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**DISCOVERING A NEW METHOD FOR MAKING SALICYLIC ACID**

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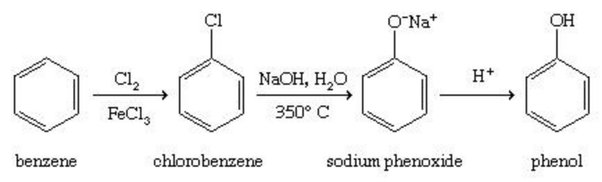
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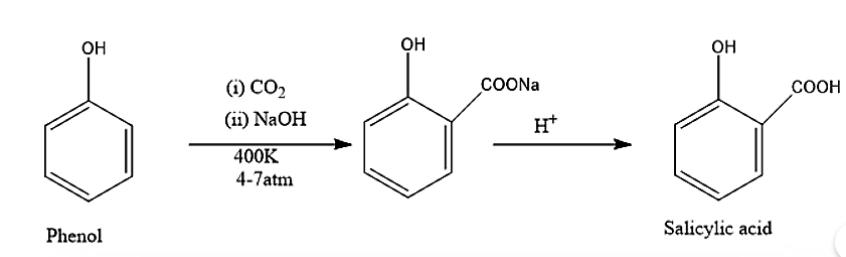
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| **ABSTRACT: Salicylic acid, a versatile compound with various applications, can be synthesized in different ways. It is a colorless organic acid used in pharmaceuticals, skincare products, and as a precursor for other chemicals. Salicylic acid has anti-inflammatory properties and is commonly used in topical treatments for skin conditions like acne and psoriasis. It is also used in the production of aspirin and as a preservative in food and personal care items.There are three main methods of synthesizing salicylic acid. The Kolbe-Schmitt Reaction involves treating phenol with carbon dioxide to form sodium phenoxide, which then becomes salicylic acid. Salicylic acid can also be prepared by oxidizing salicylaldehyde using strong oxidizing agents or hydrolyzing methyl salicylate found in wintergreen oil. Salicylic acid is widely used in various industries. In pharmaceuticals, it is a key ingredient in aspirin and other pain relievers, as well as anti-acne treatments and medicated shampoos. It is commonly found in skincare products like cleansers and acne creams due to its pore-cleansing and exfoliating properties. Additionally, it serves as a preservative in food and personal care items to prevent bacterial and fungal growth. Although generally safe, salicylic acid can cause skin irritation and allergic reactions in some individuals. Using it as directed and discontinuing use in case of adverse reactions is important.Overall, understanding the synthesis and applications of salicylic acid allows for the development of innovative products and treatments in various industries.** |
| **Keywords**: Salicylic acid , Aspirin , Benzoyloxonium , Phenol , Methyl Salicylate |

**1. INTRODUCTION**

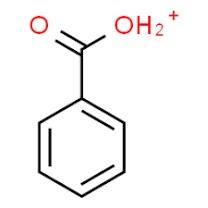
Salicylic acid, a versatile compound used in a variety of industries and products, can be synthesized in many ways. In this article, we will discuss the process of making salicylic acid, including its chemical properties, uses, and various synthetic methods. Understanding Salicylic AcidAlso known as 2-hydroxybenzoic acid, salicylic acid, or it is made of willow and birch bark. , a type of beta-hydroxy acid (BHA) that occurs naturally in plants such as wintergreen. It is a colorless film organic acid that is widely used as an indicator in the formulation of pharmaceuticals, skin care products and other chemicals.Salicylic acid has anti-inflammatory, analgesic and antipyretic properties, and let it be a simple introduction It is used to treat skin conditions such as acne, psoriasis and warts. It is also used to make aspirin (acetylsalicylic acid) and as a preservative in food and personal care products. Synthesis Method1. \*\*Kolbe-Schmidt Reaction\*\*: One of the most common methods for synthesizing salicylic acid is the Kolbe-Schmidt reaction. In this process, phenol is treated with carbon dioxide under basic conditions to form sodium phenoxide, which then undergoes a decarboxylation reaction to produce salicylic acid.2. \*\*From salicylaldehyde\*\*: Salicylic acid can also be prepared by neutralizing salicylaldehyde using strong oxidizing agents such as potassium permanganate and chromic acid. This method is used in a laboratory setting to synthesize small amounts of salicylic acid.3. \*\*Methyl salicylate\*\*: Methyl salicylate, a compound found in wintergreen oil, can be hydrogenated to produce salicylic acid. This process involves converting methyl salicylate to salicylic acid and methanol by treating it with a strong base such as sodium hydroxide. Industrial ApplicationsSalicylic acid is used in a wide range of industrial applications, including: . \ n- \*\*Chemical\*\*: Salicylic acid is the main ingredient in the manufacture of aspirin and other pain relievers. Also used in acne treatments and medicated soaps.- \*\*Skin Care Benefits\*\*: Salicylic Acid unclogs pores and tightens skin.- \* \*Benefits\*\*: Salicylic Acid Salicylic acid helps fight bacteria and fungi. It is used as a preservative in food and personal care products to prevent the growth of can cause skin irritation and allergic reactions. It is important to use salicylic acid products as directed and to discontinue use if side effects occur.In conclusion, salicylic acid is a beneficial compound with various applications in various industries. By understanding how salicylic acid is synthesized and used, researchers and manufacturers can maximize its potential to develop new products and treatments.

