

Studying Fisher Esterification by using salicylic acid to synthesize methyl salicylate, acetyl salicylic acid, and 5-nitrosalicylic acid. Sadie Roestenburg.

#### **ABSTRACT**

Salicylic acid has many derivatives that are used for commercial, cosmetic, medicinal, culinary, as well as other uses. Three of the analogues, acetyl salicylic acid, methyl salicylate, and 5-nitrosalicylic are synthesized here. Acetylsalicylic acid and methyl salicylate were synthesized by Fisher Esterification and 5-nitrosalicylic acid was synthesized by electrophilic aromatic substitution. All compounds used salicylic acid as a starting product. The purity of each compound was thoroughly analyzed using TLC, IR, and mp. Purity is an essential skill for the further use of the compounds that are synthesized. All three compounds were found to be quite impure. The percent yield ranged from 66.3- 88.5%. This suggests that further attempts of synthesis are required.

#### **INTRODUCTION**

Salicylic acid is found in willow trees, and its analogs, methyl salicylate and acetylsalicylic acid, have been widely used in medicinal and cosmetic remedies. Native American tribes used the bark of willow trees that contained salicylic acid to make tea to relieve pain, fevers, and childbirth pain. Also, the Egyptians used myrtle leaves to help relieve muscle pain and it was found they also contain salicylic acid.<sup>1</sup> One study suggests that salicylic acid may be used in conjunction with the yeast *C. laurentii* to suppress blue and gray mould rots in pear fruit.<sup>2</sup> Since salicylic acid is used in a variety of compounds, this experiment allows three diverse derivatives to be synthesized here.

One derivative of salicylic acid synthesized here is "Aspirin," or acetylsalicylic acid, which is a widely known drug that relieves pain as well as helping get rid of acne by causing skin cells to shed