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Formulation Of Ajatulama Hand Soap Preparation Against The Decline Of Microorganisms

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ABSTRACT

Background: Human hands are often the agents that carry germs and cause pathogens to pass from one person or from nature to another through direct or indirect contact. Washing hands with water alone is more common, but it has proven to be ineffective in maintaining health compared to washing hands with soap. One of the plants that contain one or more active ingredients that can be used as an antibacterial is a plant. Turi leaves contain flavonoids, alkaloids, saponins, and tannins which have been shown to have antibacterial effects against Staphylococcus aureus and Candida sp. Turi leaf extract (Sesbania grandiflora Pers.) has antibacterial activity against Escherichia coli, Bacillus subtilus, Staphylococcus aureus, Pseudomonas aeruginosa, especially against Escherichia coli and Pseudomonas aeruginosa.
Methods: This research is a quasi-experimental research (quasi-experimental). The research design used was, one group pre-post test design, namely experimental research carried out in only one group called the experimental group without any comparison group or control group. The research was carried out at the Poltekkes Campus Laboratory of the Ministry of Health, Mamuju. The instruments used consist of tools and materials to mix turi leaves with atanol.
Results: 4% concentration experienced a significant decrease in microorganisms. before examining the number of microorganisms 34,000 and after examining the number of microorganisms 3,000 with a difference of 31,000 microorganisms. Concentration of 8% turi leaf extract with 70% ethanol decreased microorganisms. before checking the number of microorganisms 12,100 and after examining the number of microorganisms 4,066 with a difference of 8034 microorganisms. Concentration of 12% turi leaf extract with 70% ethanol decreased microorganisms. before checking the number of microorganisms 7,766 and after examining the number of microorganisms 3,733 with a difference of 4,033 microorganisms.
Conclusion: Turi leaf extract hand soap with 70% ethanol is more effective in killing microorganisms

Keywords: handsoap; turi leaf extract; microorganisms

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Backgroud. Washing hands using soap is one of the preventive efforts through sanitary measures by cleaning hands and fingers using water and soap. Human hands are often agents that carry germs and cause pathogens to move from one person or from nature to another through direct or indirect contact. Washing hands with water alone is more common, but this has proven to be ineffective in maintaining health compared to washing hands with soap. Using soap in washing hands actually causes people to allocate more time when washing their hands, but the use of soap becomes effective because the fat and dirt that sticks will come off when the hands are rubbed and rubbed in an effort to remove them. It is in these adhering fats and impurities that the germs of the disease live (Amananti, 2017).

Indonesia has several types of plants that are provento have e fecundity as anti-bacterial. One of the plants that contains one or more active ingredients that can be used as antibacterials is the turi plant. Turi is a small tree (up to 10 m in height). Its origin is thought to be from South Asia and Southeast Asia but has now spread to various tropical regions of the world (Ering, 2020).

Turi leaves contain *flavonoids, alkaloids, saponins,* and *tannins* that are proven to have antibacterial effects against *Staphylococcus aureus* and *Candida sp*. Turi leaf extract (*Sesbania grandiflora Pers*.) has

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antibacterial activity against *bacteria Escherichia coli, Bacillus subtilus, Staphylococcus aureus, Pseudomonas aeruginosa* especially against *Escherichia coli and Pseudomonas aeruginosa, Stapilococcus Aureus, Candida Albicans* Pseudomonas aeruginosa, Escherichia coli, Staphylococcus epidermidis, Bacillus subtillis, Vibrio Sp, Salmonella thyposa (Mogi, 2016).

Alkaloid compounds work as antibacterials by interfering with the preparation of *peptidoglycans* in bacterial cells so that the formation of cell walls becomes imperfect. Flavonoid compounds work by binding to proteins so that they interfere with metabolic processes. Tannin compounds work by coagulating the *protoplasm of* bacteria. Saponin compounds work by increasing the permiability of bacterial cell membranes. Compounds that play a big role in making this soap are *saponins*. *Saponins* are one of the secondary metabolites that are widely found in plants. *This saponin* will produce foam so that it can be used as a washing material and can also be used as a cleaner for various kitchen utensils, floors, and even bathing pets. *Saponins* will produce foam when reacted with water. This is the basis for the use of *saponins* as washing materials and the resulting foam will last a long time (Mustikawati, 2017).

