ANTIBACTERIAL TEST OF Basil (Ocimum sanctum) LEAF EXTRACT AND FRACTION ON Escherichia coli BACTERIA GROWTH

Sri Ayumi M. Becerang[1)], Titin Dunggio[2)], and Agusrianto Yusuf[3)]
[1,2,3)] Bina Mandiri University Gorontalo
Email: sriayumibecrang90442@gmail.com

ABSTRACT

This study aims to determine the effect of basil leaf extract and fraction in inhibiting the growth of Escherichia coli bacteria and to determine the best concentration in inhibiting the growth of Escherichia coli bacteria.

The method in this study used a completely randomized design (CRD) with five treatments and five repetitions based on each extract and fraction treatment group, namely: 25% concentration, 50% concentration and 75% concentration.

The results showed that from each concentration used from the extract and fraction group, it was found that the largest concentration in inhibiting Eschericia coli bacteria was at a concentration of 75% in the extract group. Statistical analysis of data using the Kruskal Wallis method showed a significant difference in values between extracts and fractions, so it was continued by using the Post Huc Duncan test.

Keywords: Basil, Extract, Fraction, Escherichia coli

INTRODUCTION

Infectious diseases of the digestive tract caused by microbes are still common in Indonesian society. In general, thousands of microbes stick to human hands that enter the body along with the food consumed and then cause digestive tract disorders.[1]

Most digestive tract infection diseases are caused by Escherichia coli bacteria, treatment of infectious diseases is by giving antibiotics to function as growth inhibitors or killing microbes that infect the increasing bacterial resistance to several antibiotic drugs, making many researchers conducting research on various plants containing antibacterial as a treatment. adjunct to support antibiotic therapy.[2]

The basil plant is known to have various uses, including as a refreshing drink and appetite enhancer. In addition, the leaves of the basil plant (Ocimum sanctum L) are known to have antibacterial effects. Basil leaves (Ocimum sanctum L) contain essential oils, saponins, flavonoids, and tannins.[2] Research on the efficacy of basil leaves as antibacterial has been carried out with ethanol extract of basil leaves having antibacterial activity against Staphylococcus aureus and Escherichia coli. Meanwhile, in this study, the basil leaves will be tested as an antibacterial in the form of extracts and fractions against the test bacteria, namely Escherichia coli bacteria. Several other studies have been conducted regarding the antibacterial power of basil, including testing the antibacterial activity of basil essential oil against Staphylococcus aureus and Escherichia coli with the minimum killing concentration (KBM) of Staphylococcus aureus, namely 0.5% and the minimum killing concentration of Escherichia coli, namely 0.25%.[3]

Submit: Feb 5th, 2021 Accepted: March 9th, 2022 Published: March 21st, 2022

Basil essential oil (Ocimum sanctum L.) has antibacterial activity against Staphylococcus aureus and Escherichia coli, with a minimum killing concentration of 0.5 and 0.25% v/v. Based on the KBM price obtained in this study, it can be said that basil leaf essential oil has the potential to stop the growth of Escherichia coli bacteria.[4]

Single opposite basil leaves, arranged from bottom to top. It has a petiole length of 0.25-3 cm and each leaf blade is elliptical to oval, elongated, blunt ends or tapered. The base of the peg leaf is rounded, both surfaces are smooth, wavy, weakly serrated or flat.[4]

Basil is antipyretic (reduces fever), carminative (laxative fart gas), emenagogue (laxative menstruation) and stimulates the mammary glands. The aroma of forest basil oil is very useful for treating sunburned skin, headaches, influenza, inflammation of the throat, ears and eyes and stomach pain. This oil can also be used as an antibiotic. The main content of basil leaves is essential oil which functions as an anti-bacterial and other ingredients, such as 1,8 cineol, anetol, apigenin, arginine, aspartic acid and boron. [5]

1,8 Sineol (whole plant) as an anesthetic, helps overcome premature ejaculation, anticonvulsant, stimulates central nervous activity, dilates capillaries (stimulates erection), and strengthens the liver (liver). Anetol (whole plant) can stimulate immunity and stimulate breast milk. Apigenin (whole plant) can dilate blood vessels, prevent blood coagulation, improve circulation, suppress the central nervous system and help in smooth muscle relaxation.[5]

