

## Production of Youcare Hand Sanitizer with Chitosan as Antibacterial Active Ingredient in Blangcrum Village

Nurhanifa<sup>\*1</sup>, Een Setiawati<sup>2</sup>, Rika Annisa<sup>3</sup>

<sup>1</sup>Department of Renewable Energy Engineering, Malikussaleh University, Aceh Utara, Indonesia

<sup>2</sup>Department of Chemical Engineering, Lhokseumawe State Polytechnic, Aceh Utara, Indonesia

<sup>3</sup>Department of Commerce, Lhokseumawe State Polytechnic, 24301 Lhokseumawe, Aceh Utara

Email: [nurhanifaaidy@gmail.com](mailto:nurhanifaaidy@gmail.com)

### ABSTRACT

Keeping hands clean from viruses and bacteria is the easiest way to prevent disease transmission. Apart from washing hands with soap, using hand sanitizer products without water or hand sanitizers is also recommended. The purpose of the dedication is to manufacture antibacterial hand sanitizer products which are dominated by natural active ingredients, namely chitosan and Vitamin E moisturizing ingredients which are soft, safe and comfortable for users, and smell good because they contain essential oil. The presence of Chitosan reduces the alcohol content which is too strong but provides more effectiveness for its antimicrobial properties. Hand sanitizers usually contain alcohol, for example, ethanol, as an active substance that works as an antiseptic. Other ingredients are water, fragrance, and glycerin. The use of alcohol as the main antibacterial agent in hand sanitizers can have negative effects on users, including irritation to the hands down to the throat and can even cause digestive disorders. , comfortable and of course affordable by all levels of society. There are two hand sanitizers, namely hand sanitizer gel and hand sanitizer spray. The targeted output of this community service program can increase the productivity and efficiency of handsanitizer production and proposed intellectual property (IP) in the form of patents and trademarks.

**Keywords:** Handsanitizer, Chitosan, Essensial Oil, Antibacterial

## INTRODUCTION

Hands are the most potential source as a medium for transferring bacteria or germs from one object to another that is touched. Hand hygiene is one of the things that must be maintained to prevent contaminants or diseases from entering the body. Maintaining hand hygiene from viruses and bacteria is the easiest way to prevent disease transmission. In addition to washing hands with soap, using hand sanitizer products without water or hand sanitizer is also recommended.[1]

Hand cleanser product without water have now become mandatory items that must be carried anywhere to maintain hand hygiene from germs. In the market, there are also many brands of hand sanitizers available.[2]

YouCare handsanitizer comes as a sanitizer that is dominated by antibacterial natural active ingredients, namely chitosan and moisturizing vitamin E content that is soft, safe and comfortable for users, and fragrant because it contains essential oils. The composition of this product consists of chitosan, alcohol, water, alcohol essential oil which functions as an antiseptic to kill viruses and bacteria. YouCare hand sanitizer has two types of hand sanitizers, namely hand sanitizer gel and hand sanitizer spray.

YouCare handsanitizer comes as a sanitizer that is dominated by antibacterial natural active ingredients, namely chitosan and moisturizing vitamin E content that is soft, safe and comfortable for users, and fragrant because it contains essential oils. The composition of this product consists of chitosan, alcohol, water, alcohol essential oil which functions as an antiseptic to kill viruses and bacteria. YouCare hand sanitizer has two types of hand sanitizers, namely hand sanitizer gel and hand sanitizer spray. Many hand sanitizers derived from alcohol or ethanol are mixed together with thickening agents, such as carbomer, glycerin, and make it similar to jelly, gel or foam to facilitate its use. This gel is gaining popularity because its use is easy and practical without the need for water and soap.

