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## Disinfectan from Sodium Hypochloride And Essential Oil Prevents Covid-19

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### ABSTRACT

One of the efforts to prevent the transmission of COVID-19 is by disinfection of places/surfaces of inanimate objects such as door handles, tables, chairs, electric switches, banisters, bathrooms and others. The material that can be used to disinfect the surface of inanimate objects is NaOCl. The use of high-effectiveness NaOCl for disinfecting at low cost and easy use. NaOCl product on the market are generally only pure solutions without the addition of other ingredients so that the resulting NaOCl product give a distinctive odor of NaOCl which is sharp and hard to lose, so in this study, the addition of essential oils from fresh ginger and lemongrass which have anti-bacterial effectiveness for scent NaOCl covered. This research is an experimental research conducted at the Laboratory of Pharmaceutical Technology, University of Muhammadiyah Lamongan. The working procedure in this study is to make extracts from fresh ginger and lemongrass with maceration method by making NaOCl disinfectant solution with liquid extract from fresh ginger and lemongrass were then observed every month for 3 months in the study in the form of testing on alcohol levels and organoleptic of observations on color, odor and sediment. The results of this study showed that the disinfectant solution based on NaOCl with the addition of essential oils contained in the liquid extract of fresh ginger and lemongrass made by maceration method can change the scent of the product. The results of this formulation can be used as an alternative to disinfectants on the market.

Keywords: Preventing Covid; NaOCl; essential oil, fresh ginger, lemongrass

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## INTRODUCTION

The 2019 corona virus infection (COVID-19) pandemic is a problem that the world is currently facing. There are data on deaths of 387,155 cases worldwide from 6,535,354 cases<sup>1</sup>. Indonesia is one of the countries worst affected by COVID-19. The death rate from COVID-19 in Indonesia in early June 2020 reached 1,770 cases out of 29,521 positive cases of COVID-19<sup>2</sup>. Common symptoms of COVID-19 are fever, cough, fatigue, headache, haemoptysis, diarrhea, dyspnoea and lymphopenia<sup>3</sup>.

COVID-19 can be transmitted from human to human through coughing/sneezing droplets. People who are most at risk of contracting this disease are people who are in close contact with COVID-19 patients. Recommendations standard to prevent the spread of infection are washing hands regularly with soap and clean water, applying etiquette cough and sneezing, avoiding direct contact with livestock and wild animals and avoiding close contact with anyone showing symptoms of respiratory disease such as coughing and sneezing. In addition, implementing Infection Prevention and Control while in health facilities, especially emergency units<sup>4</sup>.

Efforts to prevent the spread of COVID-19 in Indonesia have been carried out in all regions. Among them are by providing policies to limit activities outside the home, school at home, work from home, closing places of worship, closing public facilities, closing road access, etc. This is a government policy based on considerations that have been analyzed to the maximum<sup>5</sup>. In addition to preventing the spread of COVID-19 carried out for people and areas, it is also necessary to prevent the surrounding environment, one of which is by disinfecting inanimate places/surfaces such as doorknobs, tables, chairs, electric switches, banisters, bathrooms, etc<sup>6</sup>.

One of the materials that can be used for disinfection of inanimate surfaces is sodium hypochloride (NaOCl). The use of NaOCl has a high effectiveness as a disinfectant with low cost and easy use<sup>7</sup>. NaOCl with a concentration of more than 2.5% has broad spectrum antibacterial effectiveness<sup>8,9</sup>. The NaOCl product on the market are generally only pure solutions without the addition of other ingredients so that The resulting NaOCl product give a distinctive sharp odor and are difficult to remove, so in this study the addition of essential oil from fresh ginger and lemongrass rhizomes which have antibacterial effectiveness so that the sharp aroma of NaOCl is covered.

## METHOD

Research design in this study is experimental research. This research was conducted at the Laboratory of Pharmaceutical Technology, Universitas Muhammadiyah Lamongan in May-December 2020. The tools used are; beaker glass, stirring rod, measuring cup, funnel, alcohol meter and analytical balance. While the materials used in this study were NaOCl, fresh ginger rhizome, lemongrass, 70% alcohol, 96% alcohol and aquadest. The working procedures in this study are; prepare all the materials needed to make extracts from fresh ginger rhizomes and lemongrass by maceration method, make product of NaOCl disinfectant solution with the addition of liquid extract of fresh ginger rhizomes and

lemongrass and then observe every month on the product in the form of testing the alcohol percentage and organoleptic in the form of observations on color, odor and sediment for 3 months.

