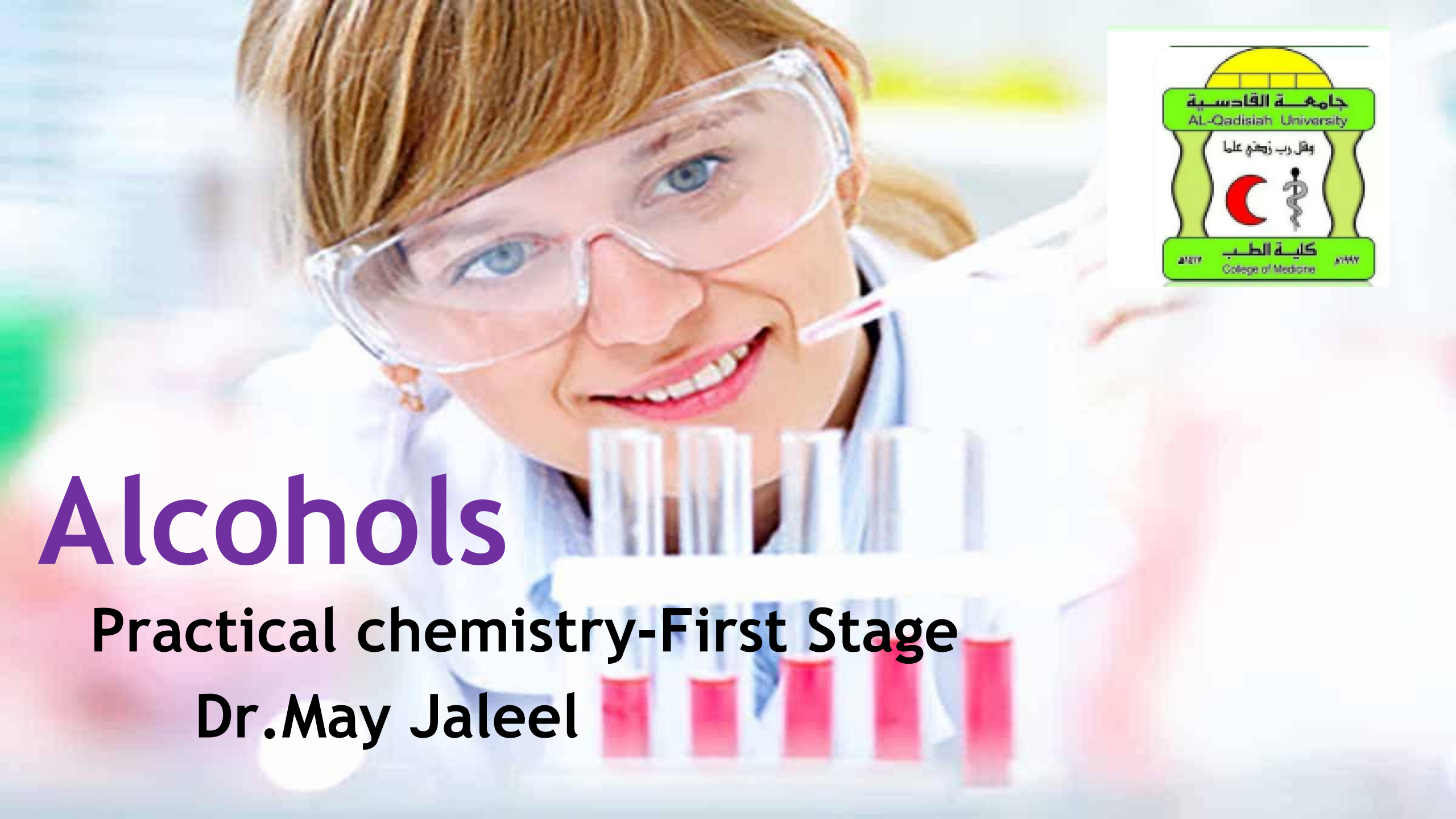

Alcohols

Practical chemistry-First Stage

Dr.May Jaleel

Alcohol

is an organic compound that carries at least one hydroxyl functional group (−OH) bound to a saturated carbon atom. The term alcohol originally referred to the primary alcohol ethanol (ethyl alcohol).

