

An Adaptation of The World Health Organization Recommended Handrub Formulations

Objective:

Due to a shortage of hand sanitizers, we are producing our own. We've adapted the WHO's handrub formula to create a small test batch. We're using corresponding weight measurements instead of volumetric measurements.

Source: [World Health Organization \(WHO\): Guide to Local Production](#)

Original file location: (https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf)

Sample file location: thelazybeetle.com/who-handrub

Recommended Amounts (for 10 L Preparations):

FORMULATION 1

(Ethanol)	mL	Percentage
• Ethanol 96%	8,333	83.33%
• Hydrogen peroxide 3%	417	4.17%
• Glycerol 98%	145	1.45%
• Distilled water	1,105	11.05%
	<hr/> 10,000	<hr/> 100.00%

Final Concentrations:

- Ethanol 80% (v/v)
- Glycerol 1.45% (v/v)
- Hydrogen peroxide 0.125% (v/v)

Amounts Adjusted by Weight for 138 mL Preparation

SAMPLE FORMULATION	mL	g
• Ethanol 95%	115	90.00
• Hydrogen peroxide 3%	6	8.66
• Vegetable Glycerin 99%	2	2.50
• Distilled water	15	15.00
	<hr/> 138	<hr/> 116.16

Final Concentrations:

- Ethanol 79% (v/v)
- Glycerol 1.45% (v/v)
- Hydrogen peroxide 0.125% (v/v)

Quality Control

1. Pre-production analysis should be made every time an analysis certificate is not available to guarantee the titration of alcohol (i.e. local production). Verify the alcohol concentration with the alcoholmeter and make the necessary adjustments in volume in the preparation formulation to obtain the final recommended concentration.
2. Post-production analysis is mandatory if either ethanol or an isopropanol solution is used. Use the alcoholmeter to control the alcohol concentration of the final use solution. The accepted limits should be fixed to $\pm 5\%$ of the target concentration (75%–85% for ethanol).
3. The alcoholmeter shown in this information pamphlet is for use with ethanol; if used to control an isopropanol solution, a 75% solution will show 77% ($\pm 1\%$) on the scale at 25°C.

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Materials Required

- 10-litre glass or plastic bottles with screw-threaded stoppers (1), *OR*
- 50-litre plastic tanks (preferably in polypropylene or high density polyethylene, translucent so as to see the liquid level) (2), *OR*
- Stainless steel tanks with a capacity of 80–100 litres (for mixing without overflowing) (3 , 4)
- Wooden, plastic or metal paddles for mixing (5)
- Measuring cylinders and measuring jugs (6 , 7)
- Plastic or metal funnel
- 100 ml plastic bottles with leak-proof tops (8)
- 500 ml glass or plastic bottles with screw tops (8)
- An alcoholometer: the temperature scale is at the bottom and the ethanol concentration (percentage v/v) at the top

Step-by-Step Preparation

PROCEDURE	FORMULATION MATERIAL
1 The alcohol for the formula to be used is poured into the large bottle or tank up to the graduated mark.	Ethanol 96%
2 Hydrogen peroxide is added using the measuring cylinder.	Hydrogen peroxide 3%
3 Glycerol is added using a measuring cylinder. As glycerol is very viscous and sticks to the wall of the measuring cylinder, it should be rinsed with some sterile distilled or cold boiled water and then emptied into the bottle/tank.	Glycerol 98%
4 The bottle/tank is then topped up to the 10-litre mark with sterile distilled or cold boiled water.	Distilled water
5 The lid or the screw cap is placed on the tank/bottle as soon as possible after preparation, in order to prevent evaporation.	
6 The solution is mixed by shaking gently where appropriate or by using a paddle.	
7 Immediately divide up the solution into its final containers (e.g. 500 or 100 ml plastic bottles), and place the bottles in quarantine for 72 hours before use. This allows time for any spores present in the alcohol or the new/re-used bottles to be destroyed.	