Antibacterial

Antibacterial is a substance or compound that can suppress or kill the growth or reproduction of bacteria. Compounds or substances used to eradicate bacteria that cause infection in humans must have the highest possible selective toxicity, meaning that these compounds must be highly toxic to bacteria but relatively non-toxic to the host. Based on the nature of selective toxicity, there are antibacterials that inhibit the growth of bacteria known as bacteriostatic substances and there are those that kill bacteria known as bactericidal substances.[6]

The minimum levels required to inhibit the growth of microbes or kill them are known as Minimum Inhibitory Levels (MIC) and Minimum Killing Levels (KBM). Antibacterial substances are substances that are used to kill or inhibit the growth of bacteria.[7]

Escherichia coli become pathogenic if the number of these bacteria in the digestive tract increases or is outside the intestine. Escherichia coli produces enterotoxins that cause some cases of diarrhea. Escherichia coli is associated with enteropathogens producing enterotoxins in epithelial cells.[15]

Clinical manifestations of infection by Escherichia coli depend on the site of infection and cannot be distinguished from symptoms of infection caused by other bacteria.[15]

The diseases caused by Escherichia coli bacteria are:

1) Urinary tract infections, Escherichia coli is the cause of urinary tract infections in approximately 90% of young women. Symptoms and signs include frequent urination, dysuria, hematuria, and pyuria. Low back pain related to upper urinary tract infection.[8]
2) Diarrhea, Escherichia coli that causes diarrhea are found throughout the world. Escherichia coli are classified by their characteristic virulence properties, and each group causes disease through different mechanisms. .[8]

3) Sepsis, when normal host defenses are insufficient, Escherichia coli can enter the bloodstream and cause sepsis. .[8]
4) Meningitis, Escherichia coli and Streptococcus are the main causes of meningitis in infants. Escherichia coli is responsible for about 40% of cases of neonatal meningitis. .[8]

Antibacterial Mechanism

There are several mechanisms of inhibition of bacterial growth, namely:

Cell Wall Damage

The structure of the cell wall can be damaged by inhibiting formation or changing once it is formed. Examples: penicillin and cephalosporin antibiotics.[8]

Changes in Cell Permeability

The membrane maintains certain materials within the cell and regulates the inflow and outflow of other materials and maintains the entire cell. Changes in the cytoplasmic membrane can result in inhibition of cell growth, causing cell death. Examples: polymyxin B antibiotics and amphotericin.[8]

Changes in Protein And Nucleic Acid Molecules

Cell life depends on the maintenance of protein molecules and nucleic acids. Antimicrobials can cause protein coagulation or denaturation of important cell materials. Example: tetracycline and streptomycin type antibiotics. .[8]

Inhibition of Enzyme Action

Each of the hundreds of different enzymes present in the cell is a potential target for the action of an inhibitor. This inhibition can result in impaired metabolism or cell death. Example: chloramphenicol and metaphene antibiotics. .[8]

Inhibition of Nucleic Acid and Protein Synthesis

Proteins, DNA and RNA play an important role in the normal life processes of cells. This means that any interference with these substances can result in cell damage. Example: Norphosacin and sulfanilamide antibiotics.[8]

Resistance Test

Resistance test is a test carried out to determine the sensitivity of bacteria to an antibiotic. Excessive or uncontrolled use of antibiotics causes harmful side effects that cause certain bacteria to become resistant (resistant) to antibiotics. The problem of resistance occurs when bacteria change which causes a decrease or loss of effectiveness of drugs, chemical compounds or other chemicals used to prevent or treat infections. The main cause of antibiotic resistance is its widespread and irrational use.The efficacy of antibacterial materials can be determined by looking at the lowest concentration of antibacterials that are still capable of killing or inhibiting the growth of pathogenic microorganisms. This method of determining antibacterial efficacy is called MIC (Minimum Inhibitory Concentration). MIC is in contrast to the sensitivity of the bacteria tested. The lower the MIC value of an antibiotic, the greater the sensitivity of the bacteria. The antibacterial test method that is often used is the Agar Plate Diffusion method.[9]

Extraction

Extraction is the process of separating a substance or several from a solid or liquid with the help of a solvent. The extracted simplicia contains soluble active compounds and insoluble compounds such as fiber, carbohydrates, protein and others. The active compounds contained in various simplicia can be classified into essential oils, alkaloids, flavonoids and others. Knowing the active compounds contained in simplicia will facilitate the selection of the right solvent and extraction method. The maceration method is a simple extraction method that is carried out by soaking the simplicia powder in a liquid extractor for several days at room temperature and protected

from light. This method is used to search for simplicia containing chemical components that are easily soluble in the liquid filter, does not contain volatile substances such as benzoin, stirax and wax. The use of this method for example in samples in the form of leaves, for example in the use of ether or acetone solvents to dissolve fats/lipids.[10]