The turi plant grows a lot in Indonesian plantations, especially the Mamuju area, because the soil in Mamuju tends to be acidic and watery. Although many have conducted research on the turi plant, but only for herbal medicine. therefore researchers are interested in conducting research on the effectiveness of washing hands using *Ajatulama* soap (turi leaf extract) against the decrease of microorganisms in the hands

This study aims to explain the effectiveness of the formulation of Ajatulama soap preparations against the reduction of microorganisms such as bacteria Esherichia coli, Bacillus subtilus, Staphylococcus aureus, Pseudomonas aeroginosa.

Methods. This research is a *quasi-experimental* research. The research design used is, *one group pre-post test design*, which is experimental research that is carried out in only one group called an experimental group without any comparison group or control group. The research was carried out at the Poltekkes Campus Laboratory of the Ministry of Health Mamuju. Data collection was carried out from June to September 2021 at the Poltekkes Campus Laboratory of the Ministry of Health Mamuju.

The research instruments used are stirring rods, goblet cups, measuring cups, beakers, blenders, drip pipettes, horn spoons, stirring rods, analytical scales, flour sieve, oven, filtration, tissue, test tubes, hot plates, spiritus, petri dishes, spray bottles, filter paper and magnetic stirrers

The ingredients used include turi leaves, aquadest, agar nutrient media, ethanol, sodium laurel sulfate, fragrance, dye sodium carboxymethyl cellulose (Na-CMC), butyl hydroxi anisol (BHA), Potassium hydroxide (KOH) and cooking oil.

The research procedure consists of the procedure for making soap without ethanol, namely: Choose a good turi leaf, then separate the turi leaf from the turi stem, Wash the turi leaf thoroughly, the washed turi leaf is dried by aerating for 5-6 days, Remove the dried turi leaf and then blender the dried turi leaf, After pounding, the turi leaf powder is sifted using a flour sieve, Next, weigh 25 grams of turi leaf powder and mix it with 125 ml of warm water put into a measuring cup, strain the solution using filter paper using filtration and then evaporate it in the oven with a temperature of 50 °C so that a thick extract of turi leaves is obtained for 2 hours, measure cooking oil as much as 7.5 ml, Aquadest 7.5 ml, and weigh KOH 4 g ingredients, Na-CMC 0.25 g, BHA 0.25 g, SLS 0.25 g, heat cooking oil on hot water for 5-10 minutes and heat KOH in aquadest solution for 5-10 minutes., After the cooking oil is hot, first cool the goring oil, After cooling, mix the cooking oil and KOH solution while stirring until paste soap forms, After forming pasta soap, added with 7.5 ml while stirring until homogeneous, dissolve SLS, BHA and Na-CMC in *hot Aquadest* as much as 5 ml stirred to homogeny, mix the paste soap with the solution that has been made and then stirred until homogeny, put the extract of turi leaves without 70% ethanol that has been evaporated in the oven as much as 4% (1 ml) from the extract. stir until homogeny, Add *Aquadest* as much as 50 ml. stir until homogeneous, mix dyes (1 drop) and fragrance (2 ml) into soap. stir until homogeny then put in a clean container that has been prepared. Falvonoid turi flower has about 17.32-30.05 mg/100 g, while the content of

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alkaloids and saponins is around 12.58-21.35/100g.

