



## Screening for Phytochemical Content of Several Types of Medicinal Plants in North Buton Regency

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### ABSTRACT

Phytochemical content or natural products can be defined as a heterogeneous group of natural metabolic products that are not essential for the vegetative growth of producing organisms, but are considered as differentiation compounds that provide adaptive roles. The most commonly known phytochemical content is divided into several compounds such as alkaloids, falfonoids, steroids, terpenoids, sapinin, tannins, and phenols. This study aims to identify phytochemical content in several types of medicinal plants such as *Eupatorium odoratum*, *L. Lantana Camara* L., *Tetracera indica*, *Ebelia* sp., *Curcumma longa* Linn., *Zingiber officinale*, *Alpinia galanga*, *Curcuma xanthorrhiza*, *Punica granatum* and *Piper betle* L. The study was conducted with several stages including: preparation of materials, extraction, flafonoid tests, alkaloid tests, steroid tests, terpenoid tests, saponin tests and tannin tests. The analyst shows that all types of plants analyzed have a variety of phytocima content.

## 1. Introduction

Phytochemical content or natural products can be defined as a heterogeneous group of natural metabolic products that are not essential for the vegetative growth of producing organisms, but are considered as differentiation compounds that provide adaptive roles, for example, can function as defense or signaling compounds, can also play a role in ecological interactions, symbiosis, metal transportation, competition and so on [1]. The most commonly known phytochemical content is divided into several compounds such as alkaloids, falfonoids, steroids, terpenoids, sapinin, tannins, and phenols.

Alkaloids are derived from amino acids and can be synthesized as secondary metabolites by plants and some animals. This compound is considered to play an important role in living organisms including humans for centuries. Apart from being a secondary metabolite, this compound also has biological effects on animals and humans in small doses [2]. Alkaloids are a class of nitrogen-containing organic compounds found in the plant kingdom. Many alkaloids are used as valuable medicinal agents which can be utilized to treat various diseases such as malaria, diabetes, cancer, cardiac dysfunction etc [3].

Steroids are a type of hormone produced by groups of plants and animals. These compounds play an important role in biological systems. Steroids affect plant development such as cell division, root growth, shoot growth, embryo, flowering, and pollen tube growth. In the pharmaceutical field, steroids have anti-tumor, immunosuppressive, hepatoprotective, antibacterial, anthelmintic, cytotoxic, and cardiotoxic activities. Several types of steroids are known in plants including brassinosteroids, phytoecdysteroids, withanolides, cardenolides, and bufadienolides [4].

Terpenoids are a class of chemical compounds present in all living organisms. However, green and especially flowering plants exhibit higher amounts of terpenoids compared to other living organisms. Various

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studies have estimated that the amount of terpenoid compounds is different in different types of plants. All plants synthesize terpenoids that have important roles such as phytohormones, protein modification reagents, antioxidants and others [5].

Tannins have several important roles, especially in the role of antioxidants and anticarcinogens. In addition, there is ample evidence that tannin plays an important role as an anti-inflammatory, cicatrizing and anti-HIV [6]. Commercial tannins are usually pale yellow to light brown in color. Tannins are used primarily in leather tanning, fabric dyeing, and ink making and in a variety of medical applications. The tannin solution is acidic and has an astringent taste. Positive content of tannins in plants if a blackish blue or blackish green color is formed.

Phenolics are compounds that have one or more aromatic rings with one or more hydroxyl groups. It is widely distributed in plants and is the most abundant plant secondary metabolite, with more than 8,000 phenolic structures currently known. Plant phenolics are generally involved in defense against ultraviolet radiation or aggression by pathogens, parasites and predators and contribute to plant coloration. Phenol is present in all plant organs and is a broad constituent of plant foods for humans [7].

