

# Effects of Time and Temperature Variations on Curcumin Contents and Antioxidant Activity Of Tamarind-Turmeric Herbs

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# Effects of Time and Temperature Variations on Curcumin Contents and Antioxidant Activity Of Tamarind-Turmeric Herbs

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**Abstract.** Tamarind-turmeric herbs also known that contain curcuminoid compounds, antioxidants that function as anti-inflammatory, decrease the level of dysmenorrhoea, and prevent body odor. This study aims to change tamarind-turmeric herbs into lozenges in order to facilitate the accessibility of the consumer get tamarind-turmeric herbs which have a longer shelf life and provides a source of curcumin. This method of the research is early to make tamarind-turmeric herbs with completely randomized design (RAL) are variously treated of time and temperature boiled as P1 : 2,5 minute and 80°C, P2 : 2,5 minute and 90°C, P3 : 2,5 minute and 100°C, P4 : 5 minute and 80°C, P5 : 5 minute and 100°C, P6 : 5 minute and 100°C with replication. Turmeric-tamarind herbs after treatment are tested of antioxidant activity (DPPH) and curcumin contents. ANOVA statistical results shows antioxidant activity (DPPH) and curcumin contents is significantly ( $p \leq 0.05$ ). The highest of antioxidant activity (DPPH) was obtained P2 treatment (2,5 minute and 90°C) with value is 55,5% and curcumin content is 0,024 mg/L.

## 1. Introduction

Various of traditional medicine in the world are often used herbs to prevent of diseases dysmenorrhoea. Indonesia has variety of rhizomes around in various regions. Phytochemicals of these rhizomes have been reported to have activities include antioxidant and anti-inflammatory activities. one of potential commodities is turmeric or curcumin [1]. curcumin has been reported to have others activity as antimutagenic, anti-HIV, antibiotic, antidiabetic, antifibrinogenic, antispasmodic, [2], immunomodulating, can counter of Alzheimer's disease [3].

Tamarindus indica (tamarind) contains of several active compounds like is flavonoids, saponin, and tannin. It Could be used to wound healing, abdominal pain, snake bite, inflammation, cold, diarrhea, helminth infection, and fever. The other Advantages of tamarind role as anti-diabetic, anti-microbial, anti-inflammatory, and have a potential for prevention of obesity and other chronic diseases [4].

Tamarind-turmeric herbs is made from tamarind and turmeric that contains of bioactive compounds is mainly curcumin that can serve as antioxidants that function as anti-inflammatory, decrease the level of dysmenorrhoea, and prevent body odor. Beverage product is easily spoiled at ambient temperature. The influence factors of damage of product quality are microbes, lights, and humidity [1].

## 2. Material and Methods

### 2.1 Material

Tamarind, turmeric, aquadest (Miliphore-Singapore), magnesium sterate (Merck-Singapore), tartate acid (Merck-Singapore), gelatine (Sigma Aldrich-Singapore), manitol (Sigma Aldrich-Singapore), and Amylum Manihot (Pharmacygrade, Merck-Singapore). Ethanol 96%, Acetate acid, and Chloroform we are purchased on Sigma Aldrich-Singapore.

### 2.2 Methods

#### 2.2.1 Tamarind-Turmeric Herbs Production

Tamarind-Turmeric Herbs production according to the procedure [5]. Turmeric rhizome is sorted, washed and boiled for 10 minutes. Then peeled to remove the skin and mixed with tamarind and water to mash with a ratio of turmeric: tamarind: water (1: 0.5: 5). Then boiling with variations in temperature and time, that is :

P1 : 2,5 minute and 80°C

P2 : 2,5 minute and 90°C

P3 : 2,5 minute and 100°C

P4 : 5 minute and 80°C

P5 : 5 minute and 90°C

P6 : 5 minute and 100°C

## 3. Analysis

### 3.1 Antioxidant Activity

The DPPH radical scavenging assay was estimated according to the procedure [6]. 40µL of DPPH and 80µL of sodium acetate buffer (0.1M, pH=5.5) were added into 80µL samples at different concentrations (10, 25 and 50µg/mL). The mixture solution was incubated at room temperature in the dark for 30min. The absorbance was measured at 517nm by using a Spectrophotometer (Winooski, USA). Antioxidant activity was calculated using the formula:

$$\% \text{ antioxidant activity} = (A_{\text{control}} - A_{\text{sample}}) / A_{\text{control}} \times 100$$

where control is the absorbance of control without test sample and sample is the absorbance of the sample. The experiment was carried out in 3 replication.