The procedure for making soap with ethanol is: Choose a good turi leaf, then separate the turi leaf from the turi stem, Wash the turi leaf clean, the washed turi leaf is dried by aerating for 5-6 days, Remove the dried turi leaf and then blender the dried turi leaf, After pounding, the turi leaf powder is sifted using a flour sieve, Next, weigh the turi leaf powder as much as 25 grams and mix it with 70% ethanol 70% as much as 125 ml put in a measuring cup. Let the solution of turi leaves that have been mixed with 70% ethanol for 5-6 days while occasionally stirring**,** after allowing it to stand, strain the solution using filter paper using filtration and then evaporate in the oven with a temperature of 50 °C for 2 hours until a thick extract of turi leaves is obtained**,** measure cooking oil by 7.5 ml, Aquadest 7.5 ml, and weigh KOH ingredients 4 g, Na-CMC 0.25 g, BHA 0.25 g, SLS 0.25 g, heat the cooking oil on hot water for 5-10 minutes and heat KOH in the aquadest solution for 5-10 minutes, After the cooking oil is hot, first cool the goring oil**,** After cooling, mix the cooking oil and KOH solution while stirring until a paste soap forms, After forming a paste soap, added with 7.5 ml while stirring until homogeneous**,** dissolve SLS, BHA and Na-CMC in *hot Aquadest* as much as 5 ml stirred to homogeny**,** mix the paste soap with the solution that has been made and then stirred until homogeny, put the extract of turi leaves without 70% ethanol that has been evaporated in the oven as much as 4% (1 ml) from the extract. stir until homogeny**,** Add *Aquadest* as much as 50 ml. stir until homogeneous**,** mix dyes (1 drop) and fragrance (2 ml) into soap.

The microorganism test procedure, namely the procedure for checking the number of cutlery germs in the laboratory, includes the following: Provide 8 sterile tubes containing pepton water media in a tube rack. 4 tubes for sample dilution before treatment and 4 tubes for sample dilution after treatment (washing the tool using turi extract soap). Each tube is labeled 10-1, 10-2, 10-3, 10-4 as dilution code and code before and after treatment, Prepare 7 seven pieces of sterile petri dish. On 6 (six) petri dishes are marked on the back according to dilution codes 10^{-2}, 10-3, 10-4 as dilution codes and codes before and after treatment. One other petri dish was marked with control. **,** Prepare a sterile cotton swab and cutlery in the form of a spoon, open the first dilution tube (10^{-1}), flambir the mouth of the tube using a bunsen fire then dip the sterile swab cotton into the first dilution tube, remove and squeeze the swab cotton on the wall of the tube. Remove the cotton swab from the tube and then apply a swab on the spoon. Swabs are carried out on all parts of the spoon. After that, put the swab cotton swab into the first dilution tube (10-1) and then homogenized. Next, it is picketed 1 ml from the first dilution tube (10-1) and put into the second dilution tube (10-2), then dihomogenized, Then picketed 1 ml from the second dilution tube (10-2) and put into the third dilution tube (10-3), then homogenized. **,** Next, 1 ml of each dilution tube is taken (10-2, 10^{-3}, 10-4) and put into a petri dish using a sterile pipette, according to the dilution and treatment code (before washing using turi extract soap), Pour 15-20 ml of liquid Plate Count Agar (PCA) media into each petri dish. evenly distributed and allowed to cool and freeze, Make control by pouring plate count agar (PCA) media into a sterile petri dish of 15-20 ml. then left to cool and freeze, then intervene on the spoon by washing the spoon using turi leaf extract soap. After that, repeat the steps of checking the Total Plate Number according to the procedure in points 1-8 above, All petridish are then put into an incubator and incubated at a temperature of 37 ° C for 2 times 24 hours in an inverted state, Do a reading of the results after 2 x 24 hours, by calculating the number of colonies growing on the petri dish using a coloni counter tool. In the process of mixing ethanol, thick ethanol extract ethanol free by adding extract with drops of aquabides then heated back on the water bath until it evaporates. So we get turi leaf extract with a little ethanol content. Preparation of ethanol extract liquid soap turi leaves meet the standards set by SNI on organoleptic testing, ph test, foam heigh test, test water content, free alkali content test, and specipic gravity test, using only 4%, 8% 10,% ethanol.

Data collection is carried out by researchers. The data collection process is carried out by comparing the number of microorganisms that exist before and after the dripped formulation of *Ajatulama* soap preparations (turi leaf extract).