This study conducted a phytochemical test on several types of medicinal plants in North Buton Regency. Phytochemical test is a method used to study the components of active compounds contained in samples, such as chemical structure, biosynthesis, natural distribution and biological function, isolation. Phytochemical tests are also used to compare the composition of chemical compounds from various types of plants. Plant samples used in the phytochemical test can be in the form of leaves, stems, fruits, flowers, tubers and roots [8]. This study aims to identify the phytochemical compounds present in several types of medicinal plants.

## **2. Material and Method**

### *2.1 Preparation of research tools and materials*

The materials used in this study were plant samples (roots, stems and leaves), distilled water, hexane, ethyl acetate, HCL, 70% ethanol, 2N HCL, acetic acid, H<sub>2</sub>SO<sub>4</sub>, FeCl<sub>3</sub>, solution dragendorff, filter paper, label paper. The tools used in this study include: measuring cup, Erlenmeyer, dropper, volume pipette, beaker, analytical balance, test tube, hot plate, shaker. incubator, tweezers, spatula and tube rack [9].

### *2.2 Ekstraksi*

Extraction was carried out on several types of plants respectively. The plant organs used as samples were ground and dried. A total of 10 g of powder plant organs are put into a beaker, then added 60 mL of alcohol, 60 mL of hexane and 60 mL of ethanol, then incubated for 3 days. The next stage is filtered using filter paper, the filtrate obtained is concentrated by evaporation with a vacuum rotary evaporator to produce a thick extract of each solvent. The viscous extract was then further tested [9].

### *2.3 Flavonoid test*

Samples were taken as much as 1 ml and put into a test tube. Then 1 ml of 70% ethanol was mixed in the sample, then 0.1g magnesium powder and 5 drops of concentrated HCl were added. The sample is shaken and observed for changes that occur, the formation of a red, yellow or orange color in the solution indicates the presence of flavonoids.

### *2.4 Alkaloid Test*

The alkaloid test was carried out on each plant by mixing 10 mL sample with 1.5 mL of 2N HCL. Then heated for 5 minutes and then filtered using filter paper. The filter results added 5 drops of Dragendorff reagent, the test results were positive for alkaloids indicated by the color orange or orange.

### *2.5 Steroid and terpenoid test*

The terpenoid test was carried out individually on plant organs by means of Mix 1 mL of the sample with 5 drops of acetic acid alhydrate and then homogenize using vortex. Then added with 2 drops of concentrated H<sub>2</sub>SO<sub>4</sub>. Formation of a blue green color The sample shows the presence of steroids and the formation of a red color indicates the presence of terpenoid content.

## 2.6 Saponin Test

The saponin test was carried out by dissolving 1 mL of the sample with 1 mL of distilled water, then stirring for 15 minutes. Results Positive saponin content was indicated by the presence of a stable foam for 5 minutes.

## 2.7 Tanin Test

The tannin test was carried out by dissolving 1 mL sample with 2 mL of distilled water. Then 3 drops of FeCl<sub>3</sub> solution were added. Blue color is formed blackish or blackish green indicates a positive Tanin content.

## 3. Results and Discussion

The results of the phytochemical content test in this study are listed in the following table.

Table 1. Results of Phytochemical Screening of Ethanol Extracts of several types of medicinal plants in North Buton Regency

Medicinal plants		Test results				
Plant Sample	Latin name	Flavonoids	Alkaloids	Steroids/ terpenoids	Saponins	Tannins
Komba-komba (daun)	<i>Eupatorium odoratum</i> L.	+	+	+/-	-	+
Tembelekan	<i>Lantana Camara</i> L.	+	+	+/-	+	+
Mempelas	<i>Tetracera indica</i>	-	+	-/+	+	+
Kamohindi	<i>Ebelia</i> sp.	-	+	+/-	+	+
Turmeric	<i>Curcuma longa</i> Linn.	+	+	+/+	+	+
Ginger	<i>Zingiber officinale</i>	+	+	+/+	+	-
Galangal	<i>Alpinia galanga</i>	+	+	+/+	+	-
Curcuma	<i>Curcuma xanthorrhiza</i>	+	+	+/-	-	-
Pomegranate	<i>Punica granatum</i>	+	-	+/-	+	+
Betel	<i>Piper betle</i> L.	+	+	+/-	+	+