This sanitary gel becomes a convenient alternative for the community. Along with the times, non-alcoholic hand sanitizers were also developed, but if the hands are really dirty, either by soil, air, blood, or others, washing hands with water and soap is more advisable because gel hand sanitizers cannot effectively kill germs and clean other organic materials. [3] Alcohol is widely used as an antiseptic/disinfectant for disinfection of clean skin surfaces, but not for injured skin. In addition, alcohol also has irritating properties on the skin, flammable, and also increases viral infections that trigger inflammation of the digestive tract, therefore the idea arises to use natural ingredients that can reduce the risk of the emergence of digestive disorders.

The objectives of product development through this service program include, developing handsanitizer products based on natural ingredients, namely shrimp shell waste (chitosan) as antibacterial active ingredients, developing the production of YouCare handsanitizer products and the specifications needed so that the product is acceptable in the community towards commercialization, expanding the market for this

handsanitizer product to a wider market coverage and helping the supply (supply) of current handsanitizers. Its rarity in the market is rife.

## **METHOD**

To produce Youcare Handsanitizer products, several stages of the process are needed as follows:

### **1. Chitosan synthesis from shrimp skin**

Weigh 100 grams of shrimp shells then clean with boiled water for 1 hour. After that, wash and dry the shrimp shells at 160°C for 2 hours in the oven. Then crush the dried shrimp shells into powder. In the demineralization stage of shrimp shell powder using HCL with a concentration of 0.25 M - 2 M (ratio 1:10 (b / v)) for 4 hours at a speed of 500 rpm with heating at a temperature of 60-70°C. Dry the filtered shrimp shell powder in the oven at 80°C. The deproteinization stage is carried out using a solution of NaOH 0.5 M - 2 M soaked for 10 minutes - 400 minutes at a temperature of 20°C -100°C. After the filtration process, the shrimp shells are washed with distilled water and dried again to produce chitin powder. Then, the color removal stage uses acetone with a ratio of 1:10 (w/v). Dry for 2 hours at 28°C after soaking for 10 minutes. Chitin powder that has been obtained is bleached using 0.315% NaOCL then soaked for 5 minutes. The deacetylation stage of chitin powder uses 50% NaOH with a ratio of 1:20 (w/v) then heated for 3 hours-5 hours at a temperature of 80°C-100°C. Then chitin powder is washed with distilled water and 80% alcohol.

