REPUBLIC OF ALGERIA
Ministry of Higher Education and Scientific Research
University Yahia Fares Of Medea
Department of Process Engineering and Environment
Pharmaceutical Process Engineering

Level: 3rd Year License **Academic Year: 2025 / 2026**
Module: Pharmaceutical chemistry **Teacher: Mrs. ATCHI CHAHINEZ**

Separation method (Liquid-liquid extraction)

Objective:

Extraction of iodine from an iodine solution (Betadine, alcoholic iodine) using cyclohexane as the solvent.

Introduction:

Extractions are widely used in analytical chemistry to separate mixtures.

The liquid-liquid extraction method is based on the different affinities of a solute between two immiscible liquid phases. It involves transferring a substance from one liquid phase (containing the solute) to another (the solvent).

Solvent extraction is a selective technique that depends on the solubility of the target substance in a chosen solvent, which must be immiscible with the other liquid and easily dissolve the solute.

Several important criteria must be taken into account when choosing a suitable solvent in order to achieve an effective and selective extraction process.

Experimental Procedure:

- Measure 20 mL of Betadine solution (or alcoholic iodine solution) and transfer it into a separating funnel.
- Add 10 mL of cyclohexane to the funnel.
- Shake the mixture gently for 2–3 minutes, periodically venting to release pressure.
- Allow the mixture to stand until two distinct layers form.
- Carefully separate the cyclohexane layer (upper layer) containing the extracted iodine.
- Measure the absorbance of the cyclohexane layer using a UV-Vis spectrophotometer at a wavelength of 520 nm

Discussion questions:

1. Explain briefly the principale of liquid-liquid extraction.
2. What properties should an extraction solvent possess?
3. State the main observations made before extraction, during mixing, and after phase separation.

4. Draw a simple scheme that summarizes the liquid–liquid extraction process.
5. Determine the concentration of iodine extracted.
6. Calculate the efficiency of the extraction process using the following formula
   Extraction Efficiency (%) = (Amount of iodine extracted / Initial amount of iodine) x 100
7. Is it possible to use ethanol instead of cyclohexane for the extraction of iodine? Explain.