### 3.1 Komba-komba (*Eupatorium Odoratum* L.)

Komba-komba (*Eupatorium odoratum*) is a type of plant that is widely available in Southeast Sulawesi and has properties as a mosquito repellent (repellant). There are two types of plants known as komba-komba, namely white-flowered komba-komba and yellow-flowered komba-komba [10]. In this study, phytochemical analysis was carried out on komba-komba leaves, the results showed that komba-komba leaves had flavonoids, alkaloids, saponins and tannins.

### 3.2 Tembelekan (*Lantana Camara* L.)

Tembelekan (*Lantana camara* L.) is an upright or semi-climbing shrub with a distinctive odor which is native to tropical and sub-tropical regions, this plant has many variations [11]. The test results showed that Tembelekan leaves contain alkaloids, flavonoids, daponins, tannins. These results are in line with the results of research which reported that the ethanolic extract of the leaves of tembelekan (*Lantana camara* Linn) showed the presence of alkaloids, flavonoids, steroids, triterpenoids and phenolics [12].

### 3.3 Mempelas (*Tetracera indica*)

*Tetracera indica* has Morphological characteristics are dark green leaves, pointed leaf base, slightly hairy leaf surface, jagged leaf edges, prominent leaf veins, pointed leaf base, pointed leaf tip, petiole slightly hairy and has a single leaf, woody stem, round stem shape, stem surface Rough [9]. The results of this study indicate that *Tetracera indica* contains alkaloids, terpenoids, saponins and tannins.

### 3.4 Kamohindi (*Ebelia* sp.)

The morphological characteristics of *Embelia* sp. of which the leaves are attached to the stem and do not have stipules, glossy leaf surfaces, pinnate veins and tapered leaf tips. Plant grows climbing and has blunt spines on the stem. Stems produce water clear, the water is commonly used to treat fever [9]. The results

showed that *Emebelia* sp. Alkaloids, steroids, saponins and tannins. The results of previous studies reported that species under the genus *Embelia* have biological activity such as anthelmintic, carminative, antibacterial, antibiotic, and hypoglycemic properties and is an ingredient in about 75 formulations of traditional Ayurvedic medicine [13].

### 3.5 Turmeric (*Curcuma longa* Linn)

This study tested the phytochemical content of turmeric rhizome. Phytochemical tests were carried out to determine the content of compounds contained in turmeric rhizome extract. Hasil penelitian menunjukkan bahwa rimpang kunyit mengandung flavonoid, alkaloid, steroid, terpenoid, saponin dan tannin. Similar studies have been reported in previous studies, turmeric rhizome contains alkaloids, flavonoids and tannins [14].

### 3.6 Ginger (*Zingiber officinale*)

Ginger (*Zingiber officinale*), which belongs to the Zingiberaceae family, was first cultivated in Asia (Indonesia and Malaysia). This plant is one of the most common herbal supplements used by many patients to treat various ailments [15]. There are three known types of ginger: giant ginger or white ginger (*Zingiber officinale* var. *Roscoe*), small white ginger or ginger emprit (*Zingiber officinale* var. *Amarum*), and red ginger (*Zingiber officinale* var. *Rubrum*). The main components of ginger rhizome are carbohydrates, lipids, essential oils, terpenes, and phenol compounds such as gingerol (23-25%) and shogaol (18-25%). Many studies had confirmed beneficial effects of ginger against inflammation, free radicals, diabetes melitus, bacterial infection, cancer, nausea [16]. In this study, we analyzed the phytochemical content of ginger rhizome. The results showed that ginger rhizome contains alkaloids, flavonoids, steroids, terpenoids and saponins.