## RESULTS

Alcohol percentage testing was carried out on both extracts and obtained alcohol percentage <70% so that in the manufacture of both extracts 96% alcohol was added until the alcohol percentage in the extract became 70%. The results obtained were that the alcohol percentage in both product at months 1-3 remained stable at 70%. This happened possibly because the product was tightly closed and only opened during testing. The resulting product has a nice odor and can mask the odor of NaOCl. The odor of the product has a nice odor of the added extract and does not change until 3 months of observation. At the first product which ginger rhizome extract was added it was slightly cloudy, while the product with lemongrass extract was clearer even though both had sediment. On observations at months 1-3, both product were clear with a sediment. The longer the storage, the more sediment, especially in product with the addition of ginger rhizome extract.

## DISCUSSION

The disinfectant solution in this study has a composition of sodium hypochloride with a concentration of 0.5% and liquid extract of fresh ginger rhizome and liquid extract of lemongrass up to 100%. This composition was made because according to a study showed that the combination of 0.5% sodium hypochloride with 70% alcohol on examination using blood agar plate and McConkey media did not show the growth of bacterial colonies<sup>10</sup>. Other studies have shown that COVID-19 can be inactivated using 62-71% alcohol or 0.1% sodium hypochloride within 1 minute<sup>11</sup>. Decontamination with 0.5% chlorine solution combined with 70% alcohol disinfectant is better at inhibiting the growth of microorganisms. Both are ingredients that work by inactivating enzymes, denaturing proteins and inactivating nucleic acids<sup>12</sup>.

The results of this study found that the disinfectant solution with the ingredient of sodium hypochlorid with the addition of essential oil contained in the liquid extract of ginger and lemongrass was made by the maceration method. Fresh ginger rhizome extract was made by maceration method using solvent 96% alcohol for 3 days with a ratio of 1:10. Remaceration was carried out 2 times. Ginger rhizome has the Latin name *Zingiber officinale var. officinarum*. Fresh extract of ginger rhizome contains several volatile oil components consisting of  $\alpha$ -pinena, kamfena, kariofilena,  $\beta$ -pinena,  $\alpha$ -farnesena, sineol, dl-kamfor, isokaryophyllene, caryophylleneoxide, and germacron which can produce antimicrobials to inhibit microbial growth. In a study conducted by Dianasari, it showed that fresh ginger rhizome extract had inhibitory activity against *S. aureus*, the higher the concentration, the higher the inhibitory power<sup>131415</sup>. Ginger also be used to inhibit fungal growth because it contains gingerol,

gingerdiol and zingerone compounds<sup>16</sup>. A study conducted by Sari showed that fresh extract of elephant ginger rhizome had the highest inhibition area on *Candida albicans*<sup>15</sup>.

Citronella extract was made by maceration of lemongrass leaves for 48 hours with solvent 70% alcohol. The leaf components were chosen because the compounds contained in the leaves have more polar properties, thus the extract produced is more than the compounds contained in the stems. The chemical content of lemongrass is essential oil, saponins, polyphenols and flavonoids<sup>17</sup>. The content of these active compounds indicates that lemongrass has considerable antibacterial activity. The dominant compounds for the antibacterial effect of lemongrass are polyphenol compounds and other phenolic compounds and their derivatives which can cause protein denaturation. Flavonoid compounds function as antibacterial by forming complex compounds with extracellular proteins. The complex formed disrupts the integrity of the bacterial cell membrane by denaturing bacterial cell proteins and damaging the cell membrane irreparably. Lemongrass plants contain saponin compounds. These compounds have been shown to be effective in inhibiting the growth of Gram-positive bacteria<sup>18</sup>.

## CONCLUSIONS

The results of this study found that a disinfectant NaOCl solution with the addition of essential oil contained in the liquid extract of fresh ginger and lemongrass rhizomes made by the maceration method can change the odor of the solution. The product have not been tested on surfaces contaminated with the COVID-19 virus, so for further research, the test can be carried out. The resulting product has sediment so it is advisable to precipitate it before use and it is better to filter it first when making this product because the sediment needs to be removed because it will leave stains when applied to the surface being disinfected.

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