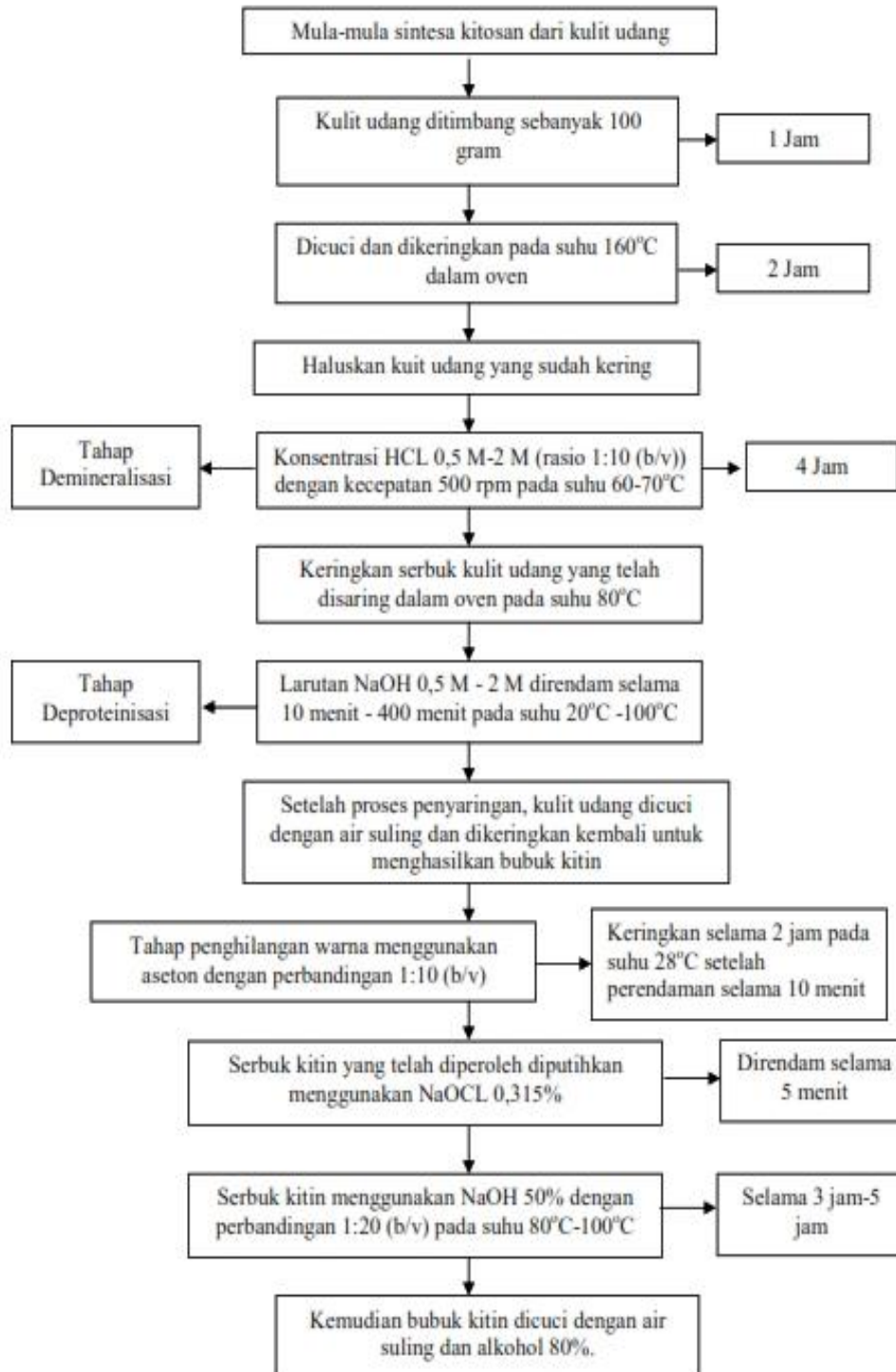
### **1. Vitamin E Moisturizing**

Vitamin E moisturizing ingredients used from the vitamin E manufacturing industry.

### **2. Persiapan Handsanitizer**

Mixing ethanol, glycerol and aloe vera extract using the aerosol technique. The use of the aerosol technique because in its use this technique has several advantages, namely more homogeneous, faster spreading, more precise dosage and more sanitary. Then add essential alcohol oil which functions as an antiseptic to kill viruses and bacteria. The essential oil used is made from ingredients with variations of mint, orange and lavender and has no side effects. [5]

Flow Chart



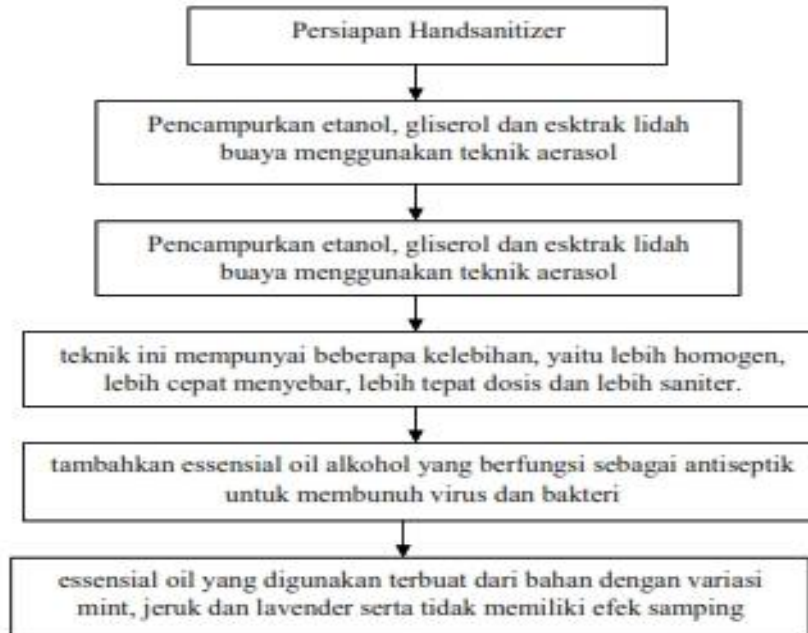


Figure 1. Flow Chart

Product Pictures:



