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Anti-Bacterial Activity Test of Carrot Tuber Ethanol Extract Hydrogel Preparation (Daucus Carota L.) in Inhibiting the Growth of Bacteria and Their Ability in the Healing Process of Grade II Burns on Wistar Rat (Rattus Norvegicus)

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ABSTRACT

Carrots are root vegetables that are very common in Indonesia. Carrot plant (Daucus carita L.) is a root vegetable plant that has a high content of beta carotene, rich in dietary fiber, natural antioxidants and high vitamin A which is 12,000 IU. The reddish-yellow color of carrots is due to the high content of carotene pigment. The sample used in this study was fresh carrot tubers. The tubers are separated from other impurities and then washed thoroughly and then drained and weighed. Next, the tubers are dried at a temperature of 30-40oC until the tubers are dry (marked when broken brittle). Simplisia that has dried (brittle) is powdered with a blender and stored in a tightly closed container and stored at room temperature. The preparation of the extract is carried out by maceration using 70% ethanol solvent. According to the Indonesian Herbal Pharmacopoeia (2008), as much as 1 part of simplisia dry powder is put into the maserator, added 10 parts of solvent. Soak for the first 6 hours while stirring occasionally, then let stand for 18 hours. Separate the maserat by filtering. Repeat the extraction process at least twice with the same type and amount of solvent. Furthermore, all the mafiber is collected, then evaporated with a rotary evaporator at a temperature of ±50oC until a thick extract is obtained. The results showed that ethanol extract of carrot tubers with a simplisia weight of 500 grams produced a yield of 3.78% with an extract weight of 68.9 grams. The results below show that carrot tuber ethanol extract shows phytochemical screening results that contain flavonoids, alkaloids, glycosides, tannins and steroids. The results of the measurement of the diameter of the inhibitory zone above showed that ethanol extract of carrot tubers (Daucus carota L.) can inhibit the growth of Pseudomonas aeruginosa and Staphylococcus aureus bacteria at concentrations of 10-400 mg / mL. The measurement results obtained the diameter of the inhibitory zone with a strong inhibitory zone response category at all concentration variations. It was found that high concentrations had activity that did not differ significantly from low concentrations. Carrot tuber ethanol extract has a significant difference ($p < 0.05$) when compared to the positive and negative groups while the results of the measurement of bacterial killing power above show that carrot tuber ethanol extract (Daucus carota L.) can inhibit the growth of Pseudomonas aeruginosa and Staphylococcus aureus bacteria at concentrations of 10 – 100 mg / mLl

INTRODUCTION

Burns are emergencies that occur on the skin or other organs due to heat, electricity, chemicals, friction, or radiation (WHO, violence and injury prevention, 2018). Burns are one of the world's health problems that cause various mental, physical and financial disorders for those affected. According to the World Health Organization (WHO), more than 265,000 people die from burns worldwide (WHO, Violence and Injury Prevention, 2018).

Burns are the fourth leading cause of all trauma worldwide (WHO, the Global Burden of Disease Update, 2018). Burns result in more than 180,000 deaths each year (WHO Burn, 2018). Southeast Asia has the highest rate of burn deaths and is the region with the highest incidence of female burns in the world. (Martina. NR, Wardhana A. 2013).

Burns are typical of other types of injuries because they hit a lot of tissue necrosies (Scabs) that last a long time. If not treated properly, burns will spread quickly (Farrell, 2016).

Burns can cause temporary, permanent disability and death and are the third leading cause of death from trauma worldwide (Lima LS, Arch Intern Med 2017). Clinical assessment of disease severity is an important part of prognosis and referral services for critically ill patients admitted to emergency departments (ER) and intensive care units (ICU) (Burn, 2017).

The normal healing process at each stage can be hampered by several factors that can lead to impaired healing. Impaired wound healing can result from pathological conditions associated with diabetes, immune disorders, ischemia, venous congestion, and wounds such as burns, whooping cough, and tuberculosis wounds. The last stage in the proliferation process is epiteliesaesi, which involves myegration, prolieferation and differentiation of epithelial cells at the edges of the wound to the surface of damaged tissue in burns, epithelialization is delayed until a granular tissue layer is formed to account for epithelial cell migration (Wang ET Al, 2018).

Burns most often occur in residential areas and the most common are II degree burns (Wibawani et Al, 2015). A burn is a type of tissue damage that results from exposure to a heat source (fire, hot water, chemicals, and radiation). The severity of burns is influenced by the form and duration of contact with the heat source and the initial conditions of the fire (Moenadjat, 2003).

Inflammatory burns are a top problem because they slow down the processing of the epiedermis and lead to the formation of scar tissue (Church et al, 2006). These open wounds are very sensitive to bacterial contamination and can occur infections so that they require regular treatment, regular treatment of infections and hospitalization is very expensive (Amaliya et all, 2013).

Based on people's experience, there are empirical plants that can heal burns, namely carrot tubers. How to apply it is still simple, namely by grating carrot roots and then applying it to the affected skin area (Dalimartha, 2003). The ability of carrot tubers in the healing process is due to the content of sapoenin (Anonymous, 2008).

