as an antioxidant and provides a spicy and spicy taste warm on sarrabba because it contains essential oils and oleoresin the ones that are high are gingerol and shogaol (Sari et al, 2015). Herawati and Saptarini research (2019) stated that red ginger ethanol extract...
has activity a strong antioxidant with an Inhibitor Concentration 50 (IC\textsubscript{50}) value of 57.14 ppm based on the 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. Pepper plays a role in providing a warm and spicy taste to sarabba drinks (Qibtiya, 2019). In Nabillah et al research, 2021, the spicy and hot taste of the product Spice drinks are affected by the addition of pepper. Pepper contains 5-9\% compound piperine so that can give rise to flavor spicy And hot.

Process of making sarabba traditional takes a long time so that people are limited in consuming it and sarabba drinks is also easily damaged because it has a high water content, therefore sarabba drink is prepared inside instant form. Processing in shape instant will be able to extend the shelf life of sarabba drinks and their properties practical (Mahendradatta et al, 2021). Existing sarabba instant drink Nowadays it is generally made from ginger, brown sugar, ground pepper, coconut milk coconut and sugar.

**Literature Review**

Cinnamon is a type of spice that is often used as a food additive to provide aroma and taste to food or drink. Cinnamon can also be used as a source antioxidant experience for body (Jayanto, 2021). Study Prashasti and Hidajati (2019) state that extract ethanol cinnamon has antioxidant activity with an Inhibitor Concentration value of 50 (IC\textsubscript{50}), namely 191,139 ppm based on the 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. In process development sarabba instant, need exists utilization material other additions such as cinnamon to enhance the aroma and taste of the instant sarabba. This study aims to evaluate the effect of proportion red ginger extract and cinnamon extract to activities antioxidant sarabba instant.

**Research Method (Times New Roman 14 bold)**

Study This done in Laboratory Technology Food and Nutrition Faculty Agriculture Sam Ratulangi University, Manado in time period 1 month. The tools used in making instant sarabba are a basin, knife, cutting board, spoon, filter cloth, blender, 80 mesh sieve, jar, thermos, stirring spoon, sieve, pan and stove. Ingredients used in making instant sarabba, fresh red ginger is obtained from market Karombasan, sugar red (sugar aren) Which obtained from market Karombasan, wood sweet, pepper white powder (Ladaku), coconut cream powder (Sasa Coconut cream Powder) and sugar.

Study This using a Completely Randomized Design (CRD) with 4 level treatment proportion Ginger Red extract and Cinnamon extract as much 3 time test so that obtained 12 units test.

A = Ginger Red extract 100\% : Cinnamon extract 0 \%  
B = Ginger Red extract 95\% : Cinnamon extract 5\%  
C = Ginger Red extract 90\% : Cinnamon extract 10\% D = Ginger Red extract 85\% : Cinnamon extract 15\%  

Data were analyzed statistically using Analysis of Variance (ANOVA) Then next with LSD Test on level 5\%.

Process making ginger red extract

Red ginger is sorted first formerly to get ginger rhizomes red with good quality (no bad smell and no scratches). After That, ginger red washed use water clean Then done reducing the size in order to facilitate the process of destroying the material. Ginger 300 g of red is weighed, then the
red ginger is weighed destroyed with use blender with comparison water warm (1) : (1) red ginger to make the extraction process easier. Red ginger has destroyed Then filtered use cloth strain for Separate the filtrate and dregs, then let it sit for 30 minutes the starch can precipitate Then extract ginger red the Which will used in process making sarabba instant (Setiawan, 2021).

Process making cinammon extract

Cinnamon is washed using clean water then reduced size to facilitate the extraction process. After it’s cinnamon weighed as much 50 g and Then boiled during 45 minute with ratio of cinnamon (1):(2) warm water. The cinnamon is then filtered use filter so that obtained cinnamon extract Which will used in process making sarabba instant (Kiswanto et al, 2021).

Process Making Sarabba Instant

Red ginger extract and cinnamon extract are poured into the pan then cooked until boiling. After boiling, pepper powder 5 g, coconut milk powder 10 g, sugar palm as much 150 g Which has crushed and sugar sand 150 g put in a pan and cook until boiling and keep stirring slowly. Once it reaches saturation point or air voids are visible and white lumps continue to stir quickly at a temperature of 70-80, And when it starts to harden then turn off the heat and continue stirring until form crystal. After That, done reduction size crystal with use blender Then sifted for uniform size details crystal with use sieve 80 mesh (Haswinda, 2020; Yolandari and Coal, 2019).