**2. PRODUCTION OF SALICYLIC ACID FROM BENZENE**

Phenol can be converted to Salicylic acid: When phenol reacts with carbon dioxide in the presence of a base such as, this reaction is called a Kolbe reaction. The final product is salicylic acid. The following reaction shows the formation of salicylic acid from phenol.



**3. PRODUCTION OF SALICYLIC ACID FROM BENZOYLOXONIUM**

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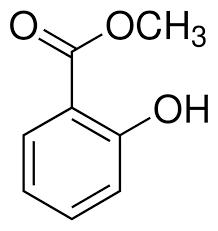
If we react this material in the picture with hydroxyl, salicylic acid is easily created.(carboxylic acid)

**4. MAKING REACTION OF CARBOXYLIC ACID WITH HYDROXYL (BENZENE)**

After neutralizing the chemical in the picture above (3): In this study, we investigated the secondary formation of HO2 after the reaction of benzene + OH in N2 and O2 species at atmospheric pressure and room temperature in the absence of NO. After OH formation, HOx(=OH + HO2) and OH decay curves were measured using laser-induced fluorescence (LIF) technology. The total yield of HO2 in synthetic air was determined to be 0.69 ± 0.10 compared to results obtained using CO as the reference compound. HO2 is a direct product of the reaction of O2 with the adduct intermediate OH-benzene. The HO2 yield is slightly higher than the expected phenol product HO2 yield (~53%). This represents another minor channel for HO2 production in the absence of NO. The formation of various epoxides is considered in the literature. For the other compounds tested, the upper limits of HO2 yield were 0.10 (isoprene) and 0.05 (cyclohexane), respectively. Other experiments with low O2 concentration (0.06-0.14% in N2) showed rate constants of (2.4 ± 1.1) × 10−16 cm3 s−1 and (5.6 ± 1.1 ) × 10−12 cm3 s−1 for OH. Estimated -Benzenic additives react with O2 and O3. The electron dissociation rate of addition to benzene + OH was determined to be (3.9 ± 1.3) s−1. HO2 yields at low O2 are similar to those observed in synthetic air at O2 and O3 concentrations, indicating similar HO2 yields for the addition + O2 and addition + O3 reactions.( <https://doi.org/10.1039/C1CP20334G>)

After this step, Benzoyloxonium will have an additional hydroxyl functional group, which will be salicylic acid, and it will be made in one step.

**4. PRODUCTION OF SALICYLIC ACID FROM METHYL SALICYLATE**

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Hydrolysis of Methyl Salicylate and Synthesis of Acetylsalicylic Acid: happens within the presence of base (rather than corrosive), the carboxylic corrosive and phenolic -Gracious bunches on salicylic corrosive are ionized and this compound exists as the sodium salt of salicylic corrosive, sodium salicylate. The response blend is along these lines acidifed utilizing sulfuric corrosive, which changes over this anion into the completely protonated corrosive, salicylic corrosive. The liquor is methanol. The salicylic corrosive, which is generally insoluble, could be a strong and can be separated and decontaminated by crystallization.

As specified over, the phenolic hydroxyl gather, which is additionally acidic, would be ionized and exist as the sodium salt during the fundamental hydrolysis, rather like the carboxylic corrosive gather, but it isn't appeared ionized in this figure since we are concerned with the ester hydrolysis. As the taking after figure appears, the phenolic -Gracious, as well as the carboxylic corrosive bunch, will be protonated amid the fermentation step taking after the expansion of the sulfuric corrosive.