Carrot tubers are a natural ingredient that can be developed in the pharmaceutical industry. Some information about the effectiveness of carrot root is not new, and many studies have scientifically proven the effectiveness of carrot root, including liver protection (Widari 2004), analgesics (Putra 2003), and anti-inflammatory (Widarsih 2003). Other studies have also shown the ability of carrot tubers as antibacterial agents. Evanikastri's study found that fermented beverages made from carrot root extracts from two bacterial species, Lactobacillus casei and Propionibacterium freudenreichii, had 100% antibacterial activity against the pathogenic bacteria tested (Escherichia coli, Staphylococcus aureus, Salmonella typhimurium and Shigella). The results of this study strengthen the role of carrot tubers in medicine and allow further research to obtain better shape and properties of carrot tubers.

This type of research is a laboratory experiment. By using a wistar rat. The research plan that will be carried out includes preparation of materials, preparation of ethanol extract of carrot tubers, testing

of the antibacterial activity of ethanol extract of carrot tubers against Pseudomonas aeruginosa and Dtaphylococcus aureus bacteria, and testing the activity of hydrogel preparations of ethanol extract of carrot tubers on accelerated healing of second degree burns in Wistar rats. The required population size is calculated using the Federer formula. And the ideal number of samples obtained is 5 male white rats Wistar strain or more. In this study, 5 treatment groups were used, so the minimum sample required was 25 rats, then the sample was increased by 10% so that 1 group was added. Thus the total research sample required is 30 heads to avoid dropping out of school during the study. Carrot tuber samples were obtained from a world center and will be carried out by knowing the plant. The variables used in the study consisted of three variables, namely independent variables, dependent variables, and control variables (Controlled). The first thing to do is to collect samples purposively, ie without comparison of the same samples from other areas, manufacture carrot tuber simplicia, and manufacture carrot root ethanol extract by maceration using 70% ethanol solvent, and then phytochemical screening (Examination of flavonoids, alkaloids, steroids) and triterpenoids, glycosides.

METHODS

Time and Place of Research

This research was conducted at the Pharmacology Laboratory, Faculty of Pharmacy, University of North Sumatra. The study is planned for August-October 2022 or until the effect is seen after using carrot root ethanol extract.

1. Population and Sample

1. Populatio

Population is a cluster of all individuals at a certain limit. The population of this study was male white Wistar rats. The criteria of the research sample are:

1. Inclusion Criteria

Healthy male white rats of wistar strain aged 3 months with a body weight of 200-250 Grams.

2. Exclusion Criteria

Male white rats of the wistar strain died at a time when the study was ongoing. The required number of the population is calculated using the Federer formula (Federer, 2008), thus obtaining the following population numbers:

$$(n – 1)(t – 1) \geq 15$$

$$(n – 1) (5 – 1) \geq 15$$

$$(n – 1) (4$$

$$) \geq 15\ 4n$$

$$– 4 \geq 15\ n$$

$$\geq 5$$

Information:

t: Number of test groups n: Sample size per group

From Federer's formula above, the ideal number of samples is 5 male white rats of wistar strains or more. In this study, 5 treatment groups were used, so the minimum number of samples needed was 25 mice. Then the sample is added by 10% so that each group is added 1 head. Thus, the total research sample required is 30 heads to avoid dropping out during the study.

2. Samples

Carrot tubers obtained from a shopping mall in the city of Medan.

2. Research Variables

The variables used in this study are:

1. The independent variables, were hydrogel base, Octenilin gel and carrot tuber ethanol extract hydrogel at 3 different dosage levels (5%, 10%, and 20%).

2. The dependent variable, is to measure the diameter of the burn, measure the percentage of burns, and measure erythema.

3. Variable example, is a white wistar rat (Male) aged 3 months with BB (Approximately 200-250 gr).

Data Collection Techniques

The method of collecting this research data is by using the following procedure: The researcher received a recommendation letter for a research permit from the educational institution of Universitas Prima Indonesia. In addition, researchers give research permission to cultivate the land and conduct research within a certain period of time.

The steps in data collection are:

1. Researchers collected 30 male Wistar white rats at the study site.

2. As a next step, the researchers divided the wistar mice into five groups. Each group received one treatment, first prepared a test area by shaving the back hair of Wistar rats with a 3 cm^2 razor. In addition, anesthesia was performed intraperitoneally

using ketamine and xylazine type anesthetics while waiting for the rats to become unconscious. Then burns were carried out on the skin of the Wistar rat's back using a metal bar with a diameter of 2 cm2 which was heated on the fire for 1 minute then attached to the back of the Wistar rat degrees down for 5 minutes. seconds marked reddish and vesicular burns (Water blisters) form on the skin of the back of Wistar rats.

3. Burnt back injury rats were treated based on each predetermined group. The no-treatment group, the preparation group already on the market and the treatment group with carrot root ethanol extract were divided into 3 groups, namely 5%, 10% and 20%.

4. Burns are treated openly until they heal, characterized by closure and closure of the burn.

Sample Collection and Processing

1. Sample Collection

Sampling is carried out purposively, that is, without comparison of the same sample from other regions. Carrot tubers purchased in the Medan market are used as planting material.

