

Example of report on procedure

[Health & Medicine](#), [Alcoholism](#)



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Lab Report on preparation of Esters by Esterification

Introduction

The organic esters are characterized using their pleasant and fruity odors. Some of these odors include lead to fruits such as banana, pear, and orange to have their pleasant smelling. When carboxylic acid is mixed with an alcohol in the presence of a strong acid leads to the production of an ester. The strong acid is used as a catalyst and the general reaction is as below. The esterification reaction is a reversible reaction with the forward being referred to as esterification, while the reverse reaction hydrolysis. The general formula of an ester compound is as follows:

The experiment aimed at preparing esters from alcohol and carboxylic acids and identification of the characteristic odors of the ester prepared. The experiment also had an aim of writing out the esterification reaction as well as enabling writing out the hydrolysis reaction of an ester.

The materials used in the experiment included glacial acetic acid, 1-pentanol, 1-octanol, salicylic acid, methanol, 400mL beaker, test tubes and racks, 3 cork stoppers, and a hot plate. Hot water was set up using a 400mL

beaker and filled half way with water. Three clean and dry test tubes were placed on the test tube rack and labeled 1, 2, and 3. In test tube 1, 20 drops of 1-pentanol, 20 drops of glacial acetic acid and 5 drops of concentrated H₂SO₄ were added. In test tube 2, 1mL or 20 drops of 1-octanol, 20 drops of glacial acetic acid and 5 drops of concentrated sulfuric acid were added. In test tube 3 20 drops of methanol, a very small amount of salicylic acid and 5 drops of concentrated H₂SO₄. The test tubes were stirred using a glass-stirring rod making sure that the rod was washed and dried after each use. The cork stoppers were placed loosely on each test tube and placed in boiling water bath for about 10 minutes. The test tubes were removed from the water bath and the smell of the vapor tested.

Results

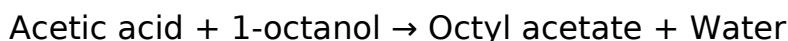
The results for the odor or the smell from the three test tubes were recorded in Table 1 below. A reaction of 1-pentanol and glacial acetic acid resulted into a product that had banana smell. The product of 1-octanol and glacial acid had a fruity orange smell and the methanol and small amount of salicylic acid gave a product with winter green smell.

Discussion

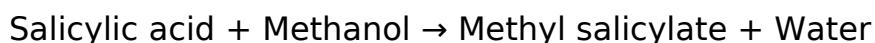
The smell from the products confirmed the products formed as methyl salicylate, octyl acetate, and pentyl acetate by banana smell, fruity orange and wintergreen respectively. The reaction of acetic acid and 1-pentanol leads to the production of Pentyl acetate with a structural formula as shown below

Acetic acid + 1-pentanol → Pentyl acetate + Water

The reaction of acetic acid and 1-octanol leads to the production of octyl acetate with a structural formula as shown below



The reaction of salicylic acid and methanol leads to the production of methyl salicylate with a structural formula as shown below



A reversible reaction refers to a chemical reaction, which leads to an equilibrium mixture of both the reactants and the products. Sulfuric acid in the esterification process is used as a catalyst. Since the reaction for ester production is a reversible reaction, the product from the reaction can be increased by increasing the reactants and can be decreased by reducing the reactants. The reaction between ethyl acetate and water is the reverse of the esterification process for producing ethyl acetate. Therefore, this process will lead to the production of ethanol and acetic acid.

Conclusion

The experiment successfully enabled the preparation of esters such as methyl salicylate, octyl acetate, and pentyl acetate from alcohol and carboxylic acids. The experiment also allowed the identification of the characteristic odors of the ester prepared. The reactions of the esterification reaction as well as that of the hydrolysis reaction of an ester were written.