

Literature Review: Antioxidant Test of Basil Leaves (*Ocimum Sanctum*)

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Abstract— Basil leaves is family of lamiaceae, which is known as daun kemangi (Indonesia). This plant is widely use as a herb. Indonesian also used basil leaves as a seasoning in their food. It has chemical compound such as flavonoid so it has an antioxidant effect. The aim of this reseach is to find out the antioxidant effect of the basil leaves, the chemical compound of basil leaves. The method by reviewing online articles at Pubmed, sciencedirect and Google Scholar. Cemichal compound was identified in some reseach. It show different potential base on the extraction proses. The antioxidant effect was tested using the DPPH method for determination of IC50. By reviewing articles, we can conclude that basil leaves have an antioxidant effect.

Keywords—basil leaves, antioxidant, DPPH Method.

I. INTRODUCTION

Indonesia is very rich in sources of biodiversity that provide various raw materials for medicines. This situation is very useful in overcoming the development of various diseases that threaten human life. One of them that can be used as a basic ingredient that is beneficial to health is basil (*Ocimum tenuiflorum* L.). Basil is an herbal plant that is used as a medicinal plant due to the presence of active compounds such as eugenol, urosolic acid, carvacrol, linalool, methyl carvicol, sitosterol including saponins, flavonoids, triterpenoids and tannins. All of them have varied biological activity, in addition many phenolics have been identified which exhibit antioxidants. [1]

Basil Leaves (*Ocimum sanctum*), are one of the most important sources of medicines. Basil (*Ocimum basilicum* Linn.) is one such plant which symbolizes all that is wondrous in nature because, the whole plant has been used as traditional medicine for household remedy against various human ailments from antiquity. The objective of this paper is to review the literature regarding *Ocimum basilicum*, specifically for its chemical properties, therapeutic benefits and scientific studies. This review consists of all publications relevant to *Ocimum basilicum* that were identified by the authors through a systemic search of major computerized medical database. Studies indicate *Ocimum basilicum* to possess analgesic, anti inflammatory, antimicrobial, antioxidant, anti ulcerogenic, cardiac stimulant, chemomodulatory, CNS depressant, hepatoprotective, hypoglycemic, hypolipidemic, immunomodulator and larvicidal activities. The drug was also searched for its folkloric claims. It is used in traditional medicine as a tonic and vermifuge, and Basil tea taken hot is good for treating nausea, flatulence, and dysentery. The oil of the plant has been found to be beneficial for the alleviation of mental fatigue, cold, spasm, rhinitis, and as a first aid treatment for

wasp stings and snakebites. Preliminary studies have found various constituents of *Ocimum basilicum* to exhibit a variety of therapeutic effects. These results are very encouraging and indicate that this drug should be studied more extensively to confirm these results and to find other potential therapeutic effects. [2]

Flavonoid compounds found in plants have a natural antioxidant activity can capture free radical molecules or as natural antioxidants. One of the plants that have compounds flavonoids, namely basil (*Ocimum basilicum* L.). The chemical content contained is tannins (4.6%), flavonoids, steroids / triterpenoids, essential oils (2%), hexauronic acid, pentose, xylose, methyl acid homoanistic, molludistin and ursolic acid, flavonoids in leaves Basil is apigenin which is a group flavones which can be used as free radicals. [3]

Antioxidants

Antioxidants are compounds that can inhibit the rate of oxidation of other molecules or neutralize free radicals. In a chemical sense, antioxidants are electron-giving compounds, whereas in a biological sense, antioxidants are molecules or compounds that can reduce free radical activity by preventing cell oxidation. Based on the mechanism of action, antioxidants can be divided into three groups, namely:

a. Primary antioxidants

Primary antioxidants are antioxidants that work by preventing the formation of new free radicals and converting free radicals into molecules that are not harmful. Examples are Butyl Hydroxy Toluene (BHT), Tertiary Butyl Hydro Quinon (TBHQ), propyl gallate, natural and synthetic tocopherols and alkyl gallates.

b. Secondary antioxidants

Secondary antioxidants are compounds that can prevent prooxidants from working, namely factors that accelerate oxidation reactions, especially metals such as: Fe, Cu, Pb, and Mn. Secondary antioxidants functions to capture free radicals and prevent chain reactions so that greater damage does not occur. Examples are vitamin E, vitamin C, and beta-carotene which can be obtained from fruits.

c. Tertiary antioxidants

Tertiary antioxidants are compounds that repair cells and tissues that are damaged by free radical attack. Usually included in this group are types of enzymes such as methionine sulfoxidant reductase which can repair DNA in

the cell nucleus. This enzyme is useful for DNA repair in cancer patients. [4]

II. METHOD

This study uses a literature review method. Literature review is a search and literature research that can be done by reading various books, journals, and other publications related to research topics, to produce a single article relating to a particular topic or issue. [5] The data source of this study comes from literature obtained via the internet in the form of research articles on the antioxidant activity test found in basil leaves (*Ocimum sanctum*). The search for research articles relevant to the topic of this research was carried out using the keyword antioxidant activity test found in basil leaves (*Ocimum sanctum*) obtained from search engines including Google Scholar, PubMed, Wiley Online Library. Data collection was carried out in March 2021.

