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"Chemistry for Development, Environment and Sustainability in Asia"



King Abdulaziz University

"Green Technology for Microscience Programs

Performing laboratory experiments for the Curriculum of Principles of Organic Chemistry, using the technology of green microscale chemistry in the Kingdom of Saudi Arabia

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Out of the point of cooperation between green chemistry school in Western region of kingdom of Saudi Arabia, with Radmaste center in South Africa and the UNESCO. We applied the technology of microscience chemistry in performing the experiments of the practical curriculum of the principles of general organic chemistry including the process of filtration, simple distillation, crystallization, chromatographic separation, Lassayn Test, detection of functional groups in organic compounds, and preparation of some esters by refluxing. In addition, to the preparation of acetylene and ethylene gases using the tools of microscale chemistry.

Radmaste center has provided us with modern microscale tools. The Arabic edition of the curriculum, sponsored by UNESCO, is available to us. It will be prepared in its final shape to be published in the website of the organization which is concerned with the practical curricula of green microscale technology. Ola Abu Ali, master degree student, Hanadi Medras, PhD student, and the lecturer Taghreed Alsufyani in Al Taif University have performed most of the above mentioned experiments using the Arabic edition for practical curricula sponsored by UNESCO, by the tools purchased from Radmaste center in South Africa. The experiments were performed easily and successfully in a relatively short time in comparison with the traditional laboratory. In addition, to the higher safety profile of the latter.

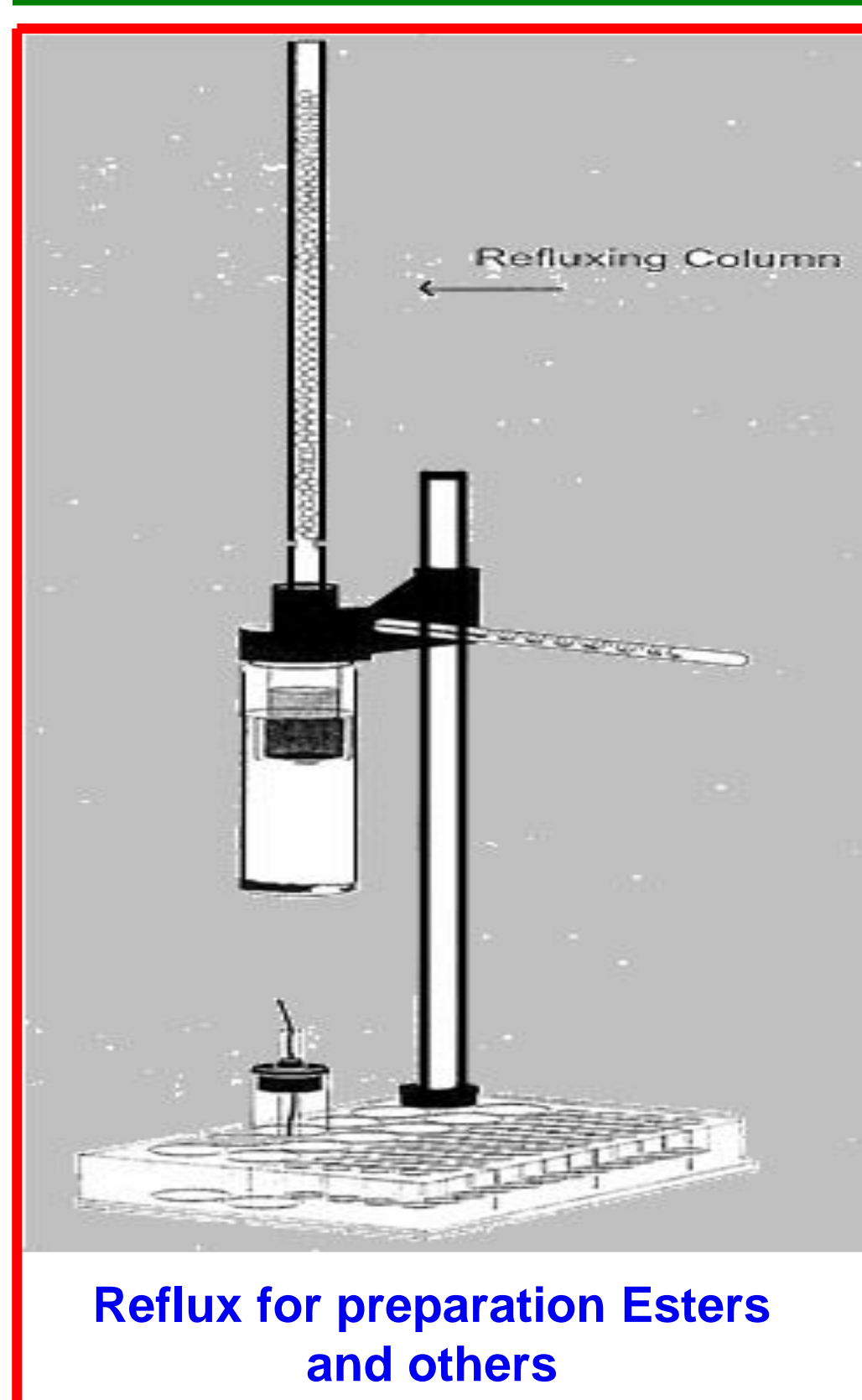
The cost of the tools is very cheap. The practical curriculum is available free from UNESCO. The UNESCO made many of the practical curricula available free on its website in different languages in order to be published throughout the world. This is out of the principle of positive globalization of education and enforcement of common concepts between the world's societies who are of multiple cultural and religious environments.

