

073206T4CHE

CHEMICAL ENGINEERING TECHNOLOGY LEVEL 6

ENG/OS/CE/CR/04/6

Prepare Process Raw Materials

July/August 2025



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

PRACTICE ASSESSMENT

Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE:

1. You are required to perform the following tasks:
 - i. **Task 1:** prepare Sample.
 - ii. **Task 2:** Extract cottonseed oil from cotton seeds using Soxhlet apparatus and hexane.
 - iii. **Task 3:** Maintain housekeeping as per SOP.
2. You have been provided with the following resources for the practical tasks:
 - 50 g of cotton seeds
 - 100 ml solvent (hexane)
 - Soxhlet extractor
 - Heating source
 - Round bottom flask
 - Analytical balance

- Beaker
- Drying plate
- Mortar and pestle or a mechanical grinder
- Tap water
- Leather gloves
- Cleaning towels
- Dust mask
- Safety goggles
- Stopwatch
- Safety boots

Procedure

Sample Preparation

1. Weigh 50g of cotton seeds
2. Grind the cotton seeds to a fine powder using a mortar and pestle or a mechanical grinder.
3. Give a reason why the cotton seeds
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Extraction Process

1. Place the ground cotton seed material into the thimble
2. Add 100 ml of hexane solvent to the round-bottom flask.
3. Heat the solvent in the round-bottom flask.
4. Note and start the timer when the solvent begins to boil
5. Allow the extraction cycle to continue until solvent runs clear when it returns to the flask
6. After the extraction is complete (1 hour), turn off the heat and allow the Soxhlet apparatus to cool
7. Carefully remove the round-bottom flask containing the solvent-oil mixture from the apparatus.
8. Evaporate the solvent from the extracted oil by gently heating the round-bottom flask for 20 minutes
9. After the evaporation is complete, allow the oil to cool to room temperature

10. Weight an empty beaker and record the weight as W_o
11. Transfer the purified oil to the empty beaker and record its weight (W_1)
12. Determine the weight of the purified oil (W_2)
- weight of extracted oil.....
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13. Calculate the percentage yield of the extracted oil

$$\text{Percentage yield} = \frac{\text{Weight of cotton seeds} - \text{Weight of extracted oil}}{50} \times 100$$

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Task 2: Maintain housekeeping as per SOP