The hydrolysis of methyl salicylate will be performed utilizing the taking after setup.Get approximately 25 mL of crisply arranged 5 M NaOH (or, then again, you'll break down 5.0 g of sodium hydroxide pellets in 25 mL of water). Pour into a 100-mL circular foot carafe (continuously utilize a pipe; never pour chemicals through a ground-glass opening).Include 7.5 g (0.050 mol; 50 mmol) of methyl salicylate (a fluid) to the 100-mL round-bottomed carafe containing the NaOH. (a white strong may shape, but it'll break up rapidly when the blend is warmed.)Include ~3-4 bubbling stones to avoid bumping (which is the generation of a expansive gas bubble when warmed) or uneven bubbling.Join a reflux condenser to the best of the carafe and turn on the cooling water.Warm the response blend to bubbling employing a warming shelf. Permit the blend to reflux (with cooling) for approximately 20 minutes. The fluid blend ought to be ceaselessly bubbling for the whole reflux time.After a 20 min reflux, exchange the response blend to a 250-mL measuring utencil.Include 50 mL of DI water to the response substance in your measuring utencil.Either include a blending bar or energetically stirr the arrangement with a glass blending bar as you include acid in the following step.Carefully include sufficient 3 M H2SO4 to form the arrangement acidic to litmus paper (pHydroin paper) to a pH of 1.Note:It is best to include the corrosive gradually with stirring to blend the substance instead of fair pouring the corrosive into the beacker. Mixing and adding slowly ought to avoid sodium salicylate from getting to be entangled within the strong salicylic corrosive.You'll ought to add more than 25 mL of 3 M sulfuric corrosive (for case, you may require more than 20 mL fair to neutralize the NaOH utilized within the response).Strong salicylic corrosive ought to frame as the neutralization continues.After pHydroin paper appears a pH of 1, include 1-2 mL more of the 3M sulfuric corrosive to guarantee all the salicylic corrosive accelerates. The blend will be acidic, but as well much corrosive will not be a problem:Corrosive remains corrosive in corrosive!Cool the blend in an ice-water shower to almost 0oC. Let container remain within the ice bucket for around 15 min while allowing the gems to settle.The salicylic corrosive must must be a slurry some time recently you are doing the filtration. So, in the event that the solid isn't unreservedly streaming within the measuring utencil, include sufficient water so that the strong is suspended and a fluid slurry appearance.Collect the precious stones by vacuum filtration, employing a Büchner pipe and channel paper. The filtration can be conducted most effectively by tapping off most of the supernatant fluid through the Büchner pipe some time recently including the mass of gems.Carefully wash the measuring utencil with ice cold water, in the event that fundamental, to exchange all the precious stones to the pipe.Store the salicylic corrosive gems in an dissipating dish or container within the drying broiler until the another lab period. Since your collected precious stones from an corrosive arrangement, you cannot store your filter paper along with your chemical. (Copyright Donald L. Robertson (Date last modified: 11/14/2012))

**5. CONCLUSION**

Salicylic acid is an acidic substance that is used in the manufacture of exfoliating cosmetics, and its industrial production is very expensive and difficult, which requires advanced devices. It is hoped that better and convenient methods for the production of this substance will be discovered.

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61. D. H. R. Barton, A. da S. Campos-Neves and R. C. Cookson

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64. This paper by Nobel Laureate Prof. Derek H. R. Barton has a POCl3-pyridine dehydration (see p. 3504-3505 in the experimental section).Using a Brønsted acid:

65. THE COMPOSITION OF BUTENE MIXTURES RESULTING FROM THE CATALYTIC DECOMPOSITION OF THE NORMAL BUTYL ALCOHOLS

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69. While this would seem to be an easy thing to study today, with NMR and GC-MS, in the early days this was not so easy. The butenes were converted to dibromides, distilled, and then the three-component dibromide mixture analyzed by density, refractive index, and determination of the second-order rate constants with potassium iodide in acetone. Both Bill Young and H. J. Lucas contributed greatly to the development of chemistry in Southern California – H. J. Lucas was a professor of chemistry at Caltech, and Bill Young later became a professor of chemistry at UCLA, and was the advisor for Prof. Saul Winstein’s M.S. in chemistry (Prof. Winstein ended up joining Bill Young at UCLA after his PhD!).

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90. Go To Experiment: [ChemDraw](https://home.miracosta.edu/dlr/211draw.htm) [1](https://home.miracosta.edu/dlr/211exp1.htm) [2](https://home.miracosta.edu/dlr/211exp2.htm) [3](https://home.miracosta.edu/dlr/211exp3.htm) [4](https://home.miracosta.edu/dlr/211exp4.htm) [5](https://home.miracosta.edu/dlr/211exp5.htm) [6](https://home.miracosta.edu/dlr/211exp6.htm) [7](https://home.miracosta.edu/dlr/211exp7.htm) [8](https://home.miracosta.edu/dlr/211exp8.htm) [9](https://home.miracosta.edu/dlr/211exp9.htm) [10](https://home.miracosta.edu/dlr/211exp10.htm) Return to [Chem211 Experiment Protocols Index](https://home.miracosta.edu/dlr/211exp.htm) Copyright Donald L. Robertson (Date last modified: 11/14/2012)

*91.* https://www.ebi.ac.uk/chebi/searchId.do?chebiId=CHEBI:16914#:~:text=Salicylic%20acid%20is%20an%20organic,of%20aspirin%20(acetylsalicylic%20acid

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