Scie

Ge

```json
{
  "title": "Synthesis and Character
  "introduction": "Aspirin, chemica
the most widely utilized pharmac
antipyretic, and anti-inflammator
from its ability to inhibit prostagl
inflammation pathways. The syn
anhydride serves as a classic exa
process in organic chemistry wh
```

acid or its derivative to form an e
hydroxyl group of salicylic acid u
catalyzed by a strong acid like su
acid as a byproduct. Understandi
appreciating the principles of org
purity of a pharmaceutical comp
Therefore, purification technique
obtaining a high-quality product.
solubility to separate the desired
dissolving the crude product in a
crystallization. The primary objec
from its precursors and subsequ
experiment aimed to characteriz
melting point and calculating the
assessment of both the efficienc
product. This comprehensive app
organic synthesis and purificatio

organic synthesis and purificatio

"objectives": [

"To successfully synthesize ac
esterification of salicylic acid wit
acid as a catalyst.",

"To purify the crude aspirin pro
aiming to remove unreacted star

"To accurately determine the m

"To calculate the theoretical yi
reaction.",

"To assess the purity of the syn
determined melting point to the e

"To gain practical experience in
techniques, including heating und
filtration, and recrystallization.",

"To understand the principles o
in pharmaceutical synthesis."

```
    ],
    "materials": [
      "Salicylic acid (2 g)",
      "Acetic anhydride (5 mL)",
      "Concentrated sulfuric acid (5
      "Distilled water",
      "Ethanol",
      "250 mL beaker",
      "Glass stirring rod",
      "Graduated cylinder",
      "Hot plate",
      "Ice bath",
      "Filter paper",
      "Buchner funnel & vacuum filtr
      "Melting point apparatus",
      "Weighing balance"
```

],

"procedures": "Initially, two gram
subsequently transferred into a c
of acetic anhydride were carefull
acid. To catalyze the esterificatio
acid were then introduced into th
beaker were gently swirled to ens
placed on a hot plate. The reactio
range of 50–60°C for a duration
proceed. Upon completion of the
slowly poured into 50 mL of cold
precipitating the crude aspirin cry
complete the crystallization proc
and water was then immersed in
solid product, crude aspirin, was
setup, which included a Buchner

crude aspirin was then subjectec
involved dissolving the crude asp
by the gradual addition of cold w
product. After recrystallization, th
filtration and allowed to dry thorc
aspirin was accurately determine
recorded for subsequent yield ca
product was also determined usi
against literature values.",
"results": "The synthesis and pu
yielding a crystalline product. Init
starting material, salicylic acid, a
and purified aspirin. Qualitative o
throughout the experimental proc
physical state.\n\n**Table 1: Exp
Parameter | Val

-- | :---------- |\n| M

|\n| Volume of Acetic Anhydride (

Crude Aspirin (g) | 2.35

(g) | 1.82

[STUDENT INPUT REQUIRED] (e.g

(°C) | 135-136 |

addition of acetic anhydride and

mixture initially appeared as a wh

beaker was heated on the hot pla

solution became clear and colorl

When the reaction mixture was p

precipitate immediately formed,

Further cooling in an ice bath enh

substantial white solid. The crud

off-white, somewhat clumpy soli

readily dissolved in hot ethanol, f

water, fine, needle-like white crys

water, fine, needle-like white cry
solution cooled further. The final
white, crystalline powder, free fro
from the purified product.\n\n**S
of Aspirin:**\n The balanced ch
$C_7H_6O_3$ (salicylic acid) + $C_4H_6O_3$ (
(acetic acid)\n\n Molar mass o
3(16.00) = 138.12 g/mol\n Mol
+ 6(1.01) + 3(16.00) = 102.09 g/r
+ 8(1.01) + 4(16.00) = 180.16 g/r
Moles of Salicylic Acid = 2.00 g /
of Acetic Anhydride = 5.00 mL\n
(literature value)\n Mass of Ace
Moles of Acetic Anhydride = 5.41
reaction is 1:1 for salicylic acid a
reactant (0.01448 mol < 0.05299
of Salicylic Acid * Molar mass of

180.16 g/mol = 2.609 g\n\n2. **
(Mass of Purified Aspirin / Theor
2.609 g) * 100% = 69.7%",
"discussion": "The primary aim c
acetylsalicylic acid, commonly kr
between salicylic acid and acetic