AISCH 2022
The 3rd Al Insyirah International Scientific Conference on Health

EFFECT OF ETHANOL EXTRACT OF MORINGA LEAF (MORINGA OLEIFERA) ON THE NUMBER OF GERMS IN ANTISEPTIC PREPARATIONS

[1]Asiska Permata Dewi, [2]Koni Putriani, [3]Vonny Kurnia Utama, [4]Nova Relida, [5]Akmal Djamaan

[1],[2,3] Undergraduate Program in Pharmacy, Faculty of Pharmacy and Health Science University Abdurrab Pekanbaru Riau
[4]Physiotheraphy study program, Faculty of Pharmacy and Health Science University Abdurrab Pekanbaru Riau
[5] Department of Pharmacy, Faculty of Pharmacy University Andalas Padang, West Sumatera
email: asiska.permata@univrab.ac.id

ABSTRACT

Moringa leaves (Moringa oleifera Lam) have benefits as antimicrobial, antibacterial, anti-inflammatory (anti-inflammatory), and viral infections. Moringa leaves contain secondary metabolites such as polyphenols consisting of non-flavonoids and flavonoids, phenols, tannins, saponins, alkaloids, and triterpenoids. This study aims to determine the effect of ethanol extract of Moringa leaves in hand sanitizer gel preparations on the number of germs at concentrations of 2%, 4%, 6% and 8%. The research method for testing germ numbers is the total plate number method by looking at the number of bacterial colonies that die after using the antiseptic gel. The research results showed that the percentage of dead bacteria was at concentration 2%, 4%, 6%, and 8%, the positive control and the negative control were 16,10%; 38,6%; 44,44%; 62,55%; 86,45% and 14,11%. The higher the concentration of the extract in the gel preparation, the more the number of bacterial colonies that died.

Keywords: Moringa Leaf, Extract, Number of Bacteria, antiseptic

INTRODUCTION

Indonesia has abundant natural wealth. Various kinds of medicinal plants thrive in Indonesia. This natural wealth is of great benefit to the health of its inhabitants, even to the world's population. Several studies have proven to the world that Indonesia has great potential as a place for growing and developing medicinal plants [1]. One of the natural ingredients that can be used is the moringa plant. Almost all parts of the Moringa plant can be used as medicine. Moringa seeds and fruit are efficacious as antioxidants, antifungals and antidiabetics. Its roots are efficacious as anti-inflammatory, antimicrobial, and antiulcer. Meanwhile, Moringa leaves can be used as antifungal, antihypertensive, antidiarrheal, antitumor, antihyperglycemic, anticancer, anti-inflammatory and antibacterial. This is because Moringa leaves contain secondary metabolites such as flavoniopids, saponins, triterpenoids, and tannins which have a mechanism of action by damaging bacterial cell membranes [2,3].

Microorganisms are one of the causes that can cause health problems in humans [4]. We can avoid infection with these microorganisms by keeping the limbs clean, especially the hands. Hands often come into contact with other people and come into direct contact with the environment so that they become the main medium for spreading disease [5]. The palms are the parts of the body that are most often in contact with microorganisms because they are often used for activities. Based on research, not washing hands can increase the risk of suffering from diarrhea by 95%, while washing hands with soap can reduce the risk of suffering from diarrhea by 4% [6]. The use of hand antiseptics in the form of gel preparations among the public has become a lifestyle. Several antiseptic preparations can be found on the market and usually many contain alcohol. How to use it by dripping on the palm of the hand, then flattening it on the surface of the hand [7].

Gel has better potential in antiseptic preparations, because gel is non-sticky, stable and has good aesthetic value, has high adhesion so it does not flow easily on the surface of the skin, has thixotropic properties so it is easy to spread evenly when smeared, does not leave marks, only in the form of a thin film-like layer when used, easily washed off with water, and gives a cold sensation after use, the gel melts immediately when in contact with the skin [8]. Antiseptic gel preparations produced from Moringa leaves will be tested for their effectiveness against the number of germs. This aims to determine the ability of the gel in various concentrations to kill bacteria attached to the hands. Generally antiseptic made from active alcohol and phenol, have a working mechanism by denaturing and coagulating germ cell proteins. Phenol at high levels causes protein coagulation and lysis of cell membranes. Phenol can also change the permeability of germ cell membranes, causing leakage of essential cell constituents and causing germs to die [9].

Several studies have been conducted related to the utilization of Moringa leaves has antibacterial properties against the growth of Staphylococcus aureus bacteria. This research is in line with research conducted by Fitriyanti (2018), proving that the ointment formulation of the ethanol extract of Moringa leaves can inhibit the growth of Staphylococcus aureus bacteria with the best inhibition at a concentration of 15%. Research by Rida et al (2020) also proved that 96% ethanol extract of Moringa could inhibit the growth of Escherichia coli bacteria with the greatest inhibition at a concentration of 10%. Based on the background above, the authors are interested in conducting research on the effect of the ethanol extract of Moringa oleifera leaves on the number of germs in antiseptic preparations [10,11].