Figure 2. YouCare Handsanitizer Product Images

The marketing target of YouCare handsanitizer products is expected to meet the local (regional) market spread especially in the Lhokseumawe area and its surroundings, including the following:



Pharmacy in Lhokseumawe



Public Hospital in Lhokseumawe



Alfamart in Lhokseumawe



Indomaret in Lhokseumawe



Pharmacy in Lhokseumawe



Retail pharmacy in Lhokseumawe

**Figure 3. Product Marketing Target**

## RESULTS AND DISCUSSION

Hand sanitizers usually contain alcohol, such as ethanol, as an active substance that works as an antiseptic. Other ingredients are water, fragrance, and glycerin. The use of this alcohol as the main antibacterial agent in hand sanitizers can cause negative effects for users including irritation of the hands to the throat and can even cause

digestive disorders, therefore hand sanitizers are needed that are halal, safe, made from natural ingredients, minimize the risk of irritation and other disorders, comfortable and certainly affordable by all levels of society. YouCare handsanitizer comes as a sanitizer that is dominated by antibacterial natural active ingredients, namely chitosan and aloevera extract content that is soft, safe and comfortable for users, and fragrant because it contains essential oils. The presence of Chitosan content reduces the alcohol content that is too strong but provides more effectiveness for its antimicrobial properties.

YouCare handsanitizer comes as a sanitizer that is dominated by antibacterial natural active ingredients, namely chitosan and aloevera extract content that is soft, safe and comfortable for users, and fragrant because it contains essential oils. The presence of Chitosan content reduces the alcohol content that is too strong but provides more effectiveness for its antimicrobial properties. The composition of this product consists of chitosan, alcohol, water, essential oil which functions as an antiseptic to kill viruses and bacteria. YouCare hand sanitizer uses aerosol technique in its use because this technique has several advantages, namely more homogeneous, faster spread, more precise dosage and more sanitary. In addition, because it is made from natural ingredients that are added fragrances and dyes from mint, orange and lavender and has no side effects. This natural hand sanitizer is packaged in a planned size of 50 ml. Even if it is eaten, it doesn't matter because the bacteria on the hands (TPC test result bacteria) are dead. Chitosan will bind free radicals in the intestine and can detoxify. In addition, it can moisturize the hands as well.

The product benefits of YouCare Hand sanitizer hand washing substitute that effectively kills bacteria and viruses which is dominated by antibacterial natural active ingredients, namely chitosan and aloevera extract content that is soft, safe and comfortable for users, and fragrant because it contains essential oils and is practical to carry anywhere and anytime.

**Table 1. Product Advantages and Disadvantages**

Aspects	CPPBT Products (YouCare-Handsanitizer)	Competitor 1 Chitasil	Competitor 2 Dettol
Active Ingredients	Chitosan, Aloevera dan ekstrak esential oil	Chitosan	Alkohol
Texture	Spray	Spray	Gel
Price	Rp. 15.000	Rp. 7.500	Rp. 30.000
Volume	100 ml	30 ml	100 ml

### Antimicrobial Test Results Data (PERCENTAGE KILL)

YouCare handsanitizer also conducts antimicrobial laboratory testing using the Scan 300 method, version 8.5.0.0 interscience with media conditions to be isolated at 24oC and bacterial incubation at 35oC. The results of antimicrobial tests can be seen that the use of YouCare Handsanitizer can kill microbes on the hands because it can be seen after using a handsanitizer the number of microbes that exist can be killed more. Microbial test results are as follows:

