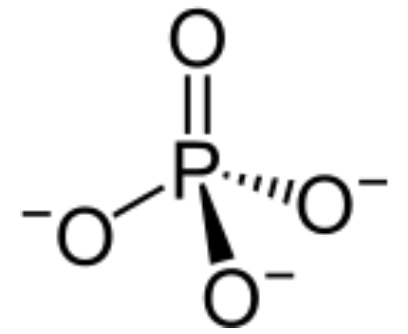


Estimation of inorganic phosphate in soft drinks

Phosphate in food:



- Phosphate occurs naturally in the form of **organic esters** in many kinds of food, including meat, potatoes, bread, and milk.
- Phosphate also used as a food additive (inorganic phosphate) as a preservative, a flavor or color enhancer, extend shelf life, and retain moisture.

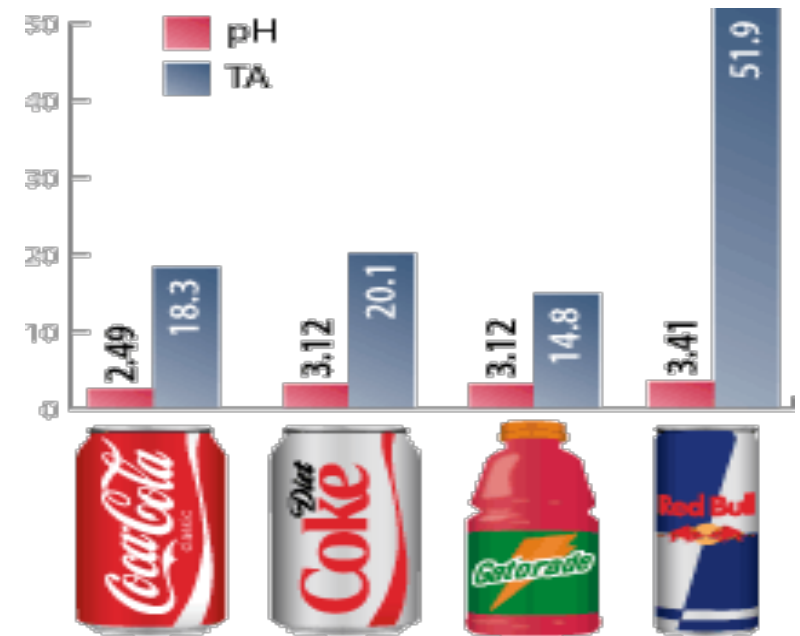
Soft drinks:

- Soft drinks are **complex mixtures** containing a variety of substances such as colouring compounds, flavoring agents, acidifiers, sweeteners, preservatives, and caffeine.
- The most common **acidifier used in soft drinks is phosphoric** which gives a tangy taste in the mouth.
- Phosphoric acid can also acts as a **preservative, keeping the contents of the bottle fresh.**



Cola vs Vinegar:

- Due to the use of phosphoric acid, cola is actually more acid than vinegar which no body can drink straight. But a ton of sugar, dyes and flavoring are added to mask the acidity.



Practical Part

Objective:



- Estimation of inorganic phosphate in soft drinks using ascorbic acid as reducing agent.

Principle:

- Phosphoric acid is colorless, they **cannot be directly** determined using visible-light spectrophotometry, Instead we will **quantitatively convert them into a colored substance**, whose absorbance can be easily measured
- Inorganic phosphate reacts with ammonium molybdate in an acid solution (ammonium molybdate prepared in sulphuric acid in this experiment) to form **phosphomolybdic acid**.
- Phosphomolybdic acid is then **reduced by a reducing agent (3% ascorbic acid)** to give **molybdenum blue a green/ blue color** that absorb at 650nm .

Method:

