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Antibacterial Activities of Kemangi Leaf Extract (Ocimumbasilicumlinn) Inhibit Salmonella typhi Bacteria Invitro

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Abstract— *Typhoid fever is most prevalent diseases in Indonesia and has a very broad spectrum of, while many have found that S.typhi has been resistant to many types of antibiotics. The increasing incidence of S.typhi resistance to antibiotics, has prompted an effort to find new antibiotics more natural and effective by using medicinal herbs basil (Ocimumbasilicum Linn). Therefore it is necessary to identify the activity of the bacteria extracted force and extraction from the light weight with effective concentrations of 25%, 50%, 75% and 100% in inhibiting S. typhi.*

Keywords— *Antibacterial, basil leaf extract (Ocimumbasilicumlinn), Salmonella typhi.*

I. INTRODUCTION

Typhoid fever is still a global health problem for people, especially in developing countries. The large number of definite cases in typhoid fever in the world is still very difficult to determine because this disease is known to have problems with very extensive clinical research [1].

Data from the World Health Organization (WHO) estimates that around 17 million cases of typhoid fever worldwide have an incidence of 600,000 deaths every year. Estimated incidence of 150 cases per 100,000 population per year in South America and 900 cases per 100,000 population per year in Asia [2].

Based on the Indonesian Health Profile in 2011, typhoid and paratyphoid fever in Indonesia itself was based on the 3rd rank out of the 10 most diseases in hospitalized patients in 2010, which were 55,098 cases with a case rate (Case Fatality Rate / CFR) of 2, 06% [3].

In Dr Soetomo General Hospital Surabaya sensitive Salmonella typhi isolates were only 31.6% and 68.4% were resistant, the same thing happened to Salmonellatyphi isolates at Dr. RSU. Saiful Anwar Malang contains 23.1% of sensitivity and 53.8% of Salmonellatyphi isolates carried out sensitivity tests have increased resistance [5]. From molecular level assessment confirmed as Salmonella typhi bacteria becoming resistant to Chloramphenicol which can be used to produce Chloramphenicol Acetyltransferase (CAT) which activates Chloramphenicol [4].

To overcome Salmonella typhi which is resistant to chloramphenicol and other antibiotics, one alternative that can be used is to utilize active substances contained in bacteria contained in medicinal plants. One of the medicinal plants containing active substances is basil bacteria. The plant of basil (Ocimum basilicum L.) is widely used in cooking besides being eaten as fresh vegetables in a raw state. Plant basil contains eugenol, alkaloids, steroids, tannins, flavonoids, and phenols. Eugenol is the largest source of essential oils of basil leaves which also contain antibacterial substances. Eugenol is used in the pharmaceutical field as an ingredient for making antibacterial compounds [5], [6].

Overall, the basil plant has been used as a traditional medicine in the community which is processed simply to handle various kinds of health problems in humans, including to treat nausea, fever, shortness of breath, stomach pain, flatulence and diarrhea. is a clinical symptom of typhoid fever[6].

II. METHOD

The type of research used in this study is the experimental method. This study was conducted at the Pharmacy Academy Samarinda and Kanujoso Djatiwibowo Hospital, Balikpapan on 14 March - 26 April 2016. The population in this study were plants. 39 Lempake Sub-District of North Samarinda Subdistrict. Taking this sample using criteria for random sampling with criteria The inclusion of green basil leaves (Ocimum basillicum L), still fresh, not withered or damaged. Samples of basil plant are taken as much as 1000 gr. The data collected consists of primary data. With Univariate data analysis.

III. RESULTS

The measurement results of inhibitory zone diameters obtained from antibacterial activity of basil leaf extract against S. typhi were processed univariately to determine the frequency distribution of inhibitory zone of basil leaf extract

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shown in the table below:

TABLE I. Diameter Table of Obstacle Zone Basil Leaf Extract Against the Growth of S. typhi

No	Repetition	Inhibited Zone Diameter (mm)					
		Concentration of Basil Leaf Extract					
		Control + Meropenem	Juice of Basil Leaf	25%	50%	75%	100%
1	I	33	10	6	10	16	23
2	II		10	7	9	14	16
3	III		11	7	10	15	20
4	IV		10	6	10	15	22
5	V		9	6	10	13	16
	Mean	33	10	6,4	9,8	14.5	19.4

Source: primary data

The distribution of antibacterial activity of basil leaf extract in inhibiting S. typhi bacteria is a concentration of 25% with a inhibition zone of 6.4 mm, 50% with a inhibition zone of 9.8 mm, 75% with a inhibition zone of 14.5 mm, 100% with a inhibitory zone of 19 , 4 mm, and pressurized basil leaves with a 10 mm inhibition zone. Basil leaf extract (Ocimum basilicum Linn) has antibacterial activity against the growth of S. typhi starting from concentrations of 100%, 75% and 50%, as well as the juice of basil leaves. The concentration of 100% is an effective concentration which gives the optimum zone of inhibition of the growth of S. typhi colonies but this 100% extract is less optimal when compared with positive control of meropenem which is equal to 33 mm. The concentration of 25% can be said to be less inhibiting the bacteria S. typhi.