- a. Blank sample

**Table 2. Microbial Test: *Escherichia coli***

Contact Time	Initial number of microbes on the suspension	Number of Living Microbes	Presentation of Killed Microbes
	CFU/ml	CFU/ml	%
30 seconds	0	0,000E+00	-
60 seconds		0,000E+00	-

**Table 3. Microbial Test: *Staphylococcus aureus***

Contact Time	Initial number of microbes on the suspension	Number of Living Microbes	Presentation of Killed Microbes
	CFU/ml	CFU/ml	%
30 seconds	0	0,000E+00	-
60 seconds		0,000E+00	-

1. Sample After Bacterial Contact (LOAD)

**Table 4. Mikrobial Test: *Escherichia coli***

Contact Time	Initial number of microbes on the suspension	Number of Living Microbes	Presentation of Killed Microbes
	CFU/ml	CFU/ml	%
30 seconds	9	9,073E+00	91
60 seconds		9,073E+00	91

**Table 5. Mikrobial Test: *Staphylococcus aureus***

Contact Time	Initial number of microbes on the suspension	Number of Living Microbes	Presentation of Killed Microbes
	CFU/ml	CFU/ml	%
30 seconds	8	9,035E+00	90
60 seconds		9,035E+00	90



2. Samples are given a handsanitizer (PASCA)

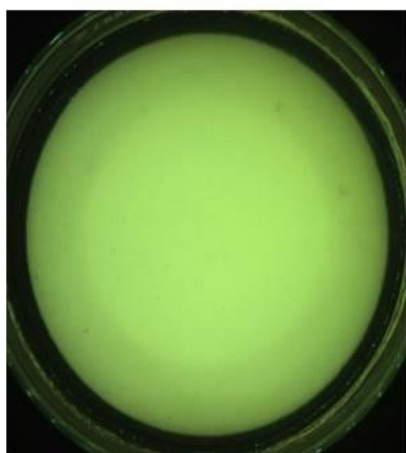
**Table 6. Mikrobial Test : *Escherichia coli***

Contact Time	Initial number of microbes on the suspension	Number of Living Microbes	Presentation of Killed Microbes
	CFU/ml	CFU/ml	%
30 seconds	1	0,735E+00	92
60 seconds		0,735E+00	92

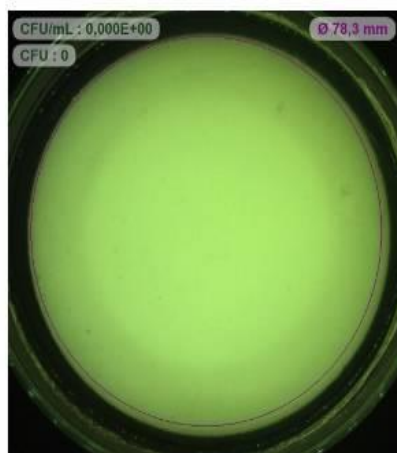
**Table 7. Mikrobial Test : *Staphylococcus aureus***

Contact Time	Initial number of microbes on the suspension	Number of Living Microbes	Presentation of Killed Microbes
	CFU/ml	CFU/ml	%
30 seconds	1	0,302E+00	97
60 seconds		0,302E+00	97

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Sample

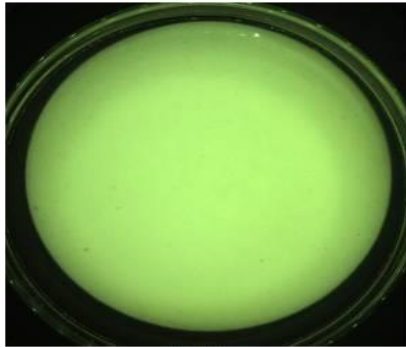


Sample analysed with SCAN 300@, version 8.5.0.0

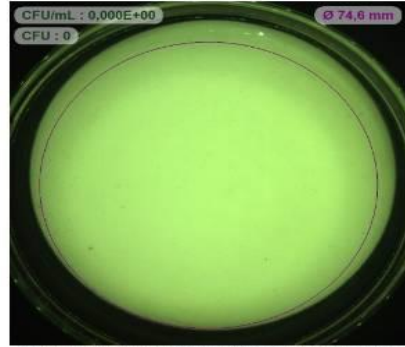
Validated by : DELL	Sample N° : 2	CFU/mL : 0,000E+00
Date Time : 02/15/2022 15:21:04	Count : 0	Dilution : 1
Parameters : Staphylococcus	Area (%) : 82,855400	CFU Prorata : 0
Comment : OK		