Result and discussion. Data collection was carried out from June to September 2021 at the Poltekkes Campus Laboratory of the Ministry of Health Mamuju. In this time span,

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results were obtained, that the content of turi leaf extract with ethanol is 70% more effective against reducing microorganisms compared to the content of turi leaf extract without ethanol 70%. The study was conducted by conducting a swab on a spoon. It is divided into two groups, namely the intervention group and the control group. The intervention group of 3 samples given before washing with soap and the control group of 3 samples after washing with soap.

This research was conducted at the integrated laboratory of chemistry and microbiology, Poltekkes Campus, Ministry of Health, Mamuju. is on the mamuju-kalukku km axis road. 16, tadui, mamuju, kec. mamuju, mamuju district of west suawesi. The unified laboratory is behind the directorate. It has 7 rooms consisting of a chemistry room, 1 microbiology room, 2 microbiolgy room, nutrition room, nursing room, obstetrics room, children's room.

1. Testing of turi leaf microorganisms

Table 1. Turi leaf Microorganism Testing Results without ethanol 70%

No	Formulation	Number of Microorganisms	
		Before	After
1	1	1 x 100	1x100
2	2	1x1000	1x1000
3	3	1x10000	1x10000
4	Control	0	0
5	Result	3.700	3.700
6	Difference	0	0

Based on table 1 above, it shows that the first formula is the formulation of liquid soap preparations of turi leaf extract without ethanol 70% using inanimate objects, namely dirty spoons. Furthermore, a microorganism test using pca was obtained as a result that before and after the examination was carried out, there was no decrease in microorganisms. In the formulation of the first 1 tube containing pepton water media and mixed with plate count agar (PCA) media. Swab results found that before being given turi leaf extract soap without ethanol 70% microorganisms as much as 1 x 100 and after being given turi leaf extract soap without ethanol 70% microorganisms as much as 1 x 100. It was found that there was no change between before being given soap and after being given soap. In the formulation of the first 2 tubes transferred 1 ml into the second tube containing pepton water media. Swab results found that before being given turi leaf extract soap without ethanol 70% microorganisms as much as 1 x 1000 and after giving turi leaf extract soap without ethanol 70% microorganisms as much as 1 x 1000. It was found that there was no change between before being given soap and after being given soap. in the formulation of the second 3 tubes put 1 ml into the third tube containing pepton water media. Swab results found that before being given turi leaf extract soap without ethanol 70% microorganisms as much as 1 x 1000 and after giving turi leaf extract soap without ethanol 70% microorganisms as much as 1 x 1000. It was found that there was no change between before being given soap and after being given soap. From the three formulas, it was found that there was no change between before being given soap and after being given soap.

Tabel 2 Turi leaf Microorganism Testing Results with 70% ethanol

No	Formula	Cawan Petri	Microorganism	
			before	After
1	Consentration4%	1	32 x 100	1 x 100
		2	7 x 1000	0 x 1000
		3	7 x 10000	1 x 10000
		Controll	0	0
		Result	34.000	3.000
		Difference	31.000	
2	Consentration 8%	1	3 x 100	2 x 100
		2	6 x 1000	2 x 1000
		3	3 x 10000	1 x 10000
		Controll	3	3
		Result	12.100	4.066
		Difference	8.034	
3	Consentration 12%	1	3 x 100	2 x 100
		2	3 x 1000	1 x 1000
		3	2 x 10000	1 x 10000
		Controll	0	0
		Result	7.766	3.733
		Difference	4.033	

Based on table 2 above, it shows that after the first test using an inanimate object, namely a spoon, we made a test of turi leaf microorganisms with 70% ethanol. It was found that the concentration of 4% had a significant decrease in microorganisms. before checking the number of microorganisms 34,000 and after checking the number of microorganisms

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3,000 with a difference of 31,000 microorganisms.

The concentration of 8% turi leaf extract with ethanol 70% has decreased microorganisms. before being checked the number of microorganisms 12,100 and after being checked the number of microorganisms 4,066 with a difference of 8,034 microorganisms.