Two workshops have been held lately in both Riyadh (the capital of the Kingdom of Saudi Arabia) and Makkah. The opinions of specialists, educational supervisors were distributed upon them after performing some experiments of the practical curriculum of the principles of organic chemistry, that was during the functions of the workshops.

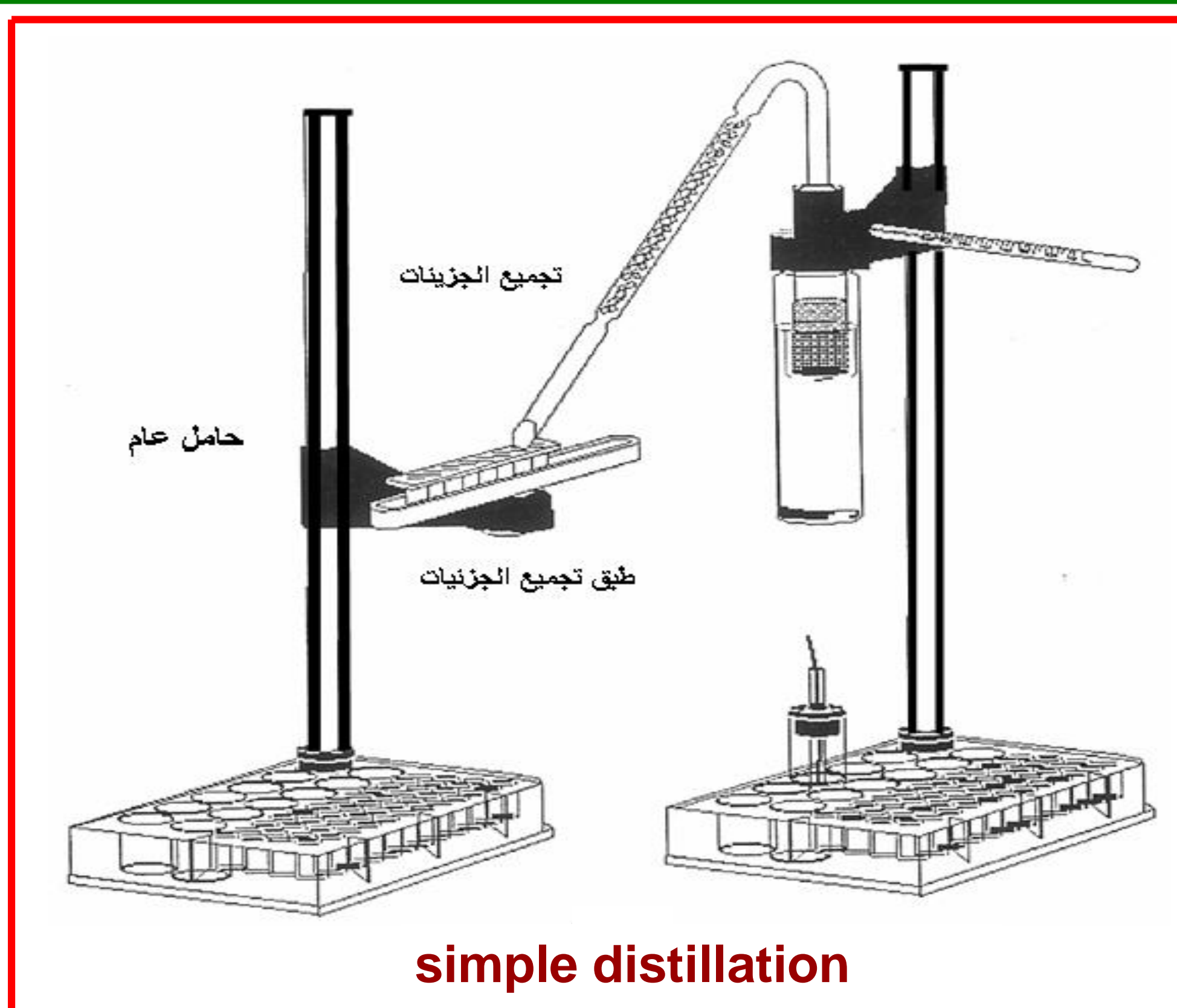
A summary of the results will be published, about the questionnaire to the specialists, about the possibility of application of green microscale chemistry technology within our curricula of educational and university learning.

