

A herbal hand sanitizer with minimal alcohol and *Mimosa pudica* leaves - a preliminary investigation

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Introduction and Objectives: The recommended hand sanitizer of the World Health Organization (WHO-HS) is composed of 75% isopropyl alcohol, 1.45% glycerol, 0.125% (v/v) hydrogen peroxide and distilled water. Though isopropyl alcohol above 60% effectively kills microorganisms, alcohol tends to excessively dry the skin. However, decreasing it could decrease the potency of the sanitizer. The aim of the current study was to develop a herbal hand sanitizer with reduced levels of alcohol with the incorporation of a plant component, *Mimosa pudica* Linn. [Nidikumba (S) Tottal-vadiin (T)] known for its medicinal properties.

Methods: An alcoholic extract of fresh leaves of *M. pudica* was prepared by vacuum infiltration. The herbal hand sanitizer was prepared by combining the crude alcoholic extract of *M. pudica* with 40% isopropyl alcohol, 5% glycerol and distilled water. To determine the minimum inhibitory concentration (MIC) of *M. pudica*, a well diffusion assay using Mueller Hinton agar was conducted for the hand sanitizer containing *M. pudica* leaf extract at five different concentrations (100000, 50000, 10000, 5000, and 1000 mg/L), a negative control (40% isopropyl alcohol, 5% glycerol and distilled water) and positive control (WHO-HS), using *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Staphylococcus aureus* ATCC 25923, *Candida albicans* ATCC 10231 and *Candida tropicalis* ATCC 13803 as the test microorganisms (2 trials, 4 replicates).

Results:

Table: Mean radius of zone of inhibition in millimeters (mm).

Test microorganism	Mean zone of inhibition (mm)			Positive control (WHO-HS)
	Concentration of <i>M. pudica</i> leaf extract in hand sanitizer (mg/L)			
	100,000	50,000	10,000 (MIC)	
<i>S. aureus</i>	5.53±1.03	3.22±0.63	1.82±0.91*	4.46±0.71
<i>P. aeruginosa</i>	5.31±0.92	3.63±1.25	2.59±1.15*	3.97±0.50
<i>E. coli</i>	1.93±0.32	1.46±0.53	1.40±0.75*	2.69±0.58
<i>C. tropicalis</i>	3.03±1.03	2.59±0.70	2.36±1.28	3.44±0.55
<i>C. albicans</i>	3.50±0.85	3.00±1.03	2.59±0.73	3.69±0.91

MIC – Minimum Inhibitory Concentration

*Significant difference ($p=0.05$) between corresponding mean of WHO-HS.

Conclusions: A hand sanitizer with 10,000 mg/L of *M. pudica* leaf extract and 40% isopropyl alcohol is effective in inhibiting all five test organisms and is comparable to the WHO-HS.

Key words: *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Candida* spp.

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