Concentrated 12% turi leaf extract with ethanol 70% experienced a decrease in microorganisms. before being checked the number of microorganisms 7,766 and after being checked the number of microorganisms 3,733 with a difference of 4,033 microorganisms.

Washing hands using soap is one of the preventive efforts through sanitary measures by cleaning hands and fingers using water and soap. Washing hands with water alone is more common, but this has proven to be ineffective in maintaining health compared to washing hands with soap. Using soap in washing hands actually causes people to allocate more time when washing their hands, but the use of soap becomes effective because the fat and dirt that sticks will come off when the hands are rubbed and rubbed in an effort to remove them. It is in these adhering fats and impurities that the germs of living diseases (Amananti, 2017).

Indonesia has several types of plants that are proven to have effectiveness as anti-bacterial. One of the plants that contains active ingredients that can be used as antibacterials is the turi plant. There are several contents of turi leaves that are effective against anti-bacterial such as *alkaloid* compounds work as antibacterials by interfering with the preparation of *peptidoglycans* in bacterial cells so that the formation of cell walls becomes imperfect. Flavonoid compounds work by binding to proteins so that they interfere with metabolic processes. Tannin compounds work by coagulating the *protoplasm of* bacteria. Saponin compounds work by increasing the permiability of bacterial cell membranes. Compounds that play a big role in making this soap are *saponins*. *Saponins* are one of the secondary metabolites that are widely found in plants. *This saponin* will produce foam so that it can be used as a washing material and can also be used as a cleaner for various kitchen utensils, floors, and even bathing pets. *Saponins* will produce foam when reacted with water. This is the basis for the use of *saponins* as washing materials and the resulting foam will last a long time (Mustikawati, 2017).

The results of observations from our study found that there were changes before and after being given turi leaf extract soap concentration of 4% with ethanol 70% spoon which initially contained many microorganisms decreased significantly. in preparations the concentration of 8% turi leaf extract with ethanol 70% experienced a decrease in microorganisms but a concentration of 4% more significant decrease in microorganisms compared to a concentration of 8%. in the preparation, the concentration of 12% turi leaf extract with ethanol 70% spoon that previously had microorganisms decreased but the decrease in microorganisms in the spoon did not experience a significant decrease. From these data, it was found that the concentration of 4% was more effective in reducing microorganisms compared to concentrations of 8% and 12%. This is also in line with research (Ering et al., 2020) [7] which says that the most powerful inhibitory zone diameter is turi leaf extract liquid soap with a concentration of 4%. This is because the higher the concentration makes the solubility level decrease so that the active substance cannot diffuse inwards so that the result of reduced inhibitory power is obtained. The more concentraibekstrak turi leaves are given to soap, the lower the inhibitory power of microorganisms.

But in research (Wahidah et al., 2015) (Wijayanti, 2020). not in line with our research. Research (Wahidah et al., 2015) by comparing between a concentration of 10%, a concentration of 30% and a concentration of 35%, it was found that a concentration of 30% had the largest inhibitory zone diameter in the reduction of microorganisms. furthermore, at a concentration of 35% it decreased compared to a concentration of 30% and at a concentration of 10% it experienced a significant decrease compared to concentrations of 30% and 35%. It is according to (Wahidah et al., 2015) can be caused because the consistency of the excrax material is almost solid and the solubility level of the extract decreases so that the active substances contained in these concentrations are not effective in diffusing inwards so that the results of inhibition power are less or decreased at the highest concentration. With the variation in the concentrations used, the antimicrobial activity will initially increase until it is at a maximum at a certain concentration,

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after obtaining the maximum inhibition its activity will decrease and tend to be constant

Conclusion and Suggestions. Hand soap turi leaf extract with ethanol is 70% more effective in killing microorganisms.It is expected that further research at the time of drying the leaves of the turi using the oven. because from the journal obtained that the saponin content for the use of the oven is more than drying with direct sunlight or indirect sunlight. Hand soap turi leaf extract with 70% ethanol can be used as an innovative ingredient that can be developed toimprove the creativias of lecturers, students and other researchers

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