



THE EFFICACY OF ESSENTIAL OILS AND ESSENTIAL OIL-BASED DISINFECTANTS AGAINST SARS CoV-2

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INTRODUCTION

Humans have turned to plants and plant extracts for medical purposes for most of recorded history. In recent years, essential oils have become increasingly popular and have been shown in several studies to exert positive antibacterial and antiviral effects¹. In the face of a worldwide pandemic, we endeavored to explore the efficacy of essential oils and essential oil-based disinfectants on the SARS-CoV-2 virus. We tested clove oil, two mixtures of oils (Mix. 1 and Mix. 2), and two disinfectants infused with those mixtures (D. 1 and D. 2). The mixtures we used were composed of clove, lemon, cinnamon, eucalyptus, and rosemary oils (mixture 1), and citronella, lavandin, lemongrass, myrtle, rosemary, and tea tree oils (mixture 2).

RESEARCH QUESTION

What are the inactivation kinetics of clove oil, mixture 1, mixture 2, and disinfectants infused with mixture 1 on SARS-Cov-2, when the virus is dried onto a glass carrier?

METHODS

- Disinfectant efficacy was determined using a disc-based carrier quantitative kill-time assay.
- Virus was dried onto glass carrier discs and then exposed to each agent for a specific time.
- The oil or disinfectant was neutralized with a custom neutralizer formulation, and virus was removed from the disc into a suspension, which was serially diluted in PBS.
- Selected dilutions were assayed for infectious virus using a standard plaque assay and Vero cells.
- After three days, the infection process was halted, virus and monolayers were fixed and stained, and plaques were counted.
- Controls included viral titers as well as negative and neutralizer controls.

RESULTS

ABBREVIATIONS AND PRODUCT INGREDIENTS	
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C. oil	Clove oil
Mix. 1	Clove oil, Lemon peel oil, Cinnamon bark oil, Eucalyptus leaf oil, Rosemary leaf oil
Mix. 2	Citronella oil, Rosemary oil, Lemongrass oil, Tea tree oil, Lavandin oil, Myrtle oil
D. 1	65% ethyl Alcohol, Clove oil, Lemon peel oil, Cinnamon bark oil, Eucalyptus leaf oil, Rosemary leaf oil
D. 2	Denatured alcohol, Clove oil, Lemon peel oil, Cinnamon bark oil, Eucalyptus leaf oil, Rosemary leaf oil

Table 1: list of the products tested, and the abbreviations used to identify each product.