- An important class of alcohols, of which methanol and ethanol are the simplest members, includes all compounds for which the general formula is $C_nH_{2n+1}OH$.
- The hydroxyl group makes alcohols polar. Those groups can form hydrogen bonds to one another and to most other compounds. Owing to the presence of the polar OH group, alcohols are more water-soluble than simple hydrocarbons. Methanol, ethanol, and propanol are miscible in water.
- Because of hydrogen bonding, alcohols tend to have higher boiling points than comparable hydrocarbons and ethers

Formation of Alcohols

- Alcohol is distributed throughout the water in the body, so most tissues such as the heart, brain, and muscles are exposed to the same concentration of alcohol as the blood. Alcohol diffuses rather slowly, except into organs with a rich blood supply such as the brain and lungs

- More than 90% of alcohol is eliminated by the liver; 2-5% is excreted unchanged in urine, sweat, or breath. The first step in metabolism is oxidation by alcohol dehydrogenases, to acetaldehyde in the presence of cofactors. Acetaldehyde is a highly reactive and toxic substance.

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Alcoholism Symptoms & The Side-Effects of Alcohol Addiction

Incoherent speech, Poor balance, Delayed reflexes, Stomach pains, vomiting or nausea, sweating, rapid heartbeat, hand tremors, problems sleeping, , hallucinations. unconsciousness and Redness of the face.

Fate and action of ethanol in the body

The ethanol contained in alcoholic beverages is rapidly absorbed from the gastrointestinal tract (GIT). Once in the bloodstream, ethanol is distributed into the total body water compartment. The volume of distribution of ethanol depends on a person's age, gender, and degree of adiposity. Elimination of ethanol from the body occurs primarily through metabolism (92–98% of dose) by hepatic alcohol dehydrogenase (ADH), an enzyme located in the liver cytosol

Identification Of Alcohols

Alcohols and Phenols contain the-OH functional group. In a phenol, the -OH group is connected to a benzene ring, whereas in alcohol, the -OH group is connected to alkyl group. Phenols are more acidic than alcohols.

Ferric chloride test to differentiate alcohols and phenols

Alcohols are readily differentiated from phenols using this test. Addition of a drops of ferric chloride solution to a sample of phenol (5-drops) will produce a distinct violet/purple coloration. Alcohols do not produce such deep coloration when treated with ferric chloride solution