Session : Counter Session1

interscience



Sample

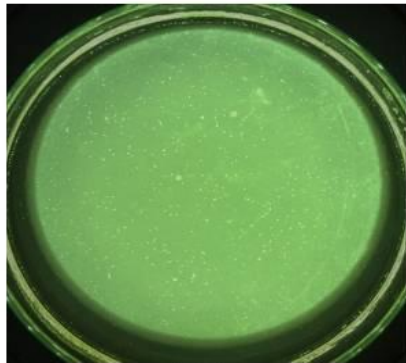


Sample analysed with SCAN 300@, version 8.5.0.0

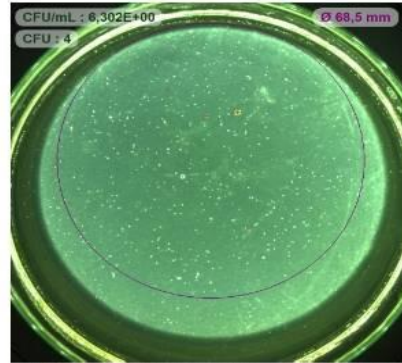
Validated by :	DELL	Sample N° :	1	CFU/mL :	0,000E+00
Date Time :	02/15/2022 15:20:45	Count :	0	Dilution :	1
Parameters :	Coliforms	Area (%) :	75,286255	CFU Prorata :	0
V (mL) :		1,000000			
Comment :					
OK					

Session : Counter Session1

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Sample

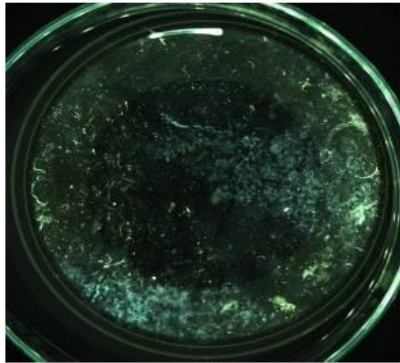


Sample analysed with SCAN 300@, version 8.5.0.0

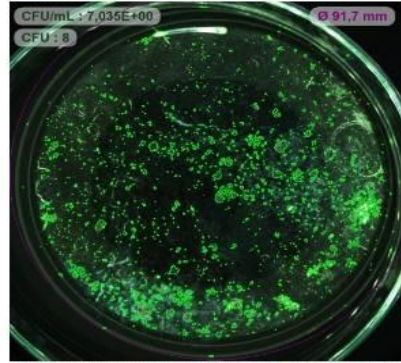
Validated by :	DELL	Sample N° :	1	CFU/mL :	0,302E+00
Date Time :	02/15/2022 14:54:45	Count :	1	Dilution :	1
Parameters :	Staphylococcus	Area (%) :	63,476540	CFU Prorata :	0
V (mL) :		1,000000			
Comment :					
OK					
With halo :		1 CFU	0,575E+00		
Without halo :		1 CFU	0,726E+00		

