



# Antioxidant Activity Test of Meniran (*Phyllanthus niruri* Linn.) and Red Ginger (*Zingiber officinale* Rosc.Var Rubrum) Tea Combination Using DPPH Method

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## ABSTRACT

Antioxidants are compounds that can stop or slow down the oxidation process. Basically, herbal mixtures made from the leaves, seeds, or roots of various plants are what make up herbal tea. Among the innovative ingredients is a combination of the Meniran plant (*Phyllanthus Nuri* Linn.) and a plant known as red ginger (*Zingiber Officinale* Rosc.Var Rubrum) which has a number of active ingredients, flavonoids, which have antioxidant properties. The aim of this study was to assess the antioxidant capacity of a combination of meniran tea and red ginger. Combination tea is made by combining meniran and red ginger with a formula of 25%, 50% and 75%. The antioxidant test data will be analyzed using the ANOVA statistical test. Spectrophotometric analysis was used to analyze antioxidants. The results of antioxidant tests showed that the highest antioxidant activity was found in the F3 treatment, namely 2,585 ppm with respectively F2 7,485 ppm and F1 9,993 ppm and ascorbic acid as a comparison showed an IC50 value of 5,158 mg/L

Keywords: Antioxidant, meniran, red ginger, DPPH, IC50

## METHODS

This research explores the antioxidant activity of tea made from meniran and red ginger plants. The key steps are as follows:

1. Gather Supplies:
  - Fresh meniran and red ginger
  - Various chemicals and lab equipment (pipettes, beakers, spectrophotometer, etc.)
2. Prepare the Plant Powders:
  - Wash and dry the plants thoroughly.
  - Cut them into small pieces and dry them further.
  - Grind the dried plants into a fine powder.
3. A. Phytochemical screening:
  - Conduct tests to identify the presence of beneficial phytochemicals: Flavonoid, Alkaloid, Phenolic, Saponin and Tannin Testing
4. Brew the Tea:
  - Combine meniran and red ginger powder in different ratios.
  - Brew each mixture with hot water and filter the resulting tea solutions.
5. Evaluate Antioxidant Activity:
  - Prepare a DPPH solution (a chemical that reacts with antioxidants).
  - Measure how effectively different tea concentrations reduce the DPPH radical (a sign of antioxidant power).
6. Analyze and Conclude:
  - Compare the antioxidant activity of different tea combinations.
  - Relate the findings to the identified phytochemicals.
  - Draw conclusions about the potential health benefits of the tea.
7. Data Analysis
  - Absorbance of meniran and ginger tea mixture was measured using UV-Vis spectrophotometry.
  - Data analysis was done using statistical methods like one-way ANOVA or Kruskal-Wallis test.

## B. Evaluation Results of Antioxidant Tea Using the DPPH Method

| No | Test Solution | IC <sub>50</sub> Value | Classification |
|----|---------------|------------------------|----------------|
| 1. | F1 Brewing    | 9,993 ppm              | Very Strong    |
| 2. | F2 Brewing    | 7,485 ppm              | Very Strong    |
| 3. | F3 Brewing    | 2,585 ppm              | Very Strong    |
| 4  | Vitamin C     | 5,158 ppm              | Very Strong    |

Table 2. IC50 Value of Tea Combination of Meniran and Red Ginger, Ascorbic Acid

The combination of meniran and red ginger tea in F1, F2 and F3 brews has very strong antioxidant activity. These results indicate an increase in antioxidant activity in these samples. Increased antioxidant levels can occur due to the synergistic properties of several antioxidants. In the F3 brew, with the addition of 0.5 grams of red ginger, especially phenols such as gingerol, shogaol, and jingeron, which have been proven to have potential as antioxidants, play an important role in increasing the antioxidant activity of the sample to reach the highest level.

## CONCLUSION

The combination preparation of meniran and red ginger tea contains alkaloids, flavonoids, phenolics, and tannins. It exhibits potent antioxidant activity with an IC50 value of less than 50 ppm, categorized as very strong. The highest antioxidant activity was found in brew F3, with an IC50 of 2.585 ppm, which was a combination of 75% meniran and 25% red ginger.

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## BACKGROUND

Free radicals can damage cells and tissues, causing disorders. Antioxidants are important to counter free radicals.

Antioxidants can delay damage from free radicals by attaching to them. The human body has natural enzymatic and non-enzymatic antioxidants.

Tea can be made from plant leaves or flowers, known as herbal tea. Meniran and red ginger are two plants used for herbal tea.

Meniran has antioxidant, antibacterial, and other medicinal properties. Its phytochemicals include phenolics, tannins, flavonoids, etc.

Red ginger also has medicinal benefits like anti-inflammatory effects. It contains terpenoids, alkaloids, flavonoids, etc.

The combination tea of meniran and red ginger will be evaluated for antioxidant activity using the DPPH method.

## OBJECTIVE

The aim of this study was to assess the antioxidant capacity of a combination of meniran tea and red ginger.

## RESULTS AND DISCUSSION

### A. Phytochemical Screening Results

| Phytochemical Test | Reagent    | Result                               | Conclusion |
|--------------------|------------|--------------------------------------|------------|
| Flavonoid          | HCl + Mg   | Forms a red or yellow color          | +          |
| Alkaloid           | Wagner     | There is a brown precipitate         | +          |
|                    | Dragonordf | An orange red color is formed        | -          |
| phenolic           | FeCl 1 %   | Forms a greenish or dark black color | +          |
| Saponin            | HCl 2 N    | Foam 1-10 cm high is formed          | -          |
| Tannin             | FeCl 1 %   | Forms a blackish blue color          | +          |

Description : + = identified, - = unidentified

Table 1. Phytochemical Screening Results of Meniran and Red Ginger Combination Tea

The meniran and red ginger combination tea contains flavonoids, alkaloids, phenols, saponins, and tannins. These phytochemicals have various potential health benefits, including antioxidant, analgesic, anti-inflammatory, and cholesterol-lowering properties.