



# In organic Pharmaceutical Chemistry

## Third Stage First Semester

### Lab No: 2



# Assay of Ibuprofen



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# Introduction



- Ibuprofen ( $C_{13}H_{18}O_2$ , 206.28 g/mol ) is a propionic acid derivative and nonsteroidal anti-inflammatory drug (NSAID) with anti-inflammatory, analgesic, and antipyretic effects
- Ibuprofen is a monocarboxylic acid and present as colorless crystals or a white crystalline powder and it has a characteristic odor
- Ibuprofen is practically insoluble in water, but very soluble in most organic solvents like ethanol, methanol, acetone and dichloromethane

# Assay of ibuprofen



- Assay?

## Purpose:

- Amount
- Purity

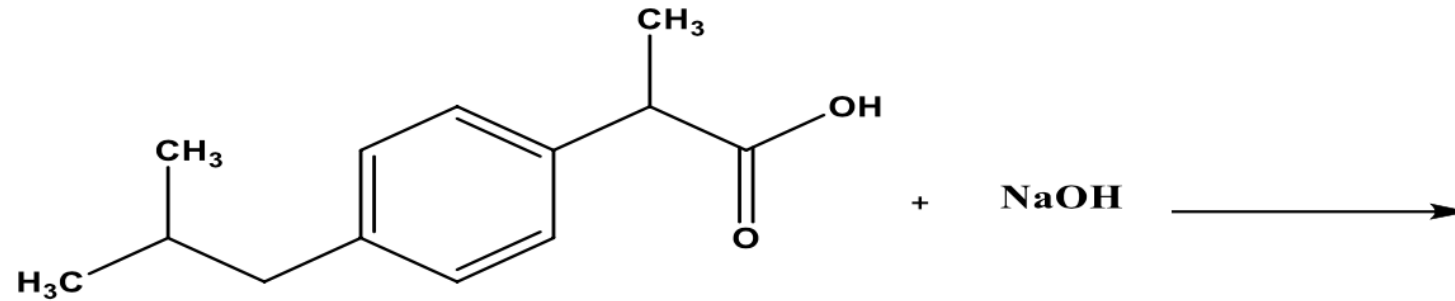


# Principle:

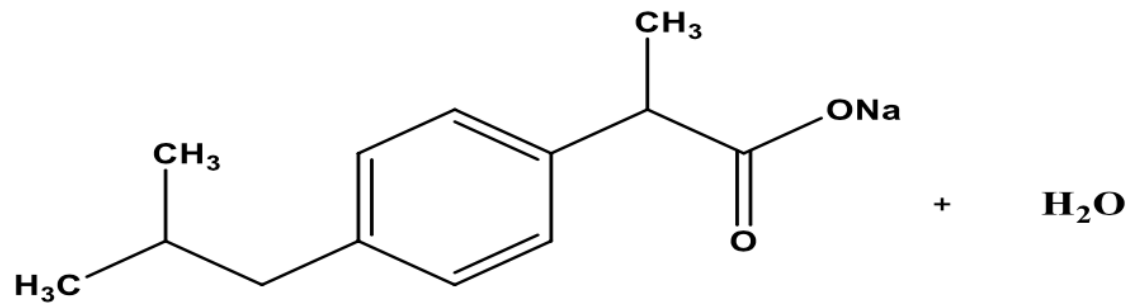


- The assay carried by acid base titration
- Weak acid with strong base neutralization
- The neutralization reaction of ibuprofen with sodium hydroxide using phenolphthalein as an indicator
- Ibuprofen is isobutyl propanoic phenolic acid, containing carboxylic acid moiety react with sodium hydroxide base to form the sodium salt of the carboxylic acid

# Principle:



**Ibuprofen**



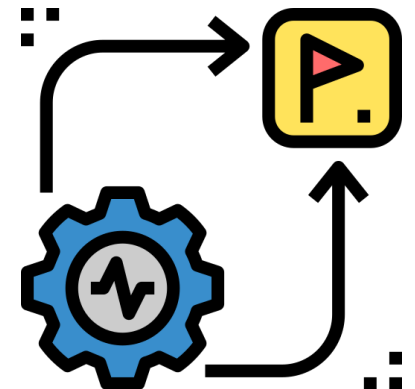
**Ibuprofen sodium**

# Methods



## Isolation and assay of pure Ibuprofen

- Ten tablets of Ibuprofen were accurately weighed and powdered in a mortar
- The powdered Ibuprofen was dissolved in 100 ml of water and stirred gently for about 10 min
- The resultant solution was poured into a separation funnel and shaken with 100 ml chloroform
- The organic layer was removed



# Methods



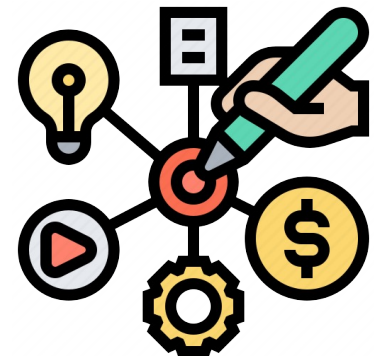
- More chloroform (50 ml) was added to the aqueous layer and the mixture further shaken
- The chloroform layer was separated and added to the already separated chloroform layer
- The total chloroform layer was filtered and upon evaporation of the solvent a needle-like crystals was obtained

# Methods



## Procedure:

- Dissolve about 0.4 g of ibuprofen, accurately weighed, in 100 mL of ethanol and then take 10 ml of the solution and add 2 drops of phenolphthalein as an indicator and titrate with sodium hydroxide (0.1 N).
- Titrate until you get a pink color





# Calculation



- When the base neutralizes the acid (at the endpoint), the number of equivalents of acid = the number of equivalents of base , therefore :-
- $(N1 * V1)_{\text{NaOH}} = (N2 * V2)_{\text{ibuprofen}}$
- N1 :the normality of NaOH solution
- V1 :the volume of NaOH solution used (descending from burette)
- N2 :the normality of ibuprofen solution (to be calculated)
- V2 : volume of ibuprofen solution used (10 ml in our experiment)
- From the normality of ibuprofen, we calculate the weight of ibuprofen in 10 ml of solution



# THANK

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