Activity antioxidant with method DPPH (Ningrum et al, 2021)

Antioxidant activity analysis test with method DPPH (2,2-diphenyl-1- picrylhydrazyl) which is started by weighing 4 mg of DPPH crystals (0.004 g) and dissolved with ethanol 96% Then entered to in 100 ml volumetric flask, added 96% ethanol and made up to the mark then covered with aluminium foil. The sample powder is also weighed as much as possible 0.1 g and dissolved with 96% ethanol then shaken until homogeneous then entered into the pumpkin measuring 100 ml, added ethanol 96 % And up to the mark limit. After that, a sample concentration series was made from sample mother liquor to 200 ppm, 400 ppm, 600 ppm, 800 ppm and 1000 ppm in pumpkin measuring 50 mL. Then taken 2 ml every solution series concentration and put it in a test tube then add 2 ml of solution DPPH was then incubated for 30 minutes in the dark and covered with aluminium foil. Absorbance was measured using a UV- Vis on wavelength 517 nm with ethanol blank.

Antioxidant activity as an antidote to free radicals, it is formulated as percent inhibition Which can calculated with use formula as following:

\[ \text{Inhibition} \% = \left( \frac{\text{Absorbance control} - \text{Absorbance sample}}{\text{Absorbance control}} \right) \times 100\% \]

Information:

- Absorbance control is absorbance DPPH + ethanol
- Absorbance sample is absorbance DPPH + sample

Determination of the IC50 value is obtained from the percent inhibition of the samples included into the linear regression equation, then through calculations obtained IC50 from sample tested.

Total Phenol (Ahmad et al. 2015)
The total phenol test was carried out using gallic acid as a standard. Stages test total phenol started from making solution standard sour error by weighing gallic acid as much as 0.050 g then dissolved with 50 ml of methanol pa. The solution was then pipetted 2.5 ml and dissolved with 25 ml methanol pa Then, solution pipette as much 1, 2, 3, 4 And 5 ml and enough with methanol pa up to 10 ml to get the concentration 10, 20, 30, 40 and 50 ppm. Each acid standard solution concentration error taken 1 ml Then added 0.4 ml reagent Folin-Chiocalteau shaken and left for 4 minutes then 4 ml of 7% Na2CO3 was added and shaken until homogeneous. After that it was sufficient with distilled water up to 10 ml and silenced during 1 O’clock Then be measured its absorbance on long 750 nm wave. After that, the total phenol test was carried out on the drink powder samples sarabba with method sample weighed as much 0.050 g dissolved in 50 ml methanol pa 1 ml of sample solution was taken and 1 ml of 96% ethanol was added 0.4 ml of Folin-Chiocalteau reagent was added, shaken and allowed to stand for 4 minutes then added 4 ml of Na2CO3 7% shaken until homogeneous. After that enough with distilled water until 10 ml and silenced during 1 O’clock Then be measured its absorbance on long wave 750 nm.

Results and Discussion
Activity Antioxidant Sarabba Instant

Measurement of antioxidant activity based on the DPPH method was obtained from the absorbance value is then transferred to percent inhibition. After percent inhibition obtained Then calculated Inhibitors Concentration 50 (IC50) Which results the calculation served in Table 8.

Table 8. Mark IC 50 sample instant sarabba drink

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Equality Line Linear</th>
<th>Coefficient Correlation</th>
<th>IC 50 (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>y = 0.0751 + 0.0754x</td>
<td>R² = 0.9989</td>
<td>662.13</td>
</tr>
<tr>
<td>B</td>
<td>y = 0.1709 + 0.0706x</td>
<td>R² = 0.9999</td>
<td>705.79</td>
</tr>
<tr>
<td>C</td>
<td>y = 0.1782 + 0.0596x</td>
<td>R² = 0.9999</td>
<td>835.94</td>
</tr>
<tr>
<td>D</td>
<td>y = 0.3319 + 0.056x</td>
<td>R² = 0.9998</td>
<td>886.93</td>
</tr>
</tbody>
</table>

LSD 5% = 33.87 (**) Average value marked with a different letter show significantly different on level 5%

Note: A= Proportion of 100% Red Ginger extract: 0% Cinnamon extract B = Proportion of Red Ginger extract 95% : Cinnamon extract 5% C = Proportion of Red Ginger extract 90% : Cinnamon extract 10% D= Proportion Ginger Red extract 85%: Cinnamon extract 15% .

Based on Table 8. It can be seen that the IC50 value of treatment A (proportion 100% red ginger and 0% cinnamon extract 662.13 ppm. IC50 value treatment B (95% proportion of red ginger and 5% cinnamon extract) was 705.79 ppm. IC50 value treatment C (proportion of red ginger extract 90% and cinnamon extract 10%) of 835.94 ppm. IC50 value treatment D (proportion of red ginger 85% and cinnamon extract 15%) as big as 886.93 ppm.