### 3.2 Curcumin Contents

The thin layer chromatograph used was the stationary phase of Silica gel 60 F<sub>254</sub> with a mobile phase Chloroform: ethanol: acetic acid (94: 5: 1) and detected under a UV lamp at a wavelength of 366 nm. Each 5 µl of the test solution and the standard solution were spotted on the stationary phase plate and eluted with the mobile phase measured by TLC Densitometry, at a wavelength of 425 nm [7].

## 4. Result and Discussion

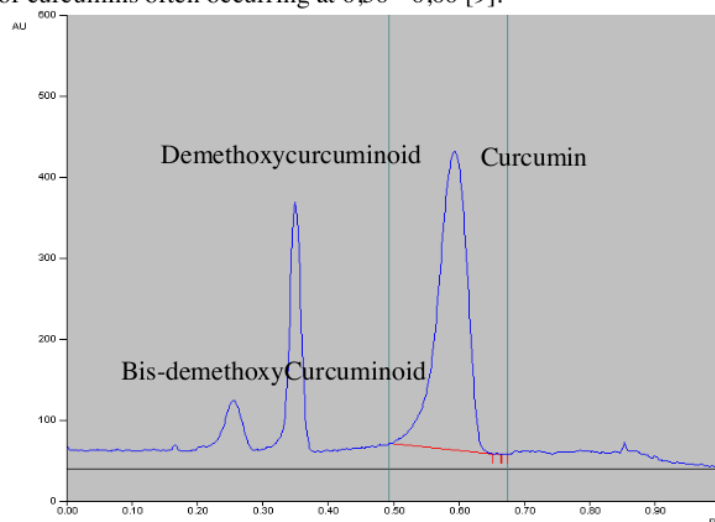
Variations of times and boiled temperature to produce of turmeric-tamarind herbs are shows significantly on antioxidant activity and curcumin content ( $p \leq 0.05$ ), the highest of antioxidant activity and curcumin contents is P2 treatments (see on Table 1). Turmeric-tamarind herbs contains of curcuminoid compounds where it widely used to anti-

inflammatory activities, and the other hands of in-silico studies curcuminoid has potency to suppressed of *mycobacterium tuberculosis* activity [8].

**Table 1.** Antioxidant activity and curcumin contents

Treatment	Antioxidant activity (%)	Curcumin contents (mg/mL)
P1	54.8±0.10 <sup>b</sup>	0.005±0.01 <sup>b</sup>
P2	55.5±0.20 <sup>c</sup>	0.0242±0.0 <sup>a</sup>
P3	53.8±0.10 <sup>a</sup>	0.190±0.01 <sup>d</sup>
P4	55.2±0.10 <sup>c</sup>	0.0163±0.01 <sup>e</sup>
P5	55.2±0.15 <sup>c</sup>	0.005±0.01 <sup>f</sup>
P6	53.5±0.78 <sup>a</sup>	0.0047±0.01 <sup>c</sup>

Quantification of curcumin contents used HPTLC plate of silica gel 60 F<sub>254</sub> as stationery phase at 427 nm. Chromatogram profile of turmeric-tamarind herbs shown has 3 strong spots as bis-demethoxycurcuminoid, demethoxycurcuminoid, and curcumin. R<sub>f</sub> values of curcumin at 0,59 for this sample (See on Figure 1). This results corresponds with others results where the R<sub>f</sub> value of curcumins often occurring at 0,50 - 0,60 [9].



**Figure 1.** Chromatogram profile of curcumin contents on herbs, detection at 427 nm.

## 5. Conclusion

The highest of antioxidant activity (DPPH) was obtained P2 treatment (2,5 minute and 90°C) with value is 55,5% and curcumin content is 0,024 mg/L.

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