RESEARCH METHODS

This research is a laboratory experimental study using ethanol extract of Moringa leaves on the number of germs in handsanitizer gel preparations and preparation test characteristics.

SAMPLE

The samples used were fresh Moringa leaves which were taken from the village of PTPN V, Kebun Tamora, Tapung Hulu District, Kampar Regency, Riau.

TOOLS AND MATERIALS

The tools used are glass tools (pyrex), maceration tools, weights, stirring rods, porcelain dishes, beakers, measuring cups, watch glass, preparation glass, parchment paper, mortar and staper, pipette drops, bath, pH meter , plastic, tube rack, rotary evaporator, iron spoon, petri dish, horn spoon, analytical balance, Brookfield viscometer. the materials used are Moringa leaves, carbopolymer 940, TEA (triethanolamine), 96% ethanol, glycerin, Sodium Metabisulfite, distilled water, nutrient agar.

SIMPLICIA MAKING PROCESS

Moringa Leaves Take 1 kg of fresh Moringa leaves then washed in running water, then drained first, then done slicing. Moringa leaves that have been cut into small pieces and then air-dried at room temperature until dry are carried out by dry sorting. Then the sample was refined in a blender. The powder obtained was stored in a tightly closed container.

EXTRACT PREPARATION

Moringa leaves The extraction process uses 96% ethanol solvent using the maceration method. Moringa leaf simplicia was weighed as much as 500 grams put into 96% ethanol in a dark bottle container until the simplicia was submerged, then the maceration soaking process was for 3 days. Placed in a cool place and protected from light and stirred several times a day for 3 days. The results of the maceration are filtered and collected in a dark bottle, then the dregs are macerated again for 3-5 days and maceration is carried out up to 3 times. Then the maceration results are combined into one and evaporated with a rotary evaporator until a thick extract is obtained.

PREPARATION OF GEL PREPARATIONS

The formula used uses Moringa leaf extract with concentrations of 2%, 4%, 6% and 8%, Carbopol 940, TEA, glycerin, sodium metabisulfite, and aguasdest. Weigh all the ingredients in accordance with the formulation. Making hand sanitizer gel from Moringa leaf extract. A mortar is prepared, then Carbopol 940 which has been weighed as much as 0.5 grams and sprinkled over 20 mL of hot water, allowed to swell and then crushed vigorously until a gel base is formed. Then add 0.5 ml TEA, then add the other ingredients. 0.2 gram of sodium metabisulfite was weighed and 1 mL of glycerin was added, then 2% moringa leaf ethanol extract was added to the mortar, stirred gently so that it was homogeneous. For the manufacture of gel with a concentration of 4%, 6% and 8%, it is carried out in the same way as for making hand sanitizer gel with Moringa leaf extract [12].

PREPARATION OF NUTRIENT AGAR (NA) MEDIA

Making the media is done in a way, the ingredients for the media are prepared. A total of 2.8 g of Nutrient Agar (NA) was weighed and then dissolved with 100 mL of distilled water in a 250 mL Erlenmeyer then covered with cotton. Then heated while stirring using a stir bar until boiling, then sterilized in an autoclave at 121˚C for 15 minutes.

TEST ON THE NUMBER OF GERMS

The germ number test was carried out to determine the number of germ colonies on the palms of the hands. Before and after for antiseptic Moringa leaf extract. The method used is swabbing with 3 respondents for each formula. The data obtained was in the form of the number of bacterial colonies that grew on NA media before and after using Moringa leaf hand sanitizer gel. Bacterial samples were taken by wiping a sterile stick which was rinsed with NaCl solution before and after and then scratched onto the palms of the hands. Then inoculated on NA media. This step was carried out for positive control (nuvo antiseptic) and negative control (gel base). The NA agar media was incubated at 37˚C for 24 hours and then the number of germs in the media was counted using a colony counter [13].

RESULTS AND DISCUSSIONS

The initial stage is to collect raw materials for fresh Moringa leaves as much as 500 gr. Then a wet sortation is carried out, namely to separate other impurities in the Moringa leaves. Washing Moringa leaves, namely to remove soil or dirt attached to Moringa leaves, is washed over running water. Furthermore, chopping is to facilitate the drying process on Moringa leaves. Then drying, namely so that the Moringa leaves are not easily damaged so that they can be stored for a long time at room temperature. Dry sorting is to separate foreign objects left in Moringa leaves. Then refine with a blender, namely to get Moringa leaf powder and to make it easier in the soaking / extraction process. Packaging and storage are stored in tightly closed bottles.

The second stage of the sample was macerated by means of Moringa leaf powder which was put into a dark bottle as much as 100 grams then added 1 liter of ethanol, then left for 3-5 days at room temperature. The extract was filtered using filter paper until the results of 32 soaking 1 extracts were obtained, then the 2nd soaking was carried out with the powder resulting from the first soaking with 1 liter of ethanol, then filtered and transferred to a dark bottle, then the 3rd soaking process of the powder resulting from the 2nd soaking with 1 liter of ethanol for 3-5 days, then in the rotary evaporator to get the thick extract.

After that, a gel was made by means of 1 gram of carbopo which was developed in 20 mL of hot water, then crushed until a gel was formed. Moringa leaf extract is mixed with 1 mL glycerin, 0.2 g sodium metabisulfite and a little distilled water until well blended. Then put it into the carbopol. To the mixture, add the remaining 75.3 mL of water to the desired volume, then add

0.5 mL of TEA while vigorously grinding until a gel forms. TEA and sodium metabisulfite are used as humectants which will maintain the water content in the preparation so that the physical properties and stability of the preparation during storage can last a long time. Glycerin also functions as a humectant or moisture barrier which can increase the spreadability of preparations and protect preparations from drying out.

The results of the germ count test were carried out using the method used, namely swabbing with a total of 3 people for each formulation. Bacterial samples were taken using a sterile stick which was rinsed with NaCl solution first and then smeared with fingers and then inoculated on NA media. After 33 etchings were made for three repetitions, they were incubated for 24 hours at 37ºC.

At a concentration of 2%, the average number of dead colonies was 16.06%. The concentration of 4% obtained an average number of dead colonies of 38.8% %. The concentration of 6% obtained an average number of dead colonies of 44.02%%. The concentration of 8% obtained an average number of dead colonies of 62.55%. Positive control obtained an average number of dead colonies of 86.2%. Negative control obtained an average number of dead colonies of 31.61%.

CONCLUSION

In this study it can be concluded that the number of colonies that died at concentrations of 2%, 4%, 6% and 8% was 16.06%; 38.8% ; 44.02% ; 62.55%, negative control the number of colonies that died was 31.61% and positive controls the number of colonies that died was 86.2%

REFERENCES

[1] Fahey JW. Moringaoleifera: A Review of the medical evidence for its nutritional. Therapeutic and prophylactic.Part 1. *Trees for Life journal*, 1:5. 2005

[2] Savitri , E, Fakhrurrazi, Harris A. Uji Antibakteri Ekstrak Daun Kelor (Moringa oleifera L.) terhadap Pertumbuhan Bakteri Staphylococcus aureus. *Jurnal Kedokteran Hewan* . 2 (4): 373-379. 2018

[3] Pandey A, Pandey RD, Tripathi P, Gupta PP, Haider J, Bhatt S, Singh AV. Moringaoleifera Lam. (Sahijan)- a plant with a plethora of diverse therapeutic benefits: an update retrospection. Medicinal and Aromatic Plants 1 (1) : 2-8. 2012

[4] Kurniawan, Setyo. *Obat Ajaib Sirih Merah dan Daun Kelor.* Yogyakarta: Buku Biru. 2013

[5] Pratiwi, S. T. *Mikrobiologi Farmasi*. Jakarta: Erlangga. 2008

[6] Walidah, Isnaini, Bambang Supriyanta, dan Sujono. Daya Bunuh Hand Sanitizer Berbahan Aktif Alkohol 59% dalam Kemasan Setelah Penggunaan Berulang Terhadap Angka Lempeng Total (ALT). *Journal Teknologi Laboratorium*. 2014

[7] Toripah SS, Abidjulu J, Wehantouw F. Aktivitas antioksidan dan kandungan ttal fenolik ekstrak daun kelor (Moringa oleifera Lam). *Pharmacon* 3 (4): 37-43. 2014

[8] Untari, E. K., dan Robiyanto. Uji Fisikokimia dan Uji Iritasi Sabun Septik Kulit Daun Aloe vera (L.) *Burm.f. Jurnal Jamu Indonesia.* Volume 3 (2) : 55-61. 2018

[9] Juwita, A. P., P.V. Yamlean, dan J. J. Edy. Formulasi Krim Ekstrak Etnaol Daun Lamun (Syringodium isoetifolium). *Jurnal Ilmiah Farmasi UNSRAT*. Volume 2 (02) : 8-12. 2013

[10] Ardana, M., Aeyni, V., dan Arsyik I. Formulasi dan Optimasi Basis Gel HPMC (Hidroxy Propyl Methyl Cellulose) Dengan Berbagai Konsentrasi. *J. Trop. Pharm. Chem*. Vol 3 (2). 101-108. 2015

[11] Manus, N., P. V. Y. Yamlean, dan N. S. Kojong. Formulasi Sediaan Gel Minyak Atsiri Daun Sereh (Cymbopogon citratus) Sebagi Antiseptik Tangan. *Jurnal ilmiah farmasi*. Vol 5(3): 87. 2016