Research data related to the antioxidant activity test found in basil leaves (*Ocimum sanctum*) were obtained from articles published in 2016-2021 as many as 5 research articles consisting of 4 national research articles and 1 international research article. All of these research articles were sampled because the year they were published was from 2016-2021 so that they were included in the latest research category and in accordance with the criteria then analyzed in a narrative.

III. RESULT AND DISCUSSION

IC₅₀ immbo basil leaves dissolved with n-hexane (> 500 ppm), dichloromethane (> 500 ppm), and methanol 368.8 ppm. In this study, ethanol solvent has an IC₅₀ of 83.53 ppm. The difference in the IC₅₀ magnitude is due to the type of solvent, where n-hexane and dichloromethane have non-polar properties, methanol is semi-polar, and ethanol is polar. It is possible that the antioxidant compounds in immbo basil leaves are polar compounds. [6]

In immbo basil leaves, it is known that they contain steroid, terpenoids, alkaline, flavonoids, and saponin compounds. Steroid compounds, terpenoids and alkaloids dissolve in n-hexane and dichloromethane, while flavonoids and saponins are soluble in methanol. Terpenoids are chemical compounds that have several isoprene units and are oil-soluble (non-polar). Terpenoids are generally found in the cytoplasm of plants. [6]

Free antiradical activity test method by using the DPPH free radical. Method DPPH was chosen because it has several advantages among others, simple, easy, fast, sensitive, and requires a small amount of sample. Parameters are used to determine antioxidant activity is IC₅₀ which is defined as concentration antioxidant compounds that cause loss 50% DPPH activity. [7]

The calculations used in the determination of the activity of the radical scavenger is value IC₅₀ (Inhibitor Concentration 50%) this value describes the concentration of the test compound which can catch radicals by 50%. Score IC₅₀ is obtained using equations linear regression which expresses the relationship between the concentration of the sample (test compound) with the symbol X against average radical scavenging activity with the symbol Y of the measurement replication series. The smaller the IC₅₀ value, the compound is has effectiveness as a radical catcher better. [8]

The results of the study of the ethanol extract of basil leaves (*Ocimum basilicum* L.) has moderate activity with an IC₅₀ value of 52.68 µg / mL, while quercetin has a very strong activity with an IC₅₀ value of 1.8 µg / mL. The compound is said to be a very free anti-radical strong if the IC₅₀ value <10 µg / mL, strong if the value IC₅₀ is between 10-50 µg / mL, moderate if the IC₅₀ value ranged from 50-100 µg / mL, weak when the value The IC₅₀ ranges from 100-250 µg / mL and is inactive if the IC₅₀ is above 250 µg / mL. [3]

The phytochemical compounds found in the methanol extract of basil leaves (*Ocimum tenuiflorum* L.) are alkaloids, flavonoids, tannins, phenols, saponins, and steroids. The methanol extract of the herb basil (*Ocimum tenuiflorum* L.) has antioxidant activity against DPPH free radicals with an IC₅₀ value of 1370.9233 µg / mL. Compared with the IC₅₀ value of gallic acid of 11.194 µg / mL, it was concluded that the antioxidant activity of the methanol extract of basil leaves was very weak. [1]

Cytotoxic is a compound or drug candidate that works to kill and inhibit the growth of developing cells. Several studies have shown that basil has cytotoxic activity and is able to inhibit the growth of cancer cells. Basil leaf ethanol extract (*Ocimum basilicum* L.) showed cytotoxic activity against breast cancer cells TD47 with IC₅₀ values amounted to 59.84 µg / mL. [9]

IV. CONCLUSION

Based on the results of the research conducted It can be concluded that the ethanol extract of basil leaves (*Ocimum basilicum* L.) has antioxidant activity moderate with an use IC₅₀ method. Several studies have shown that basil has cytotoxic activity and is able to inhibit the growth of cancer cells. The antioxidant activity of the methanol extract of basil leaves was very weak.

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