2. Making Carrot Tuber Simplisia

The sample of this study was fresh carrot tubers. Tubers are separated from other impurities and thoroughly washed, dried and weighed. In addition, the tubers are dried at a temperature of 30-40'C until the tubers are dry (Marked brittle). Frozen simplisia is mashed with a blender and stored in a tightly closed container and stored at room temperature

RESULTS AND DISCUSSION

Results of Making Extracts

Table 1. Results of Making Extracts

Simplisia Powder Weight	Extract Weight (Grams)	Yield (%)
500 grams	68.9 grams	3,78%

The results of the study were ethanol extract of carrot tubers with a simplisia weight of 500 grams grams. resultingin a yield of 3.78% with an extract weight of 68.9

Phytochemical Screening Results

Table 2. Phytochemical Screening Results

Compound Classes	Result
Flavonoids	+
Alkaloids	+
Glycosieda	+
Tannins	+
Saponien	+
Steroids/Triterpenoide	+

The results below show that carrot tuber etaenol extract shows phytochemical screening results that contain flavonoids, alkaloids, glycosieda, tannins and steroids.

1. Antibacterial Test Results

1. Results of Bacterial Minimum Inhibitory Power Examination

Table 3. Results of Minimum Inhibitory Power Test of *Pseudomonase Aeruginosae* Bacteria

Concentration	Average ± Elementary School
Negative	0.00 ±0.00#
Positive	35.63 ± 0.21*
10 mg/mL	9.03 ± 0.25*#
20 mg/mL	9.97 ± 0.15*#
30 mg/mL	10.40 ± 0.70*#
40 mg/mL	10.83 ± 0.55*#
50 mg/mL	11.17 ± 0.42*#
60 mg/mL	11.47 ± 0.67*#
70 mg/mL	11.60 ± 0.44*#
80 mg/mL	11.90 ± 0.26*#
90 mg/mL	12.57 ± 0.51*#
100 mg/mL	11.63 ± 1.36*#
200 mg/mL	12.20 ± 0.10*#
300 mg/mL	11.40 ± 0.10*#
400 mg/mL	10.37 ± 0.38*#

Information:

* Different from Negative

Different from Positive

Table 3, the results of the inhibition zone diameter assessment above, shows that ethanol extract of carrot tubers (Daucus carota L.) can inhibit the growth of Pseudomonas aeruginosa bacteria in a concentration of 10 – 400 mg / mL. The measurement results obtained the diameter of the inhibitory zone with a strong inhibitory zone response category at all concentration variations. It was found that high concentrations had activity that did not differ significantly from low concentrations. Carrot tuber ethanol extract had a significant difference ($p<0.05$) when compared to the positive and negative groups.

Table 4. Results of Minimum Inhibitory Power of *Staphylococcus Aureus* Bacteria

Concentration	Average ± Elementary School
Negative	$0.00 \pm 0.00^{\#}$
Positive	$34.10 \pm 0.80^{*}$
10 mg/mL	$8.67 \pm 0.35^{*\#}$
20 mg/mL	$9.53 \pm 0.81^{*\#}$
30 mg/mL	$9.90 \pm 0.53^{*\#}$
40 mg/mL	$10.50 \pm 0.10^{*\#}$
50 mg/mL	$11.33 \pm 0.55^{*\#}$
60 mg/mL	$11.87 \pm 0.25^{*\#}$
70 mg/mL	$12.23 \pm 0.51^{*\#}$
80 mg/mL	$12.63 \pm 0.42^{*\#}$
90 mg/mL	$13.37 \pm 0.67^{*\#}$
100 mg/mL	$13.70 \pm 0.40^{*\#}$
200 mg/mL	$14.00 \pm 0.10^{*\#}$
300 mg/mL	$14.57 \pm 0.31^{*\#}$
400 mg/mL	$15.10 \pm 0.10^{*\#}$

Information:

*Contrast to negative

Different from positive

Table 4, is the result of measuring the diameter of the inhibitory zone above, showing that ethanol extract of carrot tubers (Daucus carota L.) can prevent the growth of Staphylococcus aureus bacteria at a concentration of 10 – 400 mg / mL. The measurement result is the result of the diameter of the inhibitory zone with a strong inhibitory zone response category in all variations of the conseration. It was found that high concentrations had activities that were not significantly different from low consortrations. Carrot tuber ethanol extract had a significant difference ($p<0.05$) when compared to the positive and negative groups.

2. Results of Bacterial Killing Power Test

Table 5. Results of Killing Power of *Pseudomonas Aeruginosa* Bacteria

Concentration	Average ± Elementary School
Negative	390.67 ± 61.18[#]
Positive	2.33 ± 2.08[*]
10 mg/mL	242.33 ± 24.99[*#]
20 mg/mL	208.67 ± 12.06[*#]
30 mg/mL	199.67 ± 16.01[*#]
40 mg/mL	140.33 ± 51.81[*#]
50 mg/mL	120.67 ± 15.31[*#]
60 mg/mL	118.67 ± 22.50[*#]
70 mg/mL	117.67 ± 12.74[*#]
80 mg/mL	77.33 ± 10.07[*]
90 mg/mL	76.33 ± 6.62[*]
100 mg/mL	36.00 ± 2.00[*]

information:

*Contrast To Negative

Different From Positive

Table 5, Shows The Results Of The Measurement Of Bacterial Killing Power Above, Is Ethanol Extract Of Carrot Tubers (Daucus Carota L.) Can Inhibit The Growth Of Pseudomonas Aeruginosa Bacteria In A Concentration Of 10-100 Mg / Ml. The Measurement Results Obtained The Results Of Bacterial Killing Power With A Strong Bacterial Zone Response Category In All Variations Of Concentration. It Was Found That The Most Effective Consecration To Kill Bacteria Was 10 Mg / Ml And 20 Mg / Ml.

