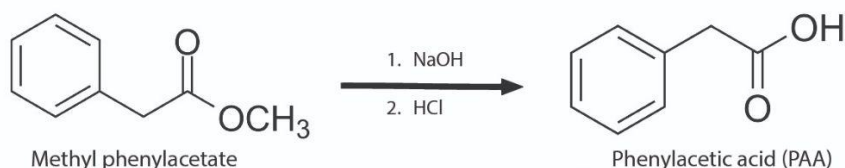




Phenylacetic Acid Synthesis

Introduction

Phenylacetic acid (PAA) is the precursor needed for a high yield of penicillin G production according to the latest studies. However, as it is required for drug synthesis, its online purchase is restricted. As per its importance, we are working on synthesizing it locally and have compiled this protocol from various sources. Its synthesis involves the basic hydrolysis of methyl phenylacetate, followed by its acidification and purification.

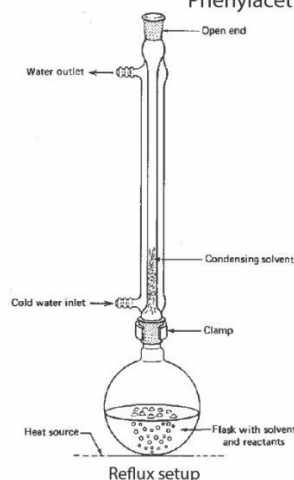


Materials

- Methyl phenylacetate
- NaOH
- HCl
- Diethyl ether
- Anhydrous sodium sulfate

Reagents	Quantity	Cost	Supplier
Methylphenyl acetate	1 kg	\$210.00	VTC
Sodium hydroxide (2M)	1 kg	\$5.00	Local
Ether	2.5 L	\$125.00	VTC
Na ₂ SO ₄	1 kg	\$17.00	VTC
HCl	1 L	\$30.00	Local
Total		\$387.00	

VTC may be reached at: <http://www.vtc-lb.com/>



Procedure

1. Reflux 2.4g (16 mmol) methyl phenylacetate and 10 ml 2M NaOH for 2h.
2. After the solution cools, acidify it with conc. HCl (~3mL). The pH value of the solution must be controlled between 4.0 and 6.0, preferably 5.0.
3. Extract three times with portions of ether equal to the amount of solution present. The mixture must be stirred until any inorganic precipitate is dissolved.
4. Filter the solution and separate the organic layer.
5. Wash with cold water.
6. Dry over anhydrous sodium sulfate.
7. Distill the ether off. Diethyl ether boils at 34.6°C.
8. Recrystallize the residue from water to obtain free crystalline phenylacetic acid.

Qualification

The quality of the phenylacetic acid is ascertained by determining its melting point using the melting point apparatus. The melting point of pure phenylacetic acid is from 76 to 77 °C. The closer the value of the product's melting point is to this range and the narrower the range, the purer the product.