### 3.7 Galangal (*Alpinia galanga*)

*Alpinia galanga* is a ginger species found in tropical Asia. *Alpinia galanga* is widely found in the South Asian region, a different region as a citizen, which includes Malaysia, Indonesia, Brunei, Singapore and the Philippines. *Alpinia galanga* from the family Zingiberaceae has been widely used decades ago and is still used for traditional and medicinal purposes [17]. *Alpinia galanga* L. rhizome was known to inhibit the growth of pathogenic fungi. The antifungal substances of galangal rhizome were found from their volatile oil [18]. This study conducted a phytochemical analysis of the *Alpinia Galanga* rhizome, the results showed that the species containing flavonoids, alkaloids, steroids, terpenoids and saponins.

### 3.8 Curcuma (*Curcuma xanthorrhiza*)

Temulawak (*Curcuma xanthorrhiza* Roxb.) or Javanese turmeric is one of the medicine plants from Indonesia, which contains curcuminoid and xanthorrhizol. These compounds have large biological activity, such as antioxidant capacity [19]. *Curcuma xanthorrhiza* Roxb., locally famed as Temulawak, has been extensively utilized in Indonesia as medicinal and nutritional plants since immemorial time[20]. In this study analyzed the content of phytochemicals in ginger leaves, the results showed that these species contain alkaloids, flavonoids and terpenoids. *Curcuma xanthorrhiza* is a native Indonesian plant and traditionally utilized for a range of illness including liver damage, hypertension, diabetes, and cancer [21]. This plant is used as an ingredient in health supplements known as “jamu” or to cure certain health problems including hepatitis, liver complaints, diabetes, rheumatism, anticancer, hypertension, and heart disorders [22].

### 3.9 Pomegranate (*Punica granatum*)

*Punica Granatum* (PG), commonly known as Pomegranate (PG), is a member of the Monogeneric Family, Punicaceae, and is mainly found in Iran which is considered as its main center. The chemical components of this plant have various pharmacological and toxicological properties including antioxidants, anti-inflammatory (by inhibiting proinflammatory cytokines), anti-cancer and anti-angiogenesis activity [23]. Pomegranate (*Punica Granatum*) is the most important plant belonging to the Lythraceae family. The rinds fruit of this plant is used throughout the world as Taenisida, due to alkaloids, and the treatment of diarrhea and oral and genital lesions, due to tannins and astringement [24]. This study analyzes the content of phytochemicals in pomegranate fruit rinds, the results show that pomegranate fruit rinds contains flavonoids, steroids, saponins and tannin.

### 3.10 Betel (*Piper betle* L)

Betel is classified in the families of Piperaceae, it is known that the leaves of the betel plant have several bioactivity and are used in traditional treatment systems. Many research studies on betel plants have reported that it contains an important chemical component which has a pharmacological effect, one of which is as an antioxidant [25]. In this study manganalysis of the Phytochemical content of betel leaf, the results of the study showed that betel leaves contain flavonoids, alkaloids, steroids, saponins and tannin. Betel leaf has a variety of benefits including treatment and as an antibacterial [26].

## 4. Conclusion

Based on the results of the study, it is shown that several types of medicinal plants in North Buton Regency contain phytochemicals. These phytochemicals include *Eupatorium odoratum* which contains flavonoids, alkaloids, steroids, and tannins. *Lantana Camara* L leaves contain flavonoids, alkaloids, steroids, saponins and tannins. Leaves of *Tetracera indica* alkaloids, terpenoids, saponins and tannins. Leaves of *Ebelia* sp. contains alkaloids, steroids, saponins and tannins. The rhizome of *Curcuma longa* Linn contains flavonoids, alkaloids, steroids, terpenoids, saponins and tannins. The rhizomes of *Zingiber officinale* and *Alpinia galanga* contain flavonoids, alkaloids, steroids, terpenoids, saponins and tannins. *Curcuma xanthorrhiza* leaves contain flavonoids, alkaloids and steroids. Furthermore, the skin of the *Punica granatum* fruit contains flavonoids, steroids, saponins and tannins. And *Piper betle* L leaves contain flavonoids, steroidal alkaloids, saponins and tannins

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