Fractionation

Fractionation is a process of separating compounds based on the level of polarity of the number and compounds that can be separated into different fractions depending on the type of plant. A separating funnel or separating funnel is a laboratory apparatus used in liquid-liquid extraction to separate the components in a mixture between two immiscible solvent phases of different densities.[11]

RESEARCH METHODS

This research uses a quantitative research type with a research design using an experimental research design, which is a systematic method to build relationships that contain causal phenomena.[12]

This study used a completely randomized design (CRD) in five treatments and five repetitions. The technique used is the disc diffusion technique. The parameter in this study is the size of the area of inhibition of microbial growth.

The tools used in this research include autoclave, incubator, laminar air flow cabinet (LAFC), refrigerator (sharp), oven (memmert), ose, bunsen, petri dish, micropipette, shaker incubator, and glassware.

The materials used in this study included basil leaves, sodium agar, sodium broth, 96% ethanol, aluminum foil, filter paper, CHCl3 (l), FeCl3, H2SO4 (l), Hcl, aquades, n-hexane, and the test bacteria used was Escherichia coli.

The population in this study is all basil plants that grow in Bone Bolango Regency, Gorontalo Province, while the sample used in this study is basil plants that grow in Poowo Village, Bone Bolango Regency, Gorontalo Province with a garden area of approximately 100 square meters.

Work procedures

The work procedures in this study are:

1. Sample Preparation

   The collection of basil leaves was carried out in Poowo Village, Kabila District, Bone Bolango Regency, Gorontalo Province. This place was chosen because it has abundant basil plants and geographically, this place is located at an altitude of 0-1500 meters above sea level, which is in accordance with the place where basil leaves grow at an altitude of 1100 meters above sea level. Empirically, the people of Poowo Village, Kabila District, Bone Bolango Regency, Gorontalo Province use the basil plant a lot as herbal medicines such as preventing bad breath caused by bacteria.

   The sample used was a basil plant (Ocimum sanctum L.). The part taken was fresh leaves, sampling was carried out in the morning, basil leaves were obtained in the Bone Bolango Regency, Gorontalo Province.

   This study begins with a sample of basil leaves that have been obtained as much as 3 kg and then washed with running water to separate the sample from other impurities. Then the sample was dried by aerating until the sample was dry, after drying the sample was then drained using a blender to produce basil leaves simplicia.

2. Extract Making

   Simplicia basil leaves later macerated using 30 L of 96% ethanol solvent for 3 x 24 hours at room temperature. Every 1 x 24 hours simplicia that has been macerated with ethanol solution is filtered to obtain an

extract.Results The extract that has been obtained is then divided into several concentrations which will then be tested for antibacterial activity, while the concentration of the extract used is 25%, 50% and 75%. The results of the extract obtained were then tested for groups of active compounds, namely the terpenoid, tannin and saponin group tests.

3. Fraction Creation

The extract that has been obtained from the extraction process, is carried out extract purification process with*rotary evaporator* at 45oC, until a thick extract was obtained.The thick ethanolic extract of basil leaves (Ocimum sanctum L.) obtained was fractionated using n-hexane as solvent. The thick ethanol extract was divided into several concentrations, namely 25%, 50% and 75% concentration. Then, it was diluted with 10 ml of hot water, stirred continuously until it was runny and homogeneous, then put in a separating funnel and then fractionated with 10 ml of n-hexane as solvent. obtained n-hexane fraction and water fraction. The result of the fractionation of the solvent thenwill be tested for antibacterial activity.

4. Antibacterial Activity Test

15 ml of agar medium was poured into each sterile petri dish and allowed to stand until the media became solid for 15 minutes. Escherichia coli bacteria that had been previously suspended as much as 1-2 oses from pure bacterial cultures according to the Mc.Farland standard (1 x 108 CFU/ml) were spread on agar medium over the entire surface of the petri dish. Then the disc paper that has been soaked in the extract and fraction is placed in each petri dish. The media was incubated at 37oC for 24 hours. After that, the diameter of the inhibition zone was measured using a caliper with an accuracy of 0.01 mm and the zone of inhibition was measured according to the measurement method.