IV. DISCUSSION

This antibacterial activity test uses basil leaf extract with various dilution concentrations, namely 25%, 50%, 75%, and 100%. The method of obtaining 100% concentration was obtained from 3 grams of weighed basil leaf extract and then mixed with 30 ml DMSO diluent, a concentration of 75% from 2.25 ml of 100% extract plus 1.75 ml of DMSO, a concentration of 50% from 1.5 ml of extract 100 % added 1.5 ml of DMSO, a concentration of 25% of 0.75 ml of 100% extract plus 2.25 ml of DMSO. Then comparing basil leaf extract using positive meropenem control and basil leaf juice. The mean of 5 repetitions of inhibition zone diameter results from the antibacterial activity of basil leaf extract against S. typhi.

The results of the antibacterial activity of basil leaf extract in this study indicate that basil leaf extract can inhibit the growth of S. typhi bacteria, starting from basil leaf extract and all concentrations except 25% concentration because it is said to be very ineffective in inhibiting the growth of S. typhi bacteria. The concentration of 100% is an effective concentration that provides the optimum inhibition zone for the growth of S. typhiakan colonies but this 100% extract is less optimal when compared with positive control of meropenem which is equal to 33 mm.

The amount of resistance at a concentration of 50% is almost the same as the juice of basil leaves, meaning that the juice of basil leaves has the ability to inhibit the same S. typhi bacteria as a concentration of 50%. So that when consuming these leaves can reduce infection due to S. typhi bacteria. This is in accordance with Gupta's statement (2005) that basil leaves can be used to treat digestive disorders, treat diarrhea and treat intestinal inflammation, and various symptoms that have been mentioned are characteristic characteristic symptoms arising from bacterial infections S. typhi [5].

The results of this study were less optimal than those of meropenem antibiotics because basil leaf extract in this study was crude extract whose antibacterial compound solubility was not maximal so that the resulting antibacterial activity was not maximal, whereas antibiotics were strong antibacterial spectrum so that the antibacterial activity was produced maximally, by the next researcher to further purify the basil leaf extract to increase the inhibitory potential of the test bacteria.

Negative control of ethanol and DMSO diluents did not show any inhibition zones. This indicates that the solvents and diluents used by researchers have no effect on the antibacterial test. Meropenem antibiotics were chosen as positive controls because they have a large inhibitory power on these bacteria.

The mechanism of the activity of the content of basil leaves is not known with certainty. The ability of basil leaves to inhibit the possibility due to its chemical content. Based on Mardiana (2007) statement that basil contains active ingredients karvakrol, ursolic acid, and essential oils (cineol, eugenol, linalool, nerol, thymol) Other compounds include ascorbic acid, kampene, betacarotine, tannin, teripeneool, xylose, aldehyde, alkaloids, and fatty acids such as linoleic, linolenic, oleic, palmitic, and stearic acid. Kangi also contains glycosides, minerals, pentose, phenol, and saponins which are antibacterial in nature [7].

One of the bacteria that can be inhibited by basil leaves is S. typhi as the cause of typhoid fever and this was stated by Mustika (2014) that research on ethanol, methanol, hexan, chloroform, water, propanol and isoamil alcohol basil leaves was stated to have activity antibacterial to S. typhi [6].

This basil leaf extract is obtained from the maceration process, according to Sudjadi (1986) The maceration process is used so that the compounds that cannot stand heat are not damaged, the choice of solvent is based on the nature of polarity so that the compounds contained can be extracted optimally. 70% ethanol solvent has polar properties, and 70% ethanol toxicity is lower when compared with acetone and methanol which are both polar solvents [8].

As stated by Mardiana (2007) The antibacterial activity of basil leaves is due to the presence of substances that are effective in killing S. typhi bacteria, for example, are essential oils (cineol, eugenol, linalool, nerol, thymol), tannins, alkaloids, phenols, flavonoids and saponins that have been known to have antibacterial properties, or also these antibacterial properties are obtained from substances that are caught due to this maceration process, because phenols also have antibacterial properties [7].

V. OTHER RECOMMENDATIONS

For other researchers then it is expected to further examine the minimum inhibitory concentration (MIC) and maximal kill

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rate (KBM) to know the results of antibacterial activity carefully and accurately, then phytochemical research needs to be done quantitatively on basil leaf extract and isolation and identification of active compounds so that can be known more specifically which compounds or substances play a role in the antibacterial activity of the basil leaves.

For related health institutions, it is expected to be able to re-examine the sensitivity of bacteria to each antibacterial substance and examine the level or the right dose of basil leaves to treat diseases caused by S. typhi bacteria.

For the community, it is expected to be able to cultivate basil leaves as one of the family medicinal plants (TOGA) used in the prevention of typhoid fever caused by the bacteria S. typhi.

VI. CONCLUSION

The concentration of basil leaf extract (Ocimum basilicum Linn) which is effective in providing the optimal inhibition zone for S. typhi colonies growth is 100% concentration. Less good compared to positive meropenem controls.

Basil leaf extract has antibacterial activity against the growth of S. typhi bacteria, with the distribution of antibacterial activity, basil leaf extract which is a concentration of 25% with a inhibitory zone of 6.4 mm, 50% with a 9.8 mm inhibition zone, 75% with inhibitory zones 14, 5 mm, 100% with a inhibition zone of 19.4 mm, and juice of basil leaves with a 10 mm inhibition zone.

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