Session : Counter Session1

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Sample

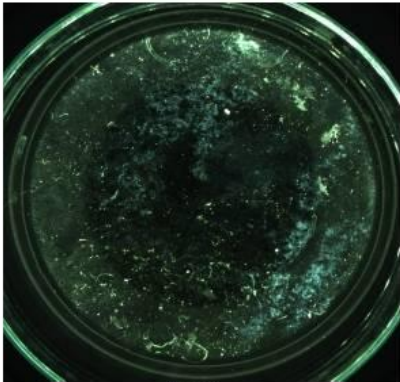


Sample analysed with SCAN 300@, version 8.5.0.0

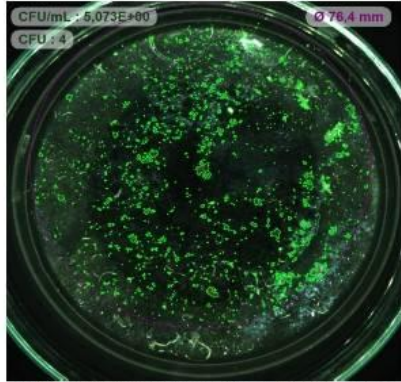
Validated by :	DELL	Sample N° :	1	CFU/mL :	7,035E+00
Date Time :	02/15/2022 09:41:06	Count :	8	Dilution :	1
Parameters :	Staphylococcus	Area (%) :	113,710251	CFU Prorata :	7
Comment :					
Nb CFU < 30					

Session : Counter Session1

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Sample

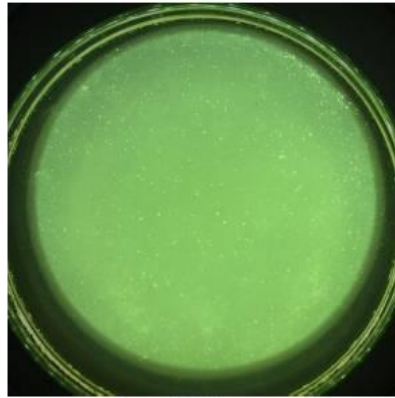


Sample analysed with SCAN 300@, version 8.5.0.0

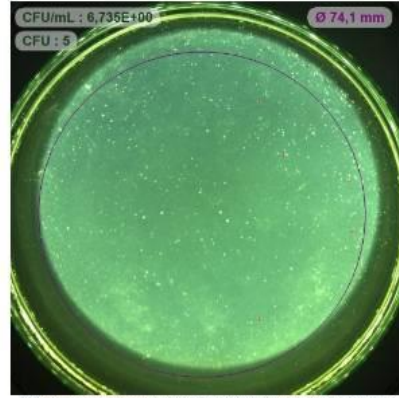
Validated by :	DELL	Sample N° :	1	CFU/mL :	5,073E+00
Date Time :	11/30/2020 10:10:25	Count :	4	Dilution :	1
Parameters :	Coliforms	Area (%) :	78,845390	CFU Prorata :	5
Comment :					
Nb CFU < 30					

Session : Counter Session1

interscience



Sample



Sample analysed with SCAN 300®, version 8.5.0.0

Validated by :	DELL	Sample N° :	2	CFU/mL :	6,735E+00
Date Time :	02/15/2022 14:57:28	Count :	5	Dilution :	1
Parameters :	Coliforms	Area (%) :	74,234543	CFU Prorata :	7
<b>Comment :</b> OK		With halo : 0 CFU 0,000E+00 Without halo : 5 CFU 6,735E+00			

Session : Counter Session1

**Figure 4. Antimicrobial Test Results**

## CONCLUSION

Hand Sanitizer is a hand sanitizer that has antibacterial ability to inhibit and kill bacteria practically without having to wash hands. YouCare handsanitizer comes as a sanitizer that is dominated by antibacterial natural active ingredients, namely chitosan and moisturizing vitamin E content that is soft, safe and comfortable for users, and fragrant because it contains essential oils. The composition of this product consists of chitosan, alcohol, water, alcohol essential oil which functions as an antiseptic to kill viruses and bacteria. In addition, because it is made from natural ingredients that are added fragrances and dyes from mint, orange and lavender and has no side effects. YouCare hand sanitizer has two types of hand sanitizers, namely hand sanitizer gel and hand sanitizer spray. This natural hand sanitizer is packaged in different sizes of 50 ml, 100 ml and 250 ml.

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