Data analysis technique

The data analysis technique used in this research is descriptive quantitative analysis, the data that has been obtained from the research results will then be analyzed statistically using SPSS. The analysis was carried out using a parametric test with the Anova method and continued with Duncan's test to see which concentration was very effective. If it does not meet the requirements of normality and homogeneity, it will be continued with the Kruskal Wallis test.

RESEARCH RESULT

1. Plant Determination Results

Plants with true flowers, at least with the stamens and (or) pistils of flowering plants, No coiling apparatus Plants can also climb or twist (with stems, leaf shafts or petioles). Leaves are not needle-shaped or not present in the bundle. Plants do not resemble the grass nation. Leaves and (or) flowers are different from those described above. With clear leaves. Not plants of the palm nation. Or something similar. Plants do not climb and do not twist.

Leaves are not arranged so tightly into rosettes. Not so. The leaf veins can be clearly distinguished from the leaf veins. And from the branches of the leaves that go to the side and push up. Not all the leaves sit in the shell or there are no leaves at all. Other forms of plants. All the leaves sit opposite. Single leaf, notched or not, but not sharing a double pinnate until branched. Double pinning. (Group X).

Plants without sap. Does not live on other plants. The arrangement of the leaf veins is not so, all or most of

the leaf bones are arranged pinnate, fingered or parallel. The leaves are pinnate or fingered, the leaf veins are like a net. Leaves do not have such fibers. Other beeform flowers. Grass. At least the branches weren't woody. Flowers are not arranged in a hump with such a dressing. Flowers are not so arranged; usually single or in bunches, spikelets or panicles. Flower bouquets are not like that. Fruit does not open with a lid. There are no supporting leaves. Plants stand tall. Symmetrical crown. The fruit opens into four hard fruit, the plants often smell good or rotten. Labiatae, 4 perfect stamens, long .

Petals tube with 5 teeth or one. The calyx or spur teeth are the same or nearly the same. The stamens have never loomed so far. The pistil split 2. Crown of another color. Lips or from the crown of the crown 4. White or purple crown. The stamens are completely removed.

2. Yield of Extracts and Fractions

Based on the results of the research that has been carried out, the results of the yield of extracts and fractions are shown in Table 1.

Table 1. Yield of Extract and Fraction

Sample	Extract	Fraction	Results
Basil leave	288 g	-	28.8%
	-	30 g	10.41%

Private Source 2021

Based on Table 1 the yield of extracts and fractions of basil leaves (Ocimum sanstum) obtained yields of 28.8% for the extract and 10.41% for the fraction.

3. Phytochemical Screening Results

Based on the results of the research that has been carried out, the results of phytochemical screening of the extract and fraction of basil leaves are shown in Table 2.

Table 2. Phytochemical Screening Results

Compound	Results	Description
Terpenoids	Positive	Coloured Red
Tannins	Positive	Green color
Saponins	Negative	Not Foaming

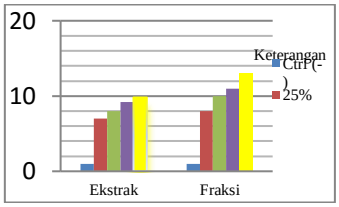
Private Source 2021

Based on Table 2, the results of the phytochemical screening of the basil leaf sample, it is known that the extract and fraction of the basil leaf contains secondary metabolites of terpenoids and tannins.

4. Antibacterial Test Results

Based on the results of the research that has been carried out, the results obtained from the antibacterial test of the extract and fraction of basil leaves as shown in Graph 1.

Graph 1. Average inhibition zone of basil extract and fraction on bacterial growth *Escherichia coli*



Private Source 2021

Based on Figure 1, it can be seen that at the 25%, 50% and 75% concentration of the extract, the inhibition zones were 7 mm, 8 mm and 9.2 mm, respectively, with a negative control using 0 mm aquadest and a positive control using the antibiotic ampicillin. 9.8 mm based on the inhibition zone criteria included in the category of moderate microbial inhibition response. Then in the treatment with a concentration fraction of 25%, 50% and 75%, the inhibition zones were 8 mm, 10 mm and 11 mm, respectively. The negative control used 0 mm aquadest and the positive control used the antibiotic ampicillin 13 mm based on the entry inhibition zone criteria. in the category of moderate to strong microbial inhibition response.