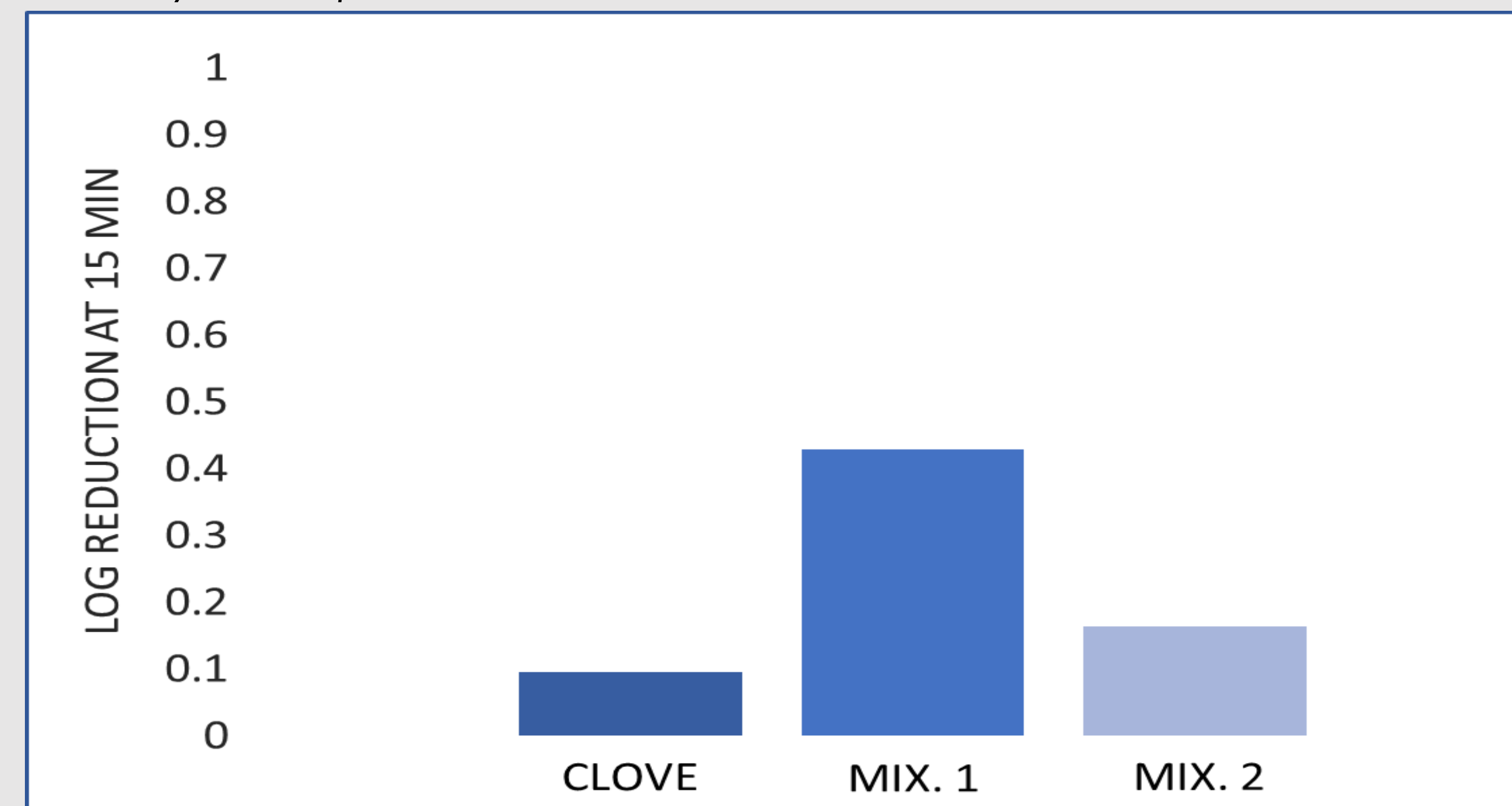


Figure 1: Maximum log reduction in SARS-CoV-2 particles caused by clove oil, mix. 1, and mix. 2 after 15 min of contact time

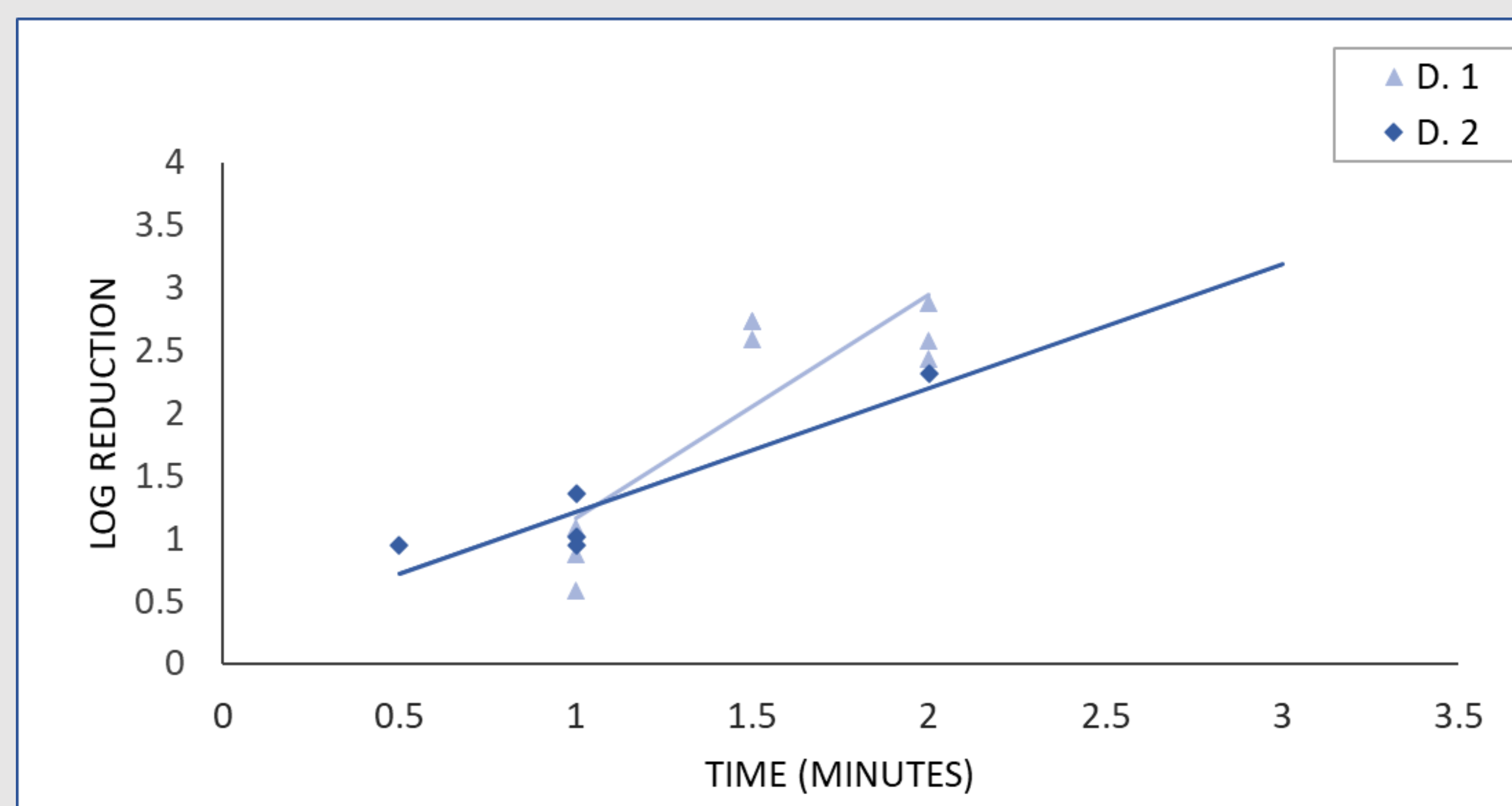


Figure 2: Log reduction caused by essential oil infused disinfectants D. 1 and D. 2 over 3 minutes of contact time.