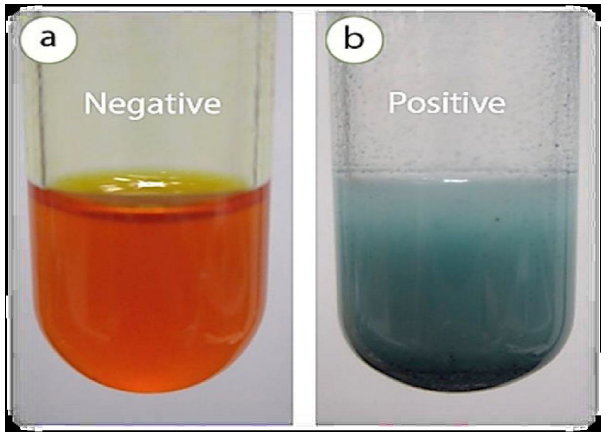
Lucas test to differentiate Alcohols

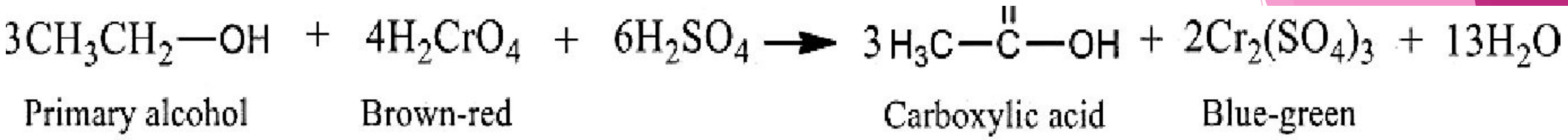
A solution of zinc chloride in concentrated hydrochloric acid is called the Lucas Reagent. The rate of reaction of an alcohol with HCl in presence of $ZnCl_2$ is dependent on the nature of the alcohol, i.e. whether almost instantaneously the alcohol is a primary alcohol, secondary, and or a tertiary alcohol in nature. Tertiary alcohols react to give water insoluble alkyl chlorides as products

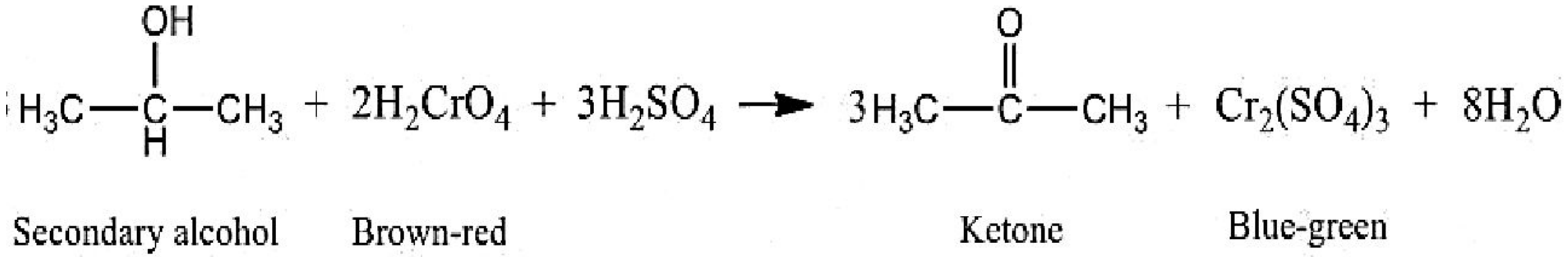
- So if a cloudy dispersion or as a separate layer within the solution occurs immediately upon mixing the alcohol with the reagents then that alcohol must be a tertiary one. Secondary alcohols will form cloudy products upon standing while primary alcohols need to be heated with the reagents before the reaction can occur. This qualitative test can be used to identify a primary alcohol from secondary and tertiary alcohols.

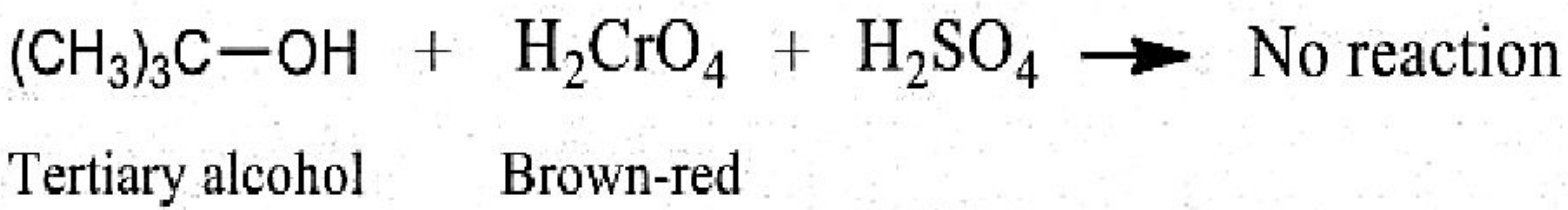
Chromic Acid Test to differentiate Alcohols

- Oxidation of alcohols using potassium dichromate and acid can be used as a method to differentiate tertiary alcohols from primary and secondary alcohols. Both primary and secondary alcohols are oxidized using these reagents, producing a green Cr III precipitate. Tertiary alcohols are not oxidized with these reagents









Phenols produce a brown tarry mass when combined with chromic acid.


Thank you for your attention