References:

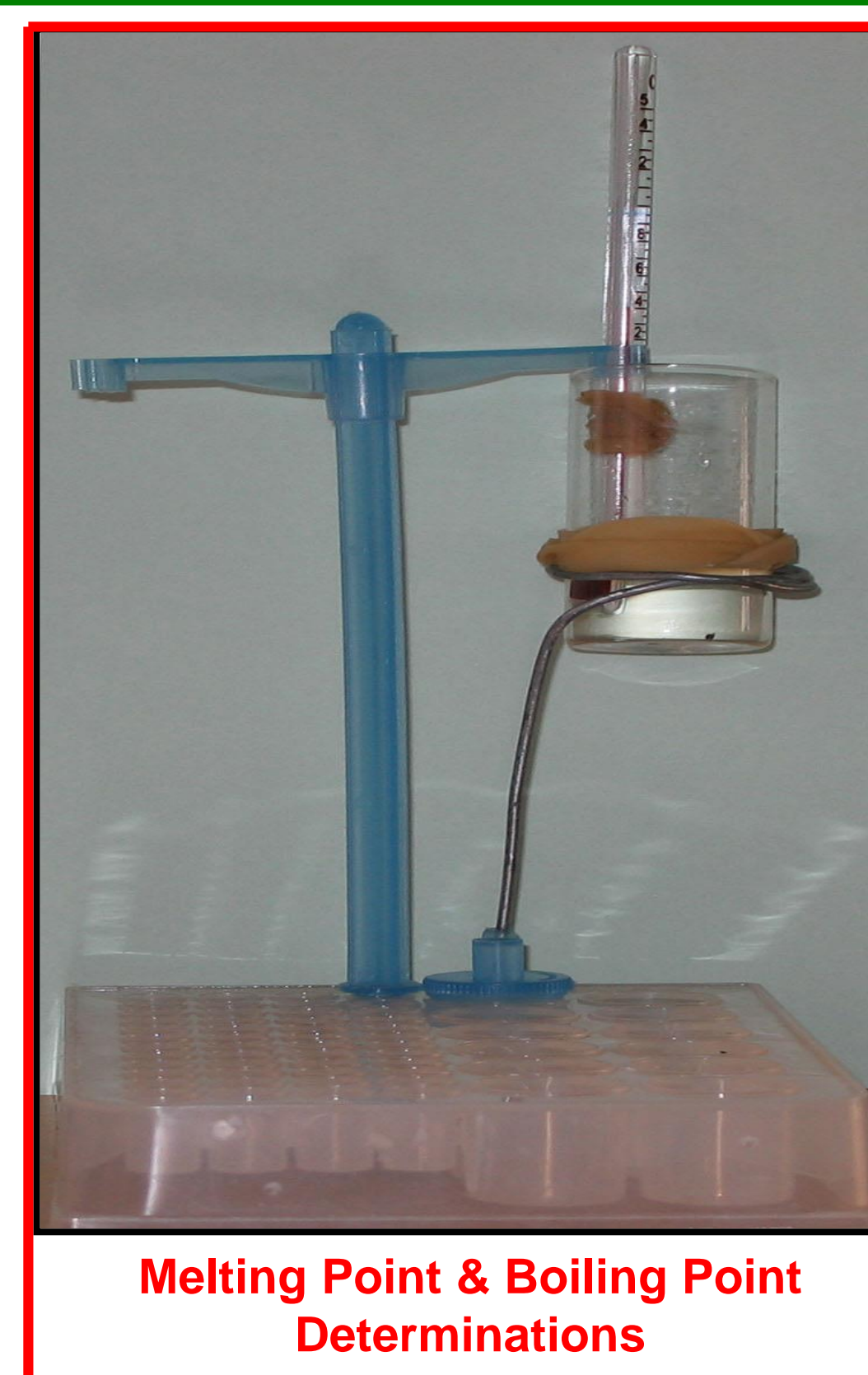
- [1] research published in the 19th conference of chemistry education, South Korea, August 2006.
- [2] workshop of educational supervisors in the Administration of girls'-held in the development center of the administration of girls' – Jeddah 2004
- [3] workshop for the supervisors in the ministry of education, Kuwait, June 2005.
- [4] workshop in the ministry of Education in Riyadh, April 2006.
- [5] workshop in the third Science Conference, King Saud University, May 2007.
- [6] workshop in the National Chemistry Conference – Saudi Chemistry Society – Makkah, April 2007.