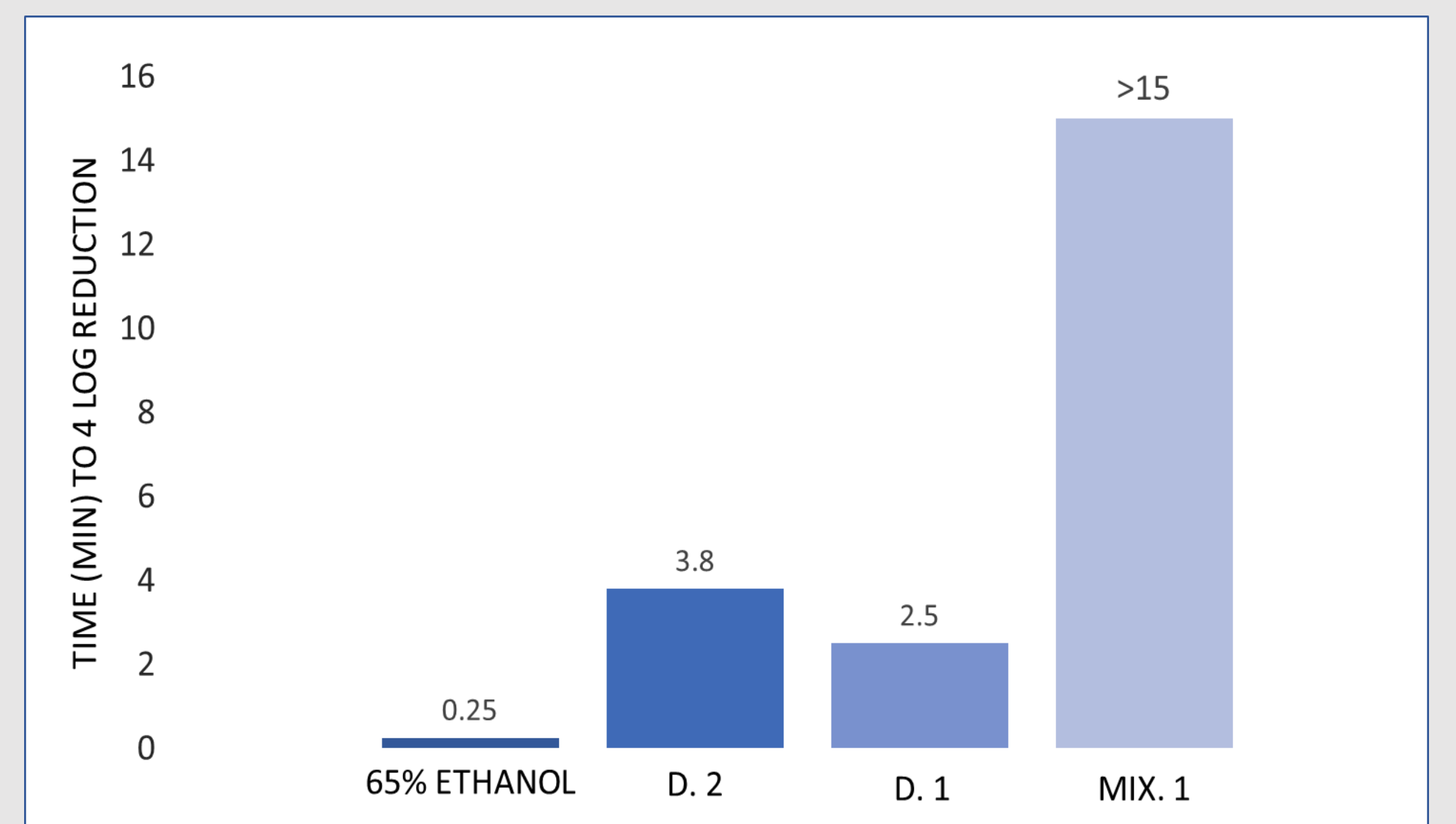


Figure 1: Comparison of the time to a 4-log reduction between ethanol, D. 1, D. 2, and Mix. 1.

CONCLUSIONS

- Disinfectant D. 1 was found to be the most effective with a 2.5 minute time to a 4-log reduction.
- Disinfectant D. 2 was the next most effective with a 3.8 minute time to a 4-log reduction.
- All the oils, C., Mix. 1, and Mix. 2 were ineffective. At 15 minutes they had caused minimal reduction in viral particles.
- Time points past 15 minutes were considered impractical and were not tested.
- Further testing will be carried out to reduce error and confirm results.

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