Table 6. Results of *Staphylococcus Aureus* Bacteria Killing Power

Concentration	Average ± Elementary School
Negative	2636.33 ± 413.01#
Positive	212.33 ± 71.28*
10 mg/mL	1859.00 ± 164.02*#
20 mg/mL	1810.67 ± 299.88*#
30 mg/mL	1336.00 ± 168.02*#
40 mg/mL	709.67 ± 57.83*#
50 mg/mL	607.33 ± 44.06*
60 mg/mL	576.67 ± 90.53*
70 mg/mL	432.00 ± 37.64*
80 mg/mL	352.67 ± 37.23*
90 mg/mL	341.00 ± 24.98*
100 mg/mL	271.67 ± 33.98*

Information:

*Contrast to Negative

Different from Positive

Table 6, shows the results of the measurement of bacterial killing power above, is that ethanol extract of carrot tubers (Daucus carota L.) can inhibit the growth of Staphylococcus aureus bacteria in a concentration of 10 – 100 mg / mL. The assessment results were obtained from the results of bacterial killing power with strong bacterial zone response category in all consecration variations. It was found that the most effective consecration to kill bacteria was 10 mg / mL and 20 mg / mL.

2. Results of Evaluation of Carrot Tuber Ethanol Extract Hydrogel Preparations

1. Organoleptis Examination Results

Table 7. Organoleptis Examination Results

Formula	Examination Results		
	Shape	Color	Smell
Blanks	Semi Dense	Transparent	Not Smell
F1	Semi Dense	Color Orange	Smell Distinctive
F2	Semi Dense	Color Orange	Smell Distinctive
F3	Semi Dense	Color Orange	Smell Distinctive

Information:
F1 = Carrot Tuber Ethanol Extract Hydrogel Preparation 5% F2 = Carrot Tuber Ethanol Extract Hydrogel Preparation 10% F3 = Carrot Tuber Ethanol Extract Hydrogel Preparation 20% The results of organoleptical evaluation of 5%, 10%, and 20% Carrot Tuber Ethanol Extract Hydrogel preparations show that the dosage forms at concentrations of 5%, 10%, 20% (F1, F2, and F3) are semi-solid, while the color shows orange color and distinctive

2. Homogeneity Check Results

Table 8. Homogeneity Check Results

Formula	Examination Results			
	Day-0	Day-30	Day-60	Day-90
Blanks	h	h	h	h
F1	h	h	h	h
F2	h	h	h	h
F3	h	h	h	h

Information:
F1 = Carrot Tuber Ethanol Extract Hydrogel Preparation 5% F2 = Carrot Tuber Ethanol Extract Hydrogel Preparation 10% F3 = Carrot Tuber Ethanol Extract Hydrogel Preparation 20% h= Homogeant

The homogeanity evaluation results of 5%, 10%, and 20% Carrot Tuber Ethanol Extract Hydrogel preparations showed that the dosage forms at concentrations of 5%, 10%, 20% (F1, F2, and F3) showed homogeneous results between 0-90 days. This indicates that there is no lump on the preparation.

pH Test Results

Table 9. pH Test Results

Formula	Average pH value of SD ±			
	Day-0	Day-30	Day-60	Day-90
Blanks	7.0 ± 0.1	6.8 ± 0.1	6.8 ± 0.1	6.8 ± 0,1
F1	6.8 ± 0.1	6.7 ± 0.1	6.6 ± 0.1	6.5 ± 0,1
F2	6.7 ±0.1	6,6 ± 0.1	6.5 ± 0.1	6.5 ± 0,1
F3	6.5 ± 0.1	6,5 ± 0.1	6.4 ± 0.1	6.2 ± 0,2

Information:

F1 = Carrot Tuber Ethanol Extract Hydrogel Preparation 5% F2 = Carrot Tuber Ethanol Extract Hydrogel Preparation 10% F3 = Carrot Tuber Ethanol Extract Hydrogel Preparation 20% The pH evaluation results of 5%, 10%, and 20% Carrot Tuber Ethanol Extract Hydrogel preparations show that dosage forms at concentrations of 5%, 10%, 20% (F1, F2, and F3) show stable pH results in the range of 6.2 – 7.0 which can be used for the skin and this supports the stability data of the hydrogel preparation.