Reflux for preparation Esters and others

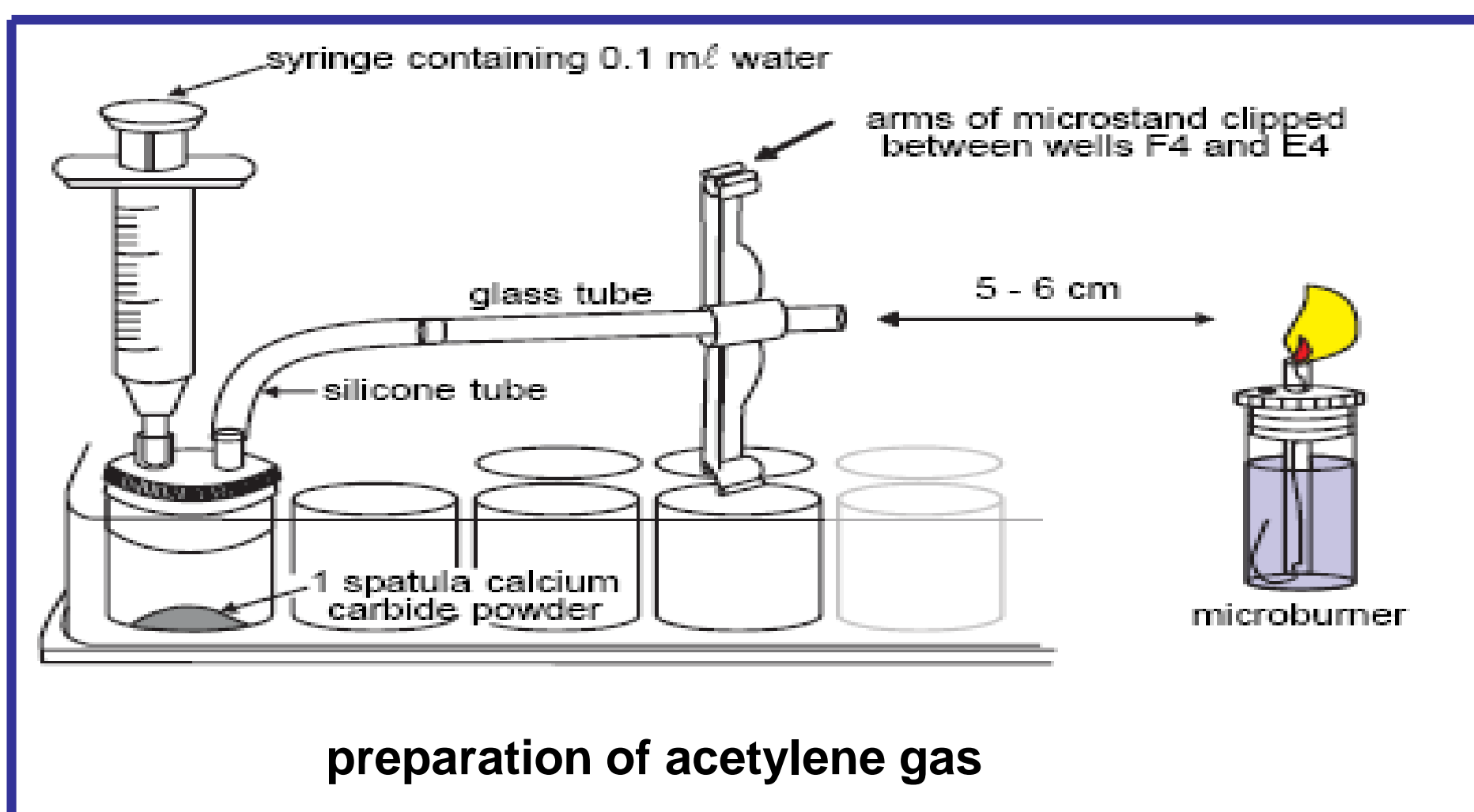


simple distillation

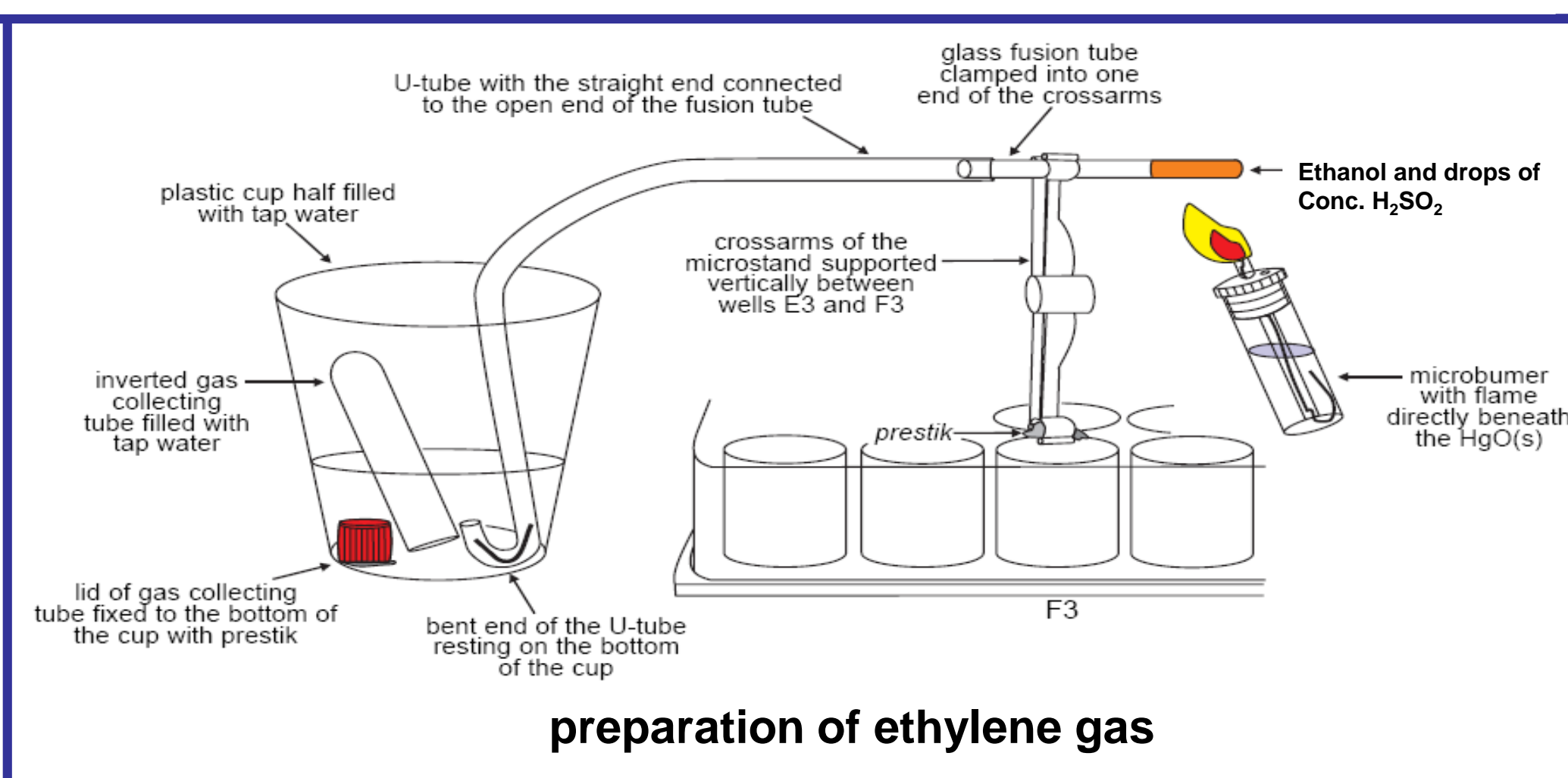


Melting Point & Boiling Point Determinations

Green Organic Laboratory			
PART ONE : Techniques in Organic Laboratory			
Exp. No.	Experiment Name	Duration (min)	Utility
1	Filtration	15	
2	Separation	10	
3	Crystallisation	15	
4	Distillation	20	
5	Chromatography	30	
6	Simple Green Laboratory separation Mixture of organic compounds	30	
7	Organic Compound Modeling	60	
8	Lassayn Test	30	
9	Reflux technique	30	
PART TWO : Identification of Function Organic Groups			
1	Alkane, Alkene & Alkyne	30	
2	RX, ROH & ROR	30	
3	Carbonyl compounds, Carboxylic Acid and its derivatives	30	
--	Writing sort report of all experiments above	30	
TOTAL TIMES		6 Hrs only	