Based on the results of the normality test that the test group has a significance value of <0.05 (0.03<0.05) so it can be concluded that the data are not normally distributed then the homogeneity test shows that the group has a significance value of p <0.05 (0.02< 0.05) so it can be concluded that the data is not homogeneous. Then for further testing, Kruskal Wallis was used with a confidence level of 5% indicating that the significance value was P = 0.000, which means P < 0.05 (0.000 < 0.05) or the extract and fraction of basil leaves had an effect on Escherichia coli bacteria.

After the Kruskal Wallis test was carried out, further tests were carried out using Duncan's Post Hoc test to see the best concentration of basil leaf extract and fraction in inhibiting the growth of Escherichia coli bacteria.

Basil plant (Ocimum sanctum) Upright herb, very fragrant, 0.3-0.6 m tall. stems are often purplish. The way the hair changes. Petiole 0.5-2 Self-aware, leaf blade elliptical, elliptical or elongated, with a pointed tip, speckled like glands, on one side of the mother bone 3-6 branches, 3.5-7.5 times 1, 5-2.5cm. pseudo-wreath of 6 flowers, gathered into end bunches. Leaf guard elliptical or ovate, 0.5-1 long. [16]

The outer side of the petals is tightly haired about 0.5 cm, the back is oblong to the inverted egg, with a tapering edge along the length of the tube; small and pointed side teeth; The two lower teeth are attached to form a two-slit lower lip. Two-lipped crown, 8-9 ml long, hairy from the outside; four-sided upper lip; flat bottom lip. The stalk of the fruit petals is erect and pressed against the axis of the wreath, with the ends of the hooks coiled, as if sitting and with the mouth tilted low. Petals 6-9 ml long. Dark brown hard fruit, glabrous, swollen when wet, often planted. Lenih often goes wild; 1-450 m. the side of the road and the edge of the garden and so on. This plant is very capricious. [16]

Basil (Ocimum sanctum) is an herbal plant used by Asians as medicine and cooking ingredients from generation to generation. Oil from this plant is also widely used in the pharmaceutical industry and in the perfume industry. Basil leaves (Ocimum sanctum L) contain flavonoid compounds, phenols, saponins and essential oils. Flavonoids are found in almost all parts of the plant, including the fruit, roots, leaves and outer bark of the stem. Plants containing flavonoids are widely used in traditional medicine.[16]

This is because flavonoids have various activities against various organisms. Pharmacological research on flavonoid compounds shows that several flavonoid compounds exhibit activities such as antifungal, diuretic, antihistamine, antihypertensive, insecticide, bactericidal, antiviral and inhibit enzyme activity. Phenols distributed in plants are useful as antioxidants, usually used to prevent free radical reactions.

Phenol is an aromatic compound whose chemical structure is derived from benzene. Saponins are active compounds with a strong surface that causes foam when shaken with water. Saponin compounds can be used in the pharmaceutical field as antibiotics, antifungals, and antitumor compounds. Saponins are chemical compounds derived from secondary metabolites which are mostly obtained from natural materials such as plants and animals in the form of sugar clusters that are connected to aglycones and sapogenins, and this makes it toxic for animals to protect these plants. Essential oils give plants their scent, protect them from harmful environmental conditions, and even help them with pollination. In low concentrations, this compound is stomach poison which can cause insect pests to die.

Based on the phytochemical examinations carried out, it was found that the basil plant (Ocimum sanctum) contains secondary metabolites of essential oils, most of which belong to the group of terpenoid organic compounds, then there are secondary metabolites of tannins which are a group of polyphenolic compounds. These compounds can be used as antibacterial. Antibacterial is a substance or compound that can suppress or kill the growth or reproduction of bacteria. Compounds or substances used to eradicate bacteria that cause infection in humans must have the highest possible selective toxicity, meaning that these compounds must be highly toxic to bacteria but relatively non-toxic to the host.[17]

In the inhibition zone test, each extract concentration and fraction has a different inhibitory power, the Average Inhibitory Zone (mm) Extract and Fraction of Basil Leaves (Ocimum sanctum) As Antibacterial, the results obtained in the extract group the inhibitory power of Escherichia coli bacteria is included in the inhibitory category moderate with an average inhibition zone of 7-9.2 mm. While in the fraction group the inhibitory power of Escherichia coli was in the moderate to strong category, at a concentration of 75% in the fraction group the inhibitory power was 11 mm. It can be seen that each treatment of each extract sample and fraction has a different inhibition zone for each concentration, this is because the greater the concentration used, the greater the inhibition zone of the extract and fraction on the growth of Escherichia coli bacteria.

