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WHO-recommended handrub formulations

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Coronavirus Method Development Community

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ABSTRACT

Composition of alcohol-based formulations for in-house/local production

The choice of components for WHO handrubs takes into account both cost constraints and microbiological efficacy. The procurement of raw ingredients will be influenced by the availability of sub-standard materials on the market and it is important to select local sources with care.

The following two alcohol-based handrub formulations are recommended for preparation in-house or in a local production facility, up to a maximum of 50 litres:

Formulation 1
To produce final concentrations of ethanol 80% v/v, glycerol 1.45% v/v, hydrogen peroxide (H2O2) 0.125% v/v.

Formulation 2
To produce final concentrations of isopropyl alcohol 75% v/v, glycerol 1.45% v/v, hydrogen peroxide (H2O2) 0.125% v/v: Only pharmacopoeial quality reagents should be used (e.g. The International Pharmacopoeia) and not technical grade products

EXTERNAL LINK

https://www.who.int/gpsc/information_centre/handrub-formulations/en/

GUIDELINES

For additional information please see the Guide to Local Production: WHO-recommended Handrub Formulations.

MATERIALS TEXT

REAGENTS FOR FORMULATION 1:	REAGENTS FOR FORMULATION 2:
• Ethanol 96%	• Isopropyl alcohol 99.8%
• Hydrogen peroxide 3%	• Hydrogen peroxide 3%
• Glycerol 98%	• Glycerol 98%
• Sterile distilled or boiled cold water	• Sterile distilled or boiled cold water

- 10-litre glass or plastic bottles with screw-threaded stoppers, or
- 50-litre plastic tanks (preferably in polypropylene or high density polyethylene, translucent so as to see the liquid level), or
- Stainless steel tanks with a capacity of 80–100 litres (for mixing without overflowing)

- Wooden, plastic or metal paddles for mixing
- Measuring cylinders and measuring jugs
- Plastic or metal funnel
- 100 ml plastic bottles with leak-proof tops

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- 500 ml glass or plastic bottles with screw tops
- An alcoholometer: the temperature scale is at the bottom and the ethanol concentration (percentage v/v) at the top

- Glycerol: used as humectant, but other emollients may be used for skin care, provided that they are cheap, widely available and miscible in water and alcohol and do not add to toxicity, or promote allergy.
- Hydrogen peroxide: used to inactivate contaminating bacterial spores in the solution and is not an active substance for hand antisepsis.
- Any further additive to both formulations should be clearly labelled and be non-toxic in case of accidental ingestion.
- A colorant may be added to allow differentiation from other fluids, but should not add to toxicity, promote allergy, or interfere with antimicrobial properties. The addition of perfumes or dyes is not recommended due to risk of allergic reactions.

1 Method for **10 L** preparations

These can be prepared in 10-liter glass or plastic bottles with screw-threaded stoppers.

step case

FORMULATION 1

Alcohol: Ethanol 96%

2 Pour **8333 ml Ethanol 96%** into the large bottle or tank up to the graduated mark.

3 Add **417 ml Hydrogen peroxide 3%** using the measuring cylinder.

4 Add **145 ml Glycerol** 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.

5 Top the bottle/tank up to the 10-liter mark with sterile distilled or cold boiled water.

6 Place the lid or the screw cap on the tank/bottle as soon as possible after preparation, in order to prevent evaporation.

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7 

Mix the solution by shaking gently where appropriate or by using a paddle.

8 Immediately divide up the solution into its final containers.

E.g. 500 or 100 ml plastic bottles.

9 Place the bottles in quarantine for **72:00:00** before use.

This allows time for any spores present in the alcohol or the new/re-used bottles to be destroyed.

step case

FORMULATION 2

Alcohol: Isopropyl alcohol 99.8%

2 Pour **7515 ml Isopropyl alcohol 99.8%** into the large bottle or tank up to the graduated mark.

3 Add **417 ml Hydrogen peroxide 3%** using the measuring cylinder.

4 Add **145 ml Glycerol** 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.

5 Top the bottle/tank up to the 10-liter mark with sterile distilled or cold boiled water.

6 Place the lid or the screw cap on the tank/bottle as soon as possible after preparation, in order to prevent evaporation.

7 

Mix the solution by shaking gently where appropriate or by using a paddle.

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