preparation of acetylene gas

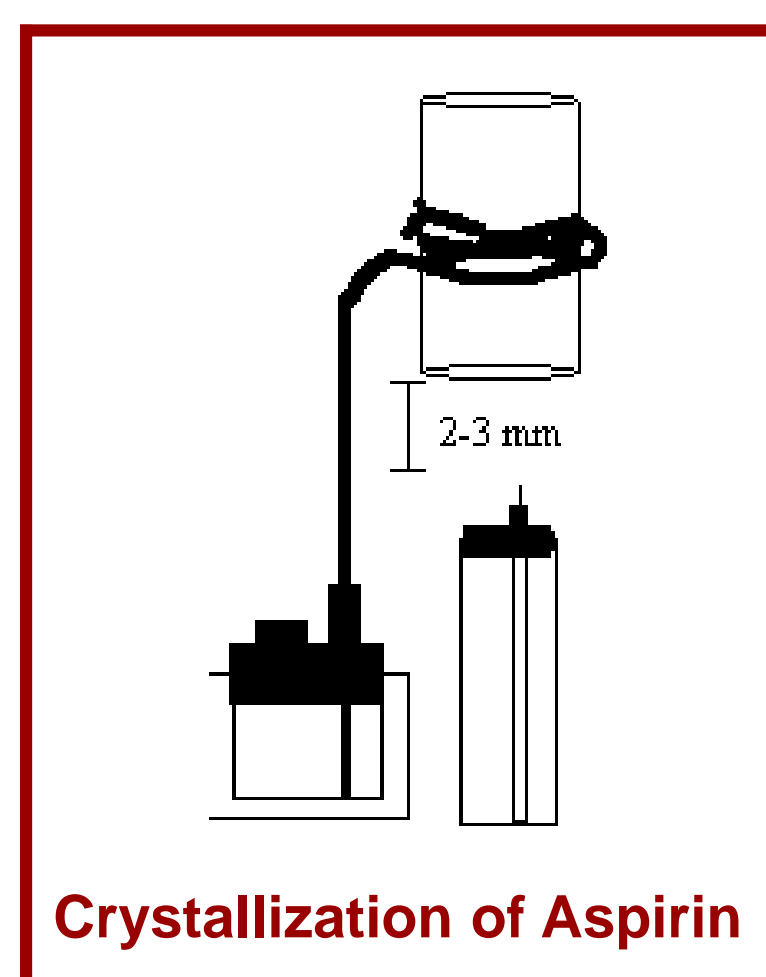
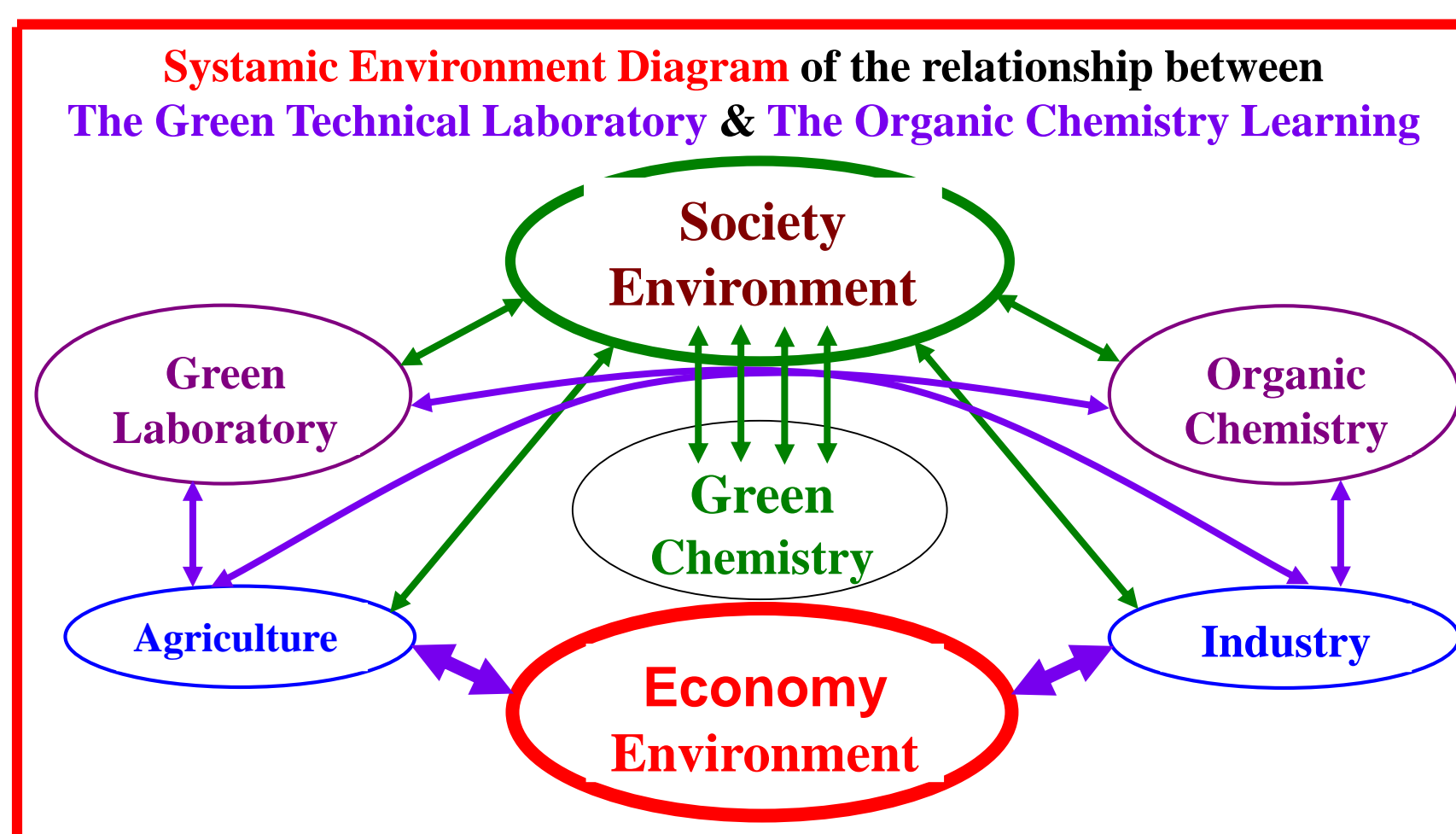