Antibacterial compounds can inhibit bacterial growth with an inhibitory mechanism against bacteria in the form of destroying cell walls by inhibiting their formation or changing them after they are formed, changes in cytoplasmic membrane permeability causing the release of food materials from the cell, changes in protein and nucleic acid molecules, inhibition of enzyme work and inhibition synthesis of nucleic acids and proteins.[18]

Essential oils in inhibiting the growth of Escherichia coli bacteria by interfering with the process of forming membranes or cell walls so that they are not formed or formed imperfectly. Essential oils that are active as antibacterials generally contain hydroxyl (-OH) functional groups and phenol-derived carbonyls interact with bacterial cells through an adsorption process involving hydrogen bonds. At low levels, protein complexes with phenol are formed through weak bonds and are immediately decomposed, followed by the penetration of phenol into cells and cause precipitation and protein denaturation. At high levels of phenol can cause protein coagulation and cell membrane lysis.

The difference in the inhibitory power of the extract and the fraction was due to the fact that the extract treatment contained several secondary metabolites dissolved in ethanol solvent and the compounds had not been separated based on their polarity level, so that the secondary metabolite compounds produced from the extraction process were able to inhibit the growth of Escherichia coli bacteria but were in the category of currently.

Antibacterial activity is influenced by 4 factors, namely concentration, solvent diffusion power, content of metabolites and the type of bacteria inhibited. Antibacterial activity is related to the secondary metabolites it contains. The presence of these secondary metabolites is an important factor through its mechanism against bacteria. The extract has different secondary metabolite compounds so that the antibacterial compounds contained in the extract are difficult to enter the cells and find targets for work. Meanwhile, in

the treatment of the secondary metabolite compound fraction, the compound was screened using a solvent suitable for the polarity of the secondary metabolite of essential oils as antibacterial which is a non-polar compound.[13]

In the antibacterial test treatment, the fraction was in the moderate to strong category, this was because the fraction contained non-polar antibacterial compounds, namely essential oils. The difference in the inhibitory power of the extracts and fractions of each concentration could be due to the occurrence of resistance to the antibacterial compounds tested on bacteria, bacterial resistance could be caused because the tested bacteria were able to recognize the antibacterial compounds being tested.[14]

Bacterial resistance can be intrinsic or acquired. Intrinsic resistance occurs chromosomally and takes place through cell multiplication which will be passed on to the next generation. Acquired resistance can occur as a result of chromosomal mutations or as a result of DNA transfer. The nature of resistance to antibiotics involves genetic changes that are stable and passed from one generation to another, and any processes that result in the genetic composition of bacteria such as mutation, transduction (transfer of DNA through bacteriophages), transformation (DNA comes from the environment) and conjugation (DNA comes from the environment). from direct contact of one bacterium to another through pili) can cause the emergence of these resistant properties. mutation process, Transduction and transformation are mechanisms that mainly play a role in the emergence of antibiotic resistance in Gram-positive cocci, while in Gram-negative rods all processes including conjugation are responsible for the emergence of resistance. The results of the inhibition zone obtained were then carried out to prove the research hypothesis by analyzing the data statistically using SPSS. This analysis uses each existing treatment presented in tabular form with the Kruskal Wallis test and then the Duncan post hoc test. The results of the inhibition zone obtained were then carried out to prove the research hypothesis by analyzing the data statistically using SPSS. This analysis uses each existing treatment presented in tabular form with the Kruskal Wallis test and then the Duncan post hoc test. The results of the inhibition zone obtained were then carried out to prove the research hypothesis by analyzing the data statistically using SPSS. This analysis uses each existing treatment presented in tabular form with the Kruskal Wallis test and then the Duncan post hoc test.

From the results of data analysis, it was found that each extract and fraction treatment had a real significance value, so it can be concluded that the extract and fraction treatment had an effect between the two. Then continued with post hoc Duncan test analysis to prove the best concentration was obtained from the results of the analysis where the fraction treatment with a concentration of 75% was the best concentration with an inhibition zone of 11 mm. This means that Ha is accepted or there is an effect of antibacterial extract and basil leaf fraction on the growth of Escherichia coli bacteria.

CONCLUSION

From the results of the study it can be concluded that:

1. There is an effect of extracts and fractions from basil leaves (Ocimum sanctum) on the growth of Escherichia coli bacteria, this is evidenced by the presence of an inhibitory zone formed around the paper disc.
2. The best concentration in inhibiting the growth of Escherichia coli

bacteria was 75% concentration in the fraction treatment.

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