

Tea Tree Hand Sanitizer Gel

1. **Objective:** The purpose is to synthesize cosmetics using raw materials to cleanse, beautify, enhance charm, alter appearance, or maintain skin and hair freshness.

2. **Experimental Skills:** Understanding the chemical properties of various synthetic cosmetic ingredients and learning to produce various cosmetics using different formulations.

3. **Principles:**

(a) **Humectants:** Most humectants contain hydroxyl groups. Apart from moisturizing the skin, they also aid in the solubility of pigments and fragrances in cosmetic formulations. They help bind moisture to the skin, prevent moisture from evaporating from the skin surface, and prevent cosmetics from drying out. They are usually colorless liquids with no odor, completely soluble in water, and commonly found in cosmetics such as toners, lotions, and creams.

(b) **Vitamins:**

*Fat-soluble Vitamin E: It is added to cosmetics for its anti-aging properties and moisturizing function. It also promotes blood circulation.

*Vitamin H: It moisturizes hair and promotes growth, often found in hair care products.

*Vitamin C: Historically used as a whitening agent, recent studies suggest its addition to sunscreens due to its antioxidant properties. While not a substitute for UV absorbers, its ability to neutralize harmful free radicals in the skin aids in skin recovery after sun exposure, protecting the skin from damage.

(c) **Emulsifiers:**

*Anionic surfactants (ANIONICS): These surfactants have a negatively charged interface after dissociation. They are typically used for cleaning, emulsification, and foaming.

*Cationic surfactants (CATIONICS): These surfactants have a positively charged interface after dissociation. They are typically used for antistatic properties, softening hair, increasing adhesion to the skin and hair. Some also have foaming, cleaning, and antibacterial effects.

4. and Materials:

Balance, beakers (200 mL, 2), graduated cylinders (10 mL, 2), graduated cylinder (50 mL, 1), hot plate stirrer, glass rod, spatula, filter paper, pressure bottle (50 mL, 1), cosmetic container (50 mL, 1).

5. Chemicals:

Glycerol (Glycyl Alcohol, $C_3H_8O_3$), Polymer gel Carbopol 940

Emulsifier: T-80 , Tea tree essential oil Alcohol (C_2H_5OH) , Triethanolamine

6. Procedure:

1. Weigh 0.2g of polymer gel Carbopol 940.
2. Add 15mL of RO water.
3. Stir at room temperature for 20 minutes.
4. Add 40mL of alcohol.
5. Stir until uniformly mixed and transparent.
6. Add 2~3 drops of triethanolamine, stirring until it solidifies (approximately 5 minutes).
7. Add 3 drops of tea tree essential oil.
8. transfer the mixture into a 50mL pressure bottle.