Can seen that treatment A is treatment Which own the strongest antioxidant activity with an IC50 value of 662.13 ppm, meanwhile Treatment D is the treatment that has the most antioxidant activity weak with IC50 value that is 886.93 ppm. According to Tristantini et al, (2016) the lower the IC50 value the stronger the activity the antioxidant.

Based on the statistical test of variance, it is known that there is an influence treatment proportion ginger red and cinnamon extract to activity instant sarabba antioxidant so it is continued with the 5% LSD test. Table 8. Show that fourth treatment different in a way statistics. Red ginger contains phenolic compounds in the form of gingerol, shogaol, curcumin and diarylheptanoid. In these compounds there are groups hydroxyl bonded to the benzene ring where
the group gives proton to DPPH specifically radical free as DPPH become non radical.

Total Phenol

Measurement of total phenol begins with measuring the absorbance of acid standards error. Results measurement standard sour error served on Table 9.

Table 9. Results measurement absorbance standard error

<table>
<thead>
<tr>
<th>Concentration (µg/ml)</th>
<th>Abs. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.247</td>
</tr>
<tr>
<td>20</td>
<td>0.309</td>
</tr>
<tr>
<td>30</td>
<td>0.418</td>
</tr>
<tr>
<td>40</td>
<td>0.484</td>
</tr>
<tr>
<td>50</td>
<td>0.708</td>
</tr>
</tbody>
</table>

After obtained absorbance standard sour error next with calculation of line equations. Calculation results of the acid standard line equation error like shown in Figure 6.

![Fig 6. Curve standard sour error](image)

From results measurement absorbance standard sour error on Table 9. So the equation of the line obtained is, \( y = 0.011x + 0.1412 \) with the relationship coefficient value \( R^2 = 0.9369 \). The equation of the line that has been obtained is used to measure total phenol content of instant sarabba drink by entering the absorbance value sample of instant sarabba drink on the acid standard curve line equation error. The results of calculating the total phenols of instant sarabba drinks can be seen in Table 10.

Table 10. Results total calculation phenol instant sarabba

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Total Phenol (mg GAE/100 g sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D (Proportion Ginger Red 85% : 15% Cinnamon extract)</td>
<td>2.21 a</td>
</tr>
<tr>
<td>C (Proportion Ginger Red 90% : 10% Cinnamon extract)</td>
<td>4.01 b</td>
</tr>
<tr>
<td>B (Proportion Ginger Red 95% : 5% Cinnamon extract)</td>
<td>5.46 b</td>
</tr>
<tr>
<td>A (Proportion Ginger Red 100% : 0% Cinnamon extract)</td>
<td>6.75c</td>
</tr>
</tbody>
</table>

LSD 5% = 1.37 (*) Mark average Which marked by letter Which different show significantly
Based on Table 10. Can seen that results calculation total phenol instant sarabba drink ranged from 2.21 – 6.75 mg GAE/100 g sample. The highest total phenol content was found in treatment A (proportion of ginger red extract 100% and cinnamon extract 0%). Meanwhile, for the total phenol content Lowest there is on treatment D (proportion Ginger Red extract 85% and Cinnamon extract 15%). This shows that the greater the proportion of red ginger red extract used, the higher the total phenol content in the drink sarabba instant.

Based on the statistical test of variance, it is known that there is an influence treatment of the proportion of red ginger extract and cinnamon extract to total phenol sarabba instant so proceed with the 5% LSD test. Table 10. Shows that proportion ginger red extract 85% and cinnamon extract 15% own significantly different effect with the proportion of 90% red ginger extract and extract cinnamon 10%, the proportion of red ginger extract is 95% and cinnamon extract is 5% and the proportion of red ginger extract is 100% and cinnamon extract is 0% while the proportion of 90% red ginger extract and 10% cinnamon extract have no different effect real with proportion ginger red extract 95% and cinnamon extract 5%.

Of the four treatments above, the use of red ginger extract increased high levels will affect the increase in total phenol levels in sarabba drinks instant. Enhancement content total phenol also along with enhancement antioxidant activity as shown in Tables 8 and 10. Compounds phenolic on red ginger that is gingerol, shogaol, curcumin and diarylheptanoidand the phenolic compounds in cinnamon, namely cinnamaldehyde and eugenol play a role in enhancement activity antioxidant on drink sarabba instant.

**Conclusion**

Treatment proportions of ginger red extract 100% red and 0% cinnamon extract have the strongest antioxidant activity with IC 50 that is 662.13 ppm and total phenol with mark 6.75 mgGAE/100 g. IC50 of instant sarabba ranges between 662.13 - 886.93 ppm and total phenol ranged from 2.21 - 6.75 mgGAE/100 g sample.

**References**