preparation of ethylene gas

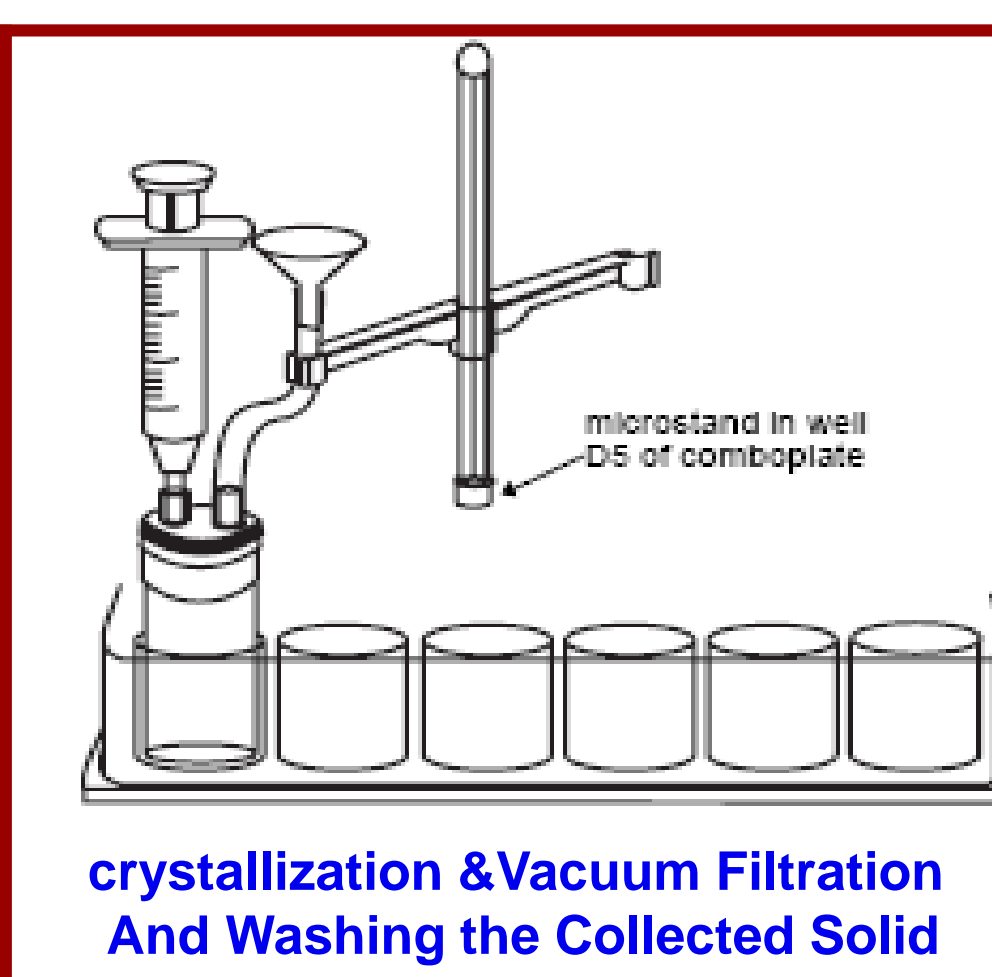
	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E									Other (optional)	tert-Butyl alcohol		
F	Propanone	Cyclohexanone	Formaldehyde	Methanol	Ethanol	sec-Butyl alcohol						
	1	2	3	4	5	6						

Functional Group Analysis

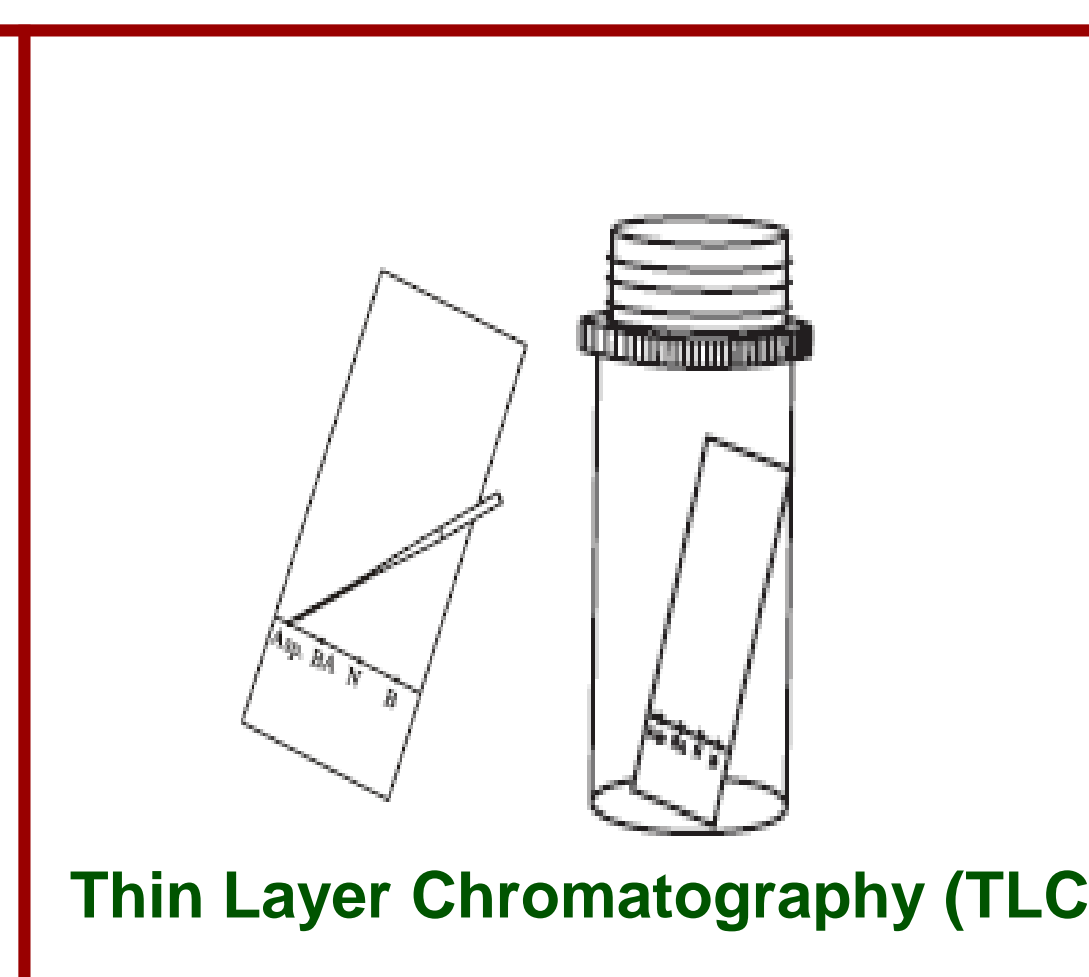
Example: Iodoform Reaction



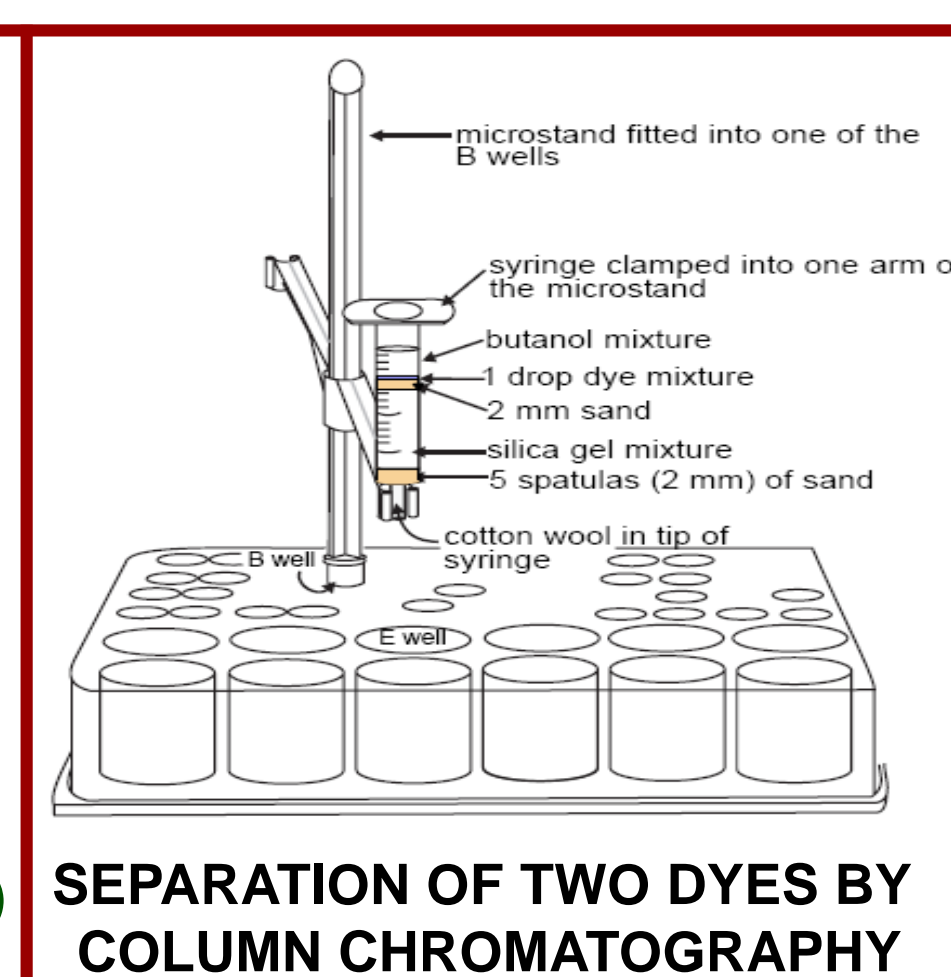
Crystallization of Aspirin



crystallization & Vacuum Filtration And Washing the Collected Solid



Thin Layer Chromatography (TLC)



SEPARATION OF TWO DYES BY COLUMN CHROMATOGRAPHY