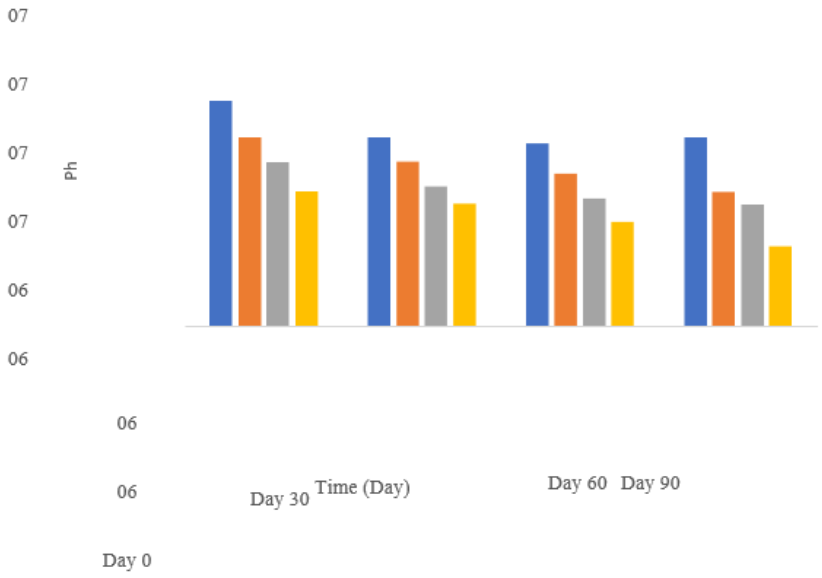

Figure 1. BlanksEEUW Hydrogel 5%EEUW Hydrogel 10%EEUW Hydrogel 20%

3. Viscosity Inspection Results

Table 10. Viscosity Inspection Results

Formula	Average Viscosity Value (m.Pas) ± SD			
	Day-0	Day-30	Day-60	Day-90
Blanks	6780 ± 7,51	6773.33 ± 7,64	6757.67 ± 8,74	6747.33 ± 2,52
F1	69464,67 ± 329.23	69178,00 ± 459.02	68402,00 ± 298.29	67433,33 ± 397.33
F2	75898,33 ± 1659.14	75357,00 ± 1827.39	74546,67 ± 2111.03	73830,67 ± 2264.49
F3	76147,33 ± 1690.94	75473,00 ± 2002.88	74891,67 ± 1841.42	73965,67 ± 2065.69

Information:

F1 = Carrot Tuber Ethanol Extract Hydrogel Preparation 5% F2 = Carrot Tuber Ethanol Extract Hydrogel Preparation 10% F3 = Carrot Tuber Ethanol Extract Hydrogel Preparation 20% The results of viscosity evaluation of 5%, 10%, and 20% Carrot Tuber Ethanol Extract Hydrogel preparations show that dosage forms at concentrations of 5%, 10%, 20% (F1, F2, and F3) show stable viscosity results in the range of 6780 – 73965.67 which can be used for skin and this supports the stability data of hydrogel preparations.

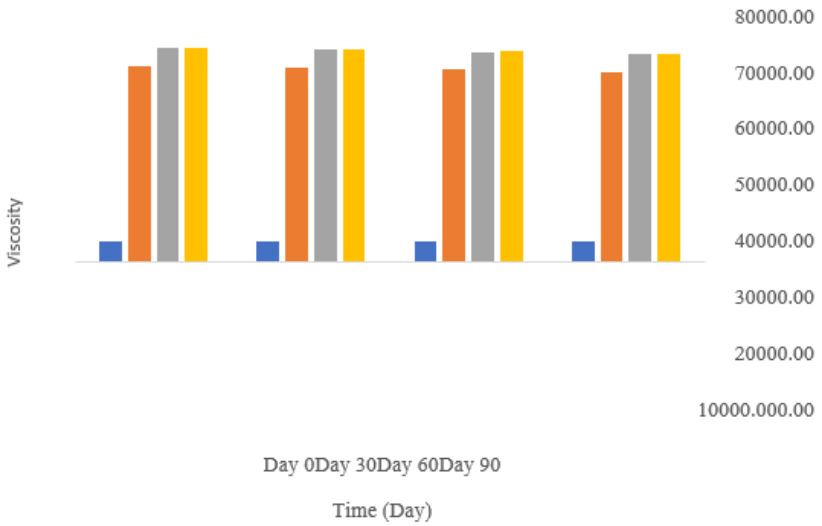

Figure 2. BlanksEEUW Hydrogel 5% EEUW Hydrogel 10% EEUW Hydrogel 20%

4. Dispersion Check Results

Table 11. Scatter Strength Check Results

Formula	Dispersion (cm) ± SD			
	Day-0	Day-30	Day-60	Day-90
Blanks	5.5 ± 0,2	5.1 ± 0,1	4.6 ± 0,2	4.2 ± 0,2
F1	6.8 ± 0,1	6.0 ± 0,2	5.6 ± 0,2	4.7 ± 0,2
F2	6.7 ± 0,2	5.8 ± 0,2	5.2 ± 0,2	4.5 ± 0,3
F3	6.4 ± 0,2	5.6 ± 0,3	4.6 ± 0,4	4.1 ± 0,3

Information:

F1 = Carrot Tuber Ethanol Extract Hydrogel Preparation 5% F2 = Carrot Tuber Ethanol Extract Hydrogel Preparation 10% F3 = Carrot Tuber Ethanol Extract Hydrogel Preparation 20%

The results of the viscosity evaluation of the 5%, 10%, and 20% Carrot Tuber Ethanol Extract Hydrogel preparations show that the dosage forms at concentrations of 5%, 10%, 20% (F1, F2, and F3) show stable viscosity results in the range of 4.1 – 6.8 cm that can be used for the skin and this supports the stability data of the hydrogel preparation

