Student 4: High Achieved

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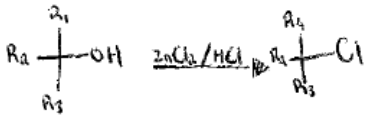
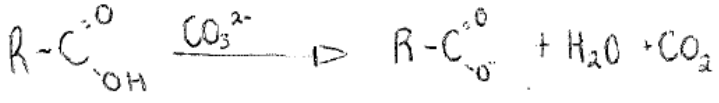
When Iucas reagent was added to Sample A, two layers instantly formed, One of which was cloudy, meaning a tertiary alcohol Group is present. When Sample A was Warmed with acidified potassium dichromate no reaction occured meaning no primary or Secondary alcohol groups are present, when Sample A was heated with Benedicts no reaction occured meaning no aldehyde groups are present. When Sample A and Bromine Water were Shaken together in a test tube no reaction occured meaning no Double Bond is Present. No reaction occured when copper Sulfate was added to Sample A, When Sodium carbonate was added to Sample A, it fizzed indicating an Carboxylic acid functional group is present. Red litmus paper stayed red when Sample A was added and blue litmus turned red when Sample A was added meaning it is an acid. Universal indicator turned orange/red meaning Sample A has a PH of 3 or 4. As Sample A only has a tertiary alcohol functional group and 2 carboxylic acid functional groups, it must be Citric Acid. 1



4

The alcohol group is replaced by a chlorine atom. ~~This is a Substitution reaction in a Substitution reaction one group is exchanged/Substituted for another.~~ This is a Substitution reaction were one group is substituted for another. By replacing the alcohol group with a halide (in this case chlorine) the product is insoluble meaning it repels water resulting in the formation of two layers in the test tube. This happens rapidly for tertiary alcohols.

The formation of H_3O^+ ions is due to the dissociation of Carboxylic acid in water. The organic product is the carboxylate of the ~~conjugate~~ acid. This reaction can be classified as an acid-base reaction or dissociation.



The reaction with Sodium Carbonate to Produce Carbon dioxide is also an acid-base reaction.

Citric acid

2

Citric acid is a tri-carboylic acid most commonly found in Citric fruits. Its molecular formula is $C_6H_8O_7$. Citric acid gives Citric fruits, mainly lemons and limes, their sour taste. The manufactured form of citric acid is commonly used as an additive in food, Cleaning agents, nutritional supplements, and cosmetics, Particularly skin care. It is also an alpha-hydroxy acid (AHA) as it has an alcohol group next to a carboxylic acid functional group.

As Citric acid is an AHA (member of the alpha hydroxy family) it is commonly used in Skin care products. Citric acid is used to exfoliate the skin meaning it removes dead skin cells, it also helps with acne by cleaning out blocked pores as it is an acid that doesn't normally inhabit skin.

As Citric acid is an acid it is used in the food industry to boost acidity, enhance flavor and preserve ingredients. It is added to canned produce (normally fruit and vegetables) to protect against botulism, a serious but rare illness. Its most common use is in candy and soft drink to add a sour, tart taste to counteract the overly sweet flavour.

3

Citric acid is a useful disinfectant against many viruses and bacteria's. It is commercially sold for the removal of Soap Scum, hard water Stains, and lime and rust. This could be because it is an acid or because it has an alcohol group present meaning it is good at disinfecting.

Citric acid Enhances the absorbtion of nutrients in the body. This is because it enhances the bioavailability of minerals. It may also help protect the body against kidney Stones by breaking already formed kidney stones down and preventing new ones forming. This occurs not in the form of Potassium citrate but by consuming high natural foods with acid (like citrus fruits) it may have a similar effect.