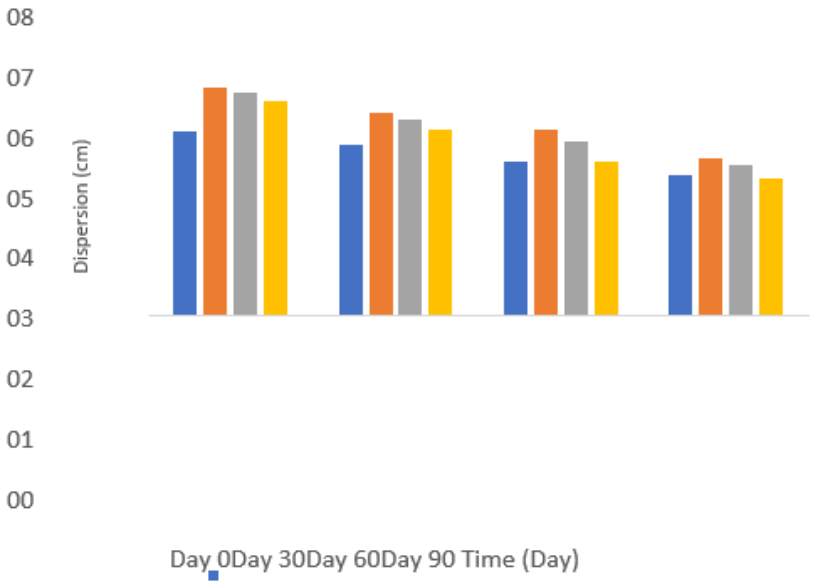

Figure 3. BlanksEEUW Hydrogel 5% EEUW Hydrogel 10% EEUW Hydrogel 20%

This examination is carried out by inquibation at a temperature of 37'C with the aim of optimizing the development of fungi. In addition, the diameter of the blocking zone is obtained, where the strength of the blocking zone is classified according to Davis and Stout as follows: (a) very heavy (inhibitory zone > 20 mm), (b) heavy (inhibitory zone 10-20 mm), (c) medium (inhibitory zone 5-10 mm), (d) weak (inhibitory zone is <5 mm). After incubation, monitoring is carried out to see the formation of clear bands and the diameter of the inhibitory zone measured in millimeters (mm), using the average diameter of the caliper minus the diameter of the well (7 mm) and the minimum inhibitory concentration (KHM) determined. Antibacterial activity tests against SA and PA showed that ethanol extract of carrot tubers (Daucus carota L.) had antibacterial activity. This is shown by the formation of clear bands around the wells treated with carrot root ethanol extract solution after incubation 3 x 24 hours. The size of the resistance formed is determined by the difference in the concentration of the test solution, the higher the conanthration, the more active components it contains, so that the resistance formed is also different and becomes a parameter for the effectiveness of the test sample solution for prevent or kill bacteria.

Flavonoid and saponien compounds in carrot tubers can prevent bacterial growth. Flavonoids process by blocking bacterial cell permeabiality because they contain hydroxyl groups that cause changes in organic substances and nutrient transport, which ultimately cause toxic effects on bacteria.

Saponins are surface-active substances in polar form, as a result of which they break down the fat layer of the cell membrane, which in turn leads to disruption of the membraene permeabilicity of the cell. Flavonoid and saponien compounds in carrot tubers can inhibit bacterial growth. Flavonoids work by disrupting bacterial cell permeabiliety because they contain hydroxyl groups that cause changes in organic substances and nutrient transport, which ultimately cause toxic effects on bacteria.

Effect of Wound Fertilization of EEUW Hydrogel Preparations on Wound Diameter Parameters and Percent Healing

Table 12. Wound Diameter

Day to -	Average Diameter (cm) ± SD				
	Blanks	Octenilin	F1	F2	F3
0	2,41 ± 0,16#	2,12 ± 0,16*	2,14 ± 0,06 *	2,17 ± 0,12	2,17 ± 0,11 *
1	2,33 ± 0,16#	1,95 ± 0,12*	2,04 ± 0,06 *	2,05 ± 0,10 *	2,02 ± 0,13 *
2	2,25 ± 0,16#	1,86 ± 0,10*	1,94 ± 0,06 *	1,96 ± 0,13 *	1,94 ± 0,14 *
3	2,16 ± 0,20#	1,73 ± 0,12*	1,83 ± 0,05 *	1,85 ± 0,11 *	1,84 ± 0,13 *
4	2,05 ± 0,17#	1,64 ± 0,10*	1,75 ± 0,03 *	1,76 ± 0,10 *	1,73 ± 0,10 *

5	1,97 ± 0,24#	1,49 ± 0,12*	1,63 ± 0,99 *	1,64 ± 0,15 *	1,59 ± 0,15 *
6	1,92 ± 0,29#	1,38 ± 0,08*	1,53 ± 0,15 *	1,54 ± 0,14 *	1,48 ± 0,22 *
7	1,83 ± 0,29#	1,20 ± 0,10*	1,38 ± 0,20 *	1,39 ± 0,13 *	1,32 ± 0,22 *
8	1,80 ± 0,17#	1,00 ± 0,25*	1,29 ± 0.21 *	1,24 ± 0.15 *	1,19 ± 0.19 *
9	1,70 ± 0,17#	0,85 ± 0,31*	1,17 ± 0.21 *	1,09 ± 0.14 *	1,02 ± 0.20 *
10	1,63 ± 0,19#	0,63 ± 0,31*	1,10 ± 0.21 *	1,00 ± 0 20*	0,87 ± 0.23 *

1 1	1,6 0 ± 0,1 2#	0,3 2 ± 0,2 9*	0,95 ± 0.12 * #	0,89 ± 0.17 * #	0,75 ± 0.28 * #
1 2	1,5 1 ± 0,1 9#	0,1 5 ± 0,2 2*	0 88 ± 0.10 * #	0,75 ± 0.20 * #	0,57 ± 0.28 * #
1 3	1,3 9 ± 0,2 4#	0,1 1 ± 0,1 7*	0,71 ± 0,13 * #	0,56 ± 0,15 * #	0,43 ± 0,26 * #
1 4	1,3 0 ± 0,2 7#	0,0 3 ± 0,0 7*	0,56 ± 0.15 * #	0,43 ± 0.14 * #	0,20 ± 0.22 *
1 5	1,1 9 ± 0,1 9#	0,0 0 ± 0,0 0*	0,45 ± 0.13 * #	0,33 ± 0.13 * #	0,15 ± 0.15 *
1 6	1,1 2 ± 0,3 0#	0,0 0 ± 0,0 0*	0,35 ± 0.12 * #	0,23 ± 0.09 *	0,03 ± 0.06 *

17	1,05 ± 0,31#	0,00 ± 0,00*	0,29 ± 0.06 *#	0,08 ± 0.12 *	0,00 ± 0.00 *
18	0,98 ± 0,32#	0,00 ± 0,00*	0,21 ± 0.13 *	0,00 ± 0.00 *	0,00 ± 0.00 *
19	0,83 ± 0,32#	0,00 ± 0,00*	0,12 ± 0.12 *	0,00 ± 0.00 *	0,00 ± 0.00 *
20	0,72 ± 0,36#	0,00 ± 0,00*	0,05 ± 0.10 *	0,00 ± 0.00 *	0,00 ± 0.00 *
21	0,65 ± 0,37#	0,00 ± 0,00*	0,00 ± 0.00 *	0,00 ± 0.00 *	0,00 ± 0.00 *
22	0,51 ± 0,37#	0,00 ± 0,00*	0,00 ± 0.00 *	0,00 ± 0.00 *	0,00 ± 0.00 *

23	0,41 ± 0,44#	0,00 ± 0,00*	0,00 ± 0,00*	0,00 ± 0,00*	
24	0,31 ±	0,00 ±	0,00 ±	0,00 ±	
	0,32#	0,00*	0,00*	0,00*	
25	0,17 ± 0,25	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	
26	0,10 ± 0,22	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	
27	0,08 ± 0,17	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	
28	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	

Information:

* = There are differences with the Hydrogel Base group # = There are differences with the Octenilin group

F1 = EEUW hydrogel preparation 5%

F2 = EEUW Hydrogel Preparation 10%

F3 = EEUW Hydrogel Preparation 20%

The results showed that EEUW hydrogel preparations had wound healing activity by decreasing wound diameter, especially in the hydrogel preparation group with a concentration of 20% experienced the fastest wound healing on day 17, while in the comparison group by giving octenilin experienced total healing on day 15.

Table 13. Percent of Wound Healing

Day to -	Average Diameter (cm) ± SD				
	Blanks	Octenilin	F1	F2	F3
1	3,40 ± 0,89	7,63 ± 3,58	4,84 ± 1,29	5,48 ± 1,63	6,78 ± 4,57
2	6,80 ± 1,60	11,93 ± 3,56	9,59 ± 2,02	9,67 ± 2,61	10,28 ± 5,58
3	10,79 ± 2,62#	18,38 ± 4,85*	14,40 ± 3,45	14,94 ± 3,89	15,28 ± 4,39
4	15,21 ± 2,41#	22,55 ± 5,25*	18,23 ± 2,75	19,18 ± 3,24	20,28 ± 2,39

5	18,54 ± 6,40	29,45 ± 7,45	23,85 ± 4,77	24,54 ± 5,90	26,72 ± 4,45
6	20,82 ± 9,08#	34,75 ± 6,09*	28,77 ± 7,18	29,15 ± 5,02	31,84 ± 7,80
7	24,48 ± 8,93#	42,78 ± 7,55*	35,56 ± 10,63	36,16 ± 4,37	39,34 ± 7,88
8	25,63 ± 3,83#	52,40 ± 13,74*	39,75 ± 10,91	42,96 ± 4,77*	45,21 ± 6,27**
9	29,84 ±	59,68 ±	45,15 ±	50,17 ±	53,24 ±
4	15,21 ± 2,41#	22,55 ± 5,25*	18,23 ± 2,75	19,18 ± 3,24	20,28 ± 2,39
5	18,54 ± 6,4	29,45 ± 7,4	23,85 ± 4,7	24,54 ± 5,9	26,72 ± 4,45

	0	5	7	0	
6	20,82 ± 9,08#	34,75 ± 6,09*	28,77 ± 7,18	29,15 ± 5,02	31,84 ± 7,80
7	24,48 ± 8,93#	42,78 ± 7,55*	35,56 ± 10,63	36,16 ± 4,37	39,34 ± 7,88
8	25,63 ± 3,83#	52,40 ± 13,74*	39,75 ± 10,91	42,96 ± 4,77*	45,21 ± 6,27*
9	29,84 ± 4,76#	59,68 ± 15,81*	45,15 ± 11,08	50,17 ± 4,31*	53,24 ± 7,10*
10	32,63 ± 5,43#	69,56 ± 16,55*	48,40 ± 10,87#	54,18 ± 7,12*	59,99 ± 8,41*
11	33,58 ± 2,75#	84,26 ± 15,07*	55,71 ± 1*#	59,33 ± 6,38*#	65,64 ± 11,06*#

12	37,51 ± 5,79#	92,53 ± 11,35*	58,94 ± 5,68*#	65,60 ± 7,77*#	73,98 ± 11,47*#
13	42,55 ± 7,15#	94,34 ± 8,75*	66,55 ± 6,80*#	74,28 ± 6,63*#	80,28 ± 10,97*
14	46,57 ± 8,98#	98,32 ± 3,75*	74,02 ± 6,88*#	80,11 ± 6,33*#	90,65 ± 9,90*
15	51,24 ± 9,75#	100,00 ± 0.00*	79,06 ± 6,03*#	85,08 ± 5,81*#	92,76 ± 6,88*
16	54,07 ± 10,69#	100,00 ± 0.00*	83,67 ± 5,44*#	89,59 ± 4,02*	98,87 ± 2,53*
17	57,08 ± 11,19#	100,00 ± 0.00*	86,31 ± 2,71*#	96,02 ± 5,46*	100,00 ± 0,00*
18	59,99 ± 10,85#	100,00 ± 0.00*	90,38 ± 6,02*	100,00 ± 0.00*	100,00 ± 0,00*

19	65,98 ± 11,54#	100,00 ± 0,00*	94,21 ± 5,67*	100,00 ± 0,00*	100,00 ± 0,00*
20	70,87 ± 13,44#	100,00 ± 0,00*	97,90 ± 4,70*	100,00 ± 0,00*	100,00 ± 0,00*
21	73,69 ± 14,25#	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*
22	79,46 ± 14,12 #	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*
23	83,60 ± 17,36#	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*
24	87,69 ± 12,43#	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*	100,00 ± 0,00*
25	93,24 ± 9,5	100,00 ± 0,0	100,00 ± 0,0	100,00 ± 0,0	100,00 ± 0,00

	2	0	0	0	
2 6	96,2 3 ± 8,4 4	100, 00 ± 0.0 0	100, 00 ± 0.0 0	100, 00 ± 0.0 0	100, 00 ± 0,00
2 7	97,1 3 ± 6,4 1	100, 00 ± 0.0 0*	100, 00 ± 0.0 0	100, 00 ± 0.0 0	100, 00 ± 0,00
2 8	100, 00 ±	100, 00 ±	100, 00 ±	100, 00 ±	100, 00 ± 0,00
	0,0 0	0,0 0	0,0 0	0,0 0	

Information:

* = There are differences with the Hydrogel Base group # = There are differences with the Octenilin group

F1 = EEUW Hydrogel Preparation 5% F2 = EEUW Hydrogel Preparation 10% F3 = EEUW Hydrogel Preparation 20%

The results stated that carrot umbie had activity to heal wounds with percent healing parameters on day 17 showed that EEUW Hydrogel 20% had a percent of wound healing of 100% while in the comparison group with octenilin had wound healing activity on day 15 faster than the group given extract.

Some studies show that there are a number of plants that have the potential to heal burns. Carrots (Daucus carota) are a type of shrub-shaped root vegetable (shrub) that comes from the Apiaceae family. Carrots have a reddish-yellow color because they are high in carotene. Carrots are known to be rich in benefits because of the content they have. Carrot extract contains βcaroten which is quite high, also contains flavonoids and saponins which are thought to be anti-inflammatory. Many studies have been conducted that prove that carrot plants have many benefits such as antioxidants,anti-inflammatory, anticarcinogens, and antidiabetics.

As far as researchers trace, no studies have been found that show that carrot extract can affect the manufacture of granuelation tissue in the healing process of experimental rat burns. However, based on research conducted by Pang and Kim on the activity of flavonoids and saponins, it was found that flavonoids and saponins were proven to increase the production of new blood vessels and collagen connective tissue and increase the amount of fibroblast production which is a component of granulation tissue formation

CONCLUSION

1.Carrot tuber etaenol extract contains flavonoid compounds, saponien tannins, glycosides, steroids, and triterpenoide

2.Hydrogel preparations and ethanol extracts of carrot tubers have inhibitory activity of bacteria Pseudomonase aeruginosae and Staphylococcus aureus.

3.Carrot tuber ethanol extract hydrogel preparations with a concentration of 20% have the fastest effectiveness of wound fertilization compared to concentrations of 5% and 10%

4.Carrot tuber extract hydrogel preparations have wound healing activity with percent healing parameters on day 17 have a percent of wound healing of 100%, while in the comparison group with octenilin has wound healing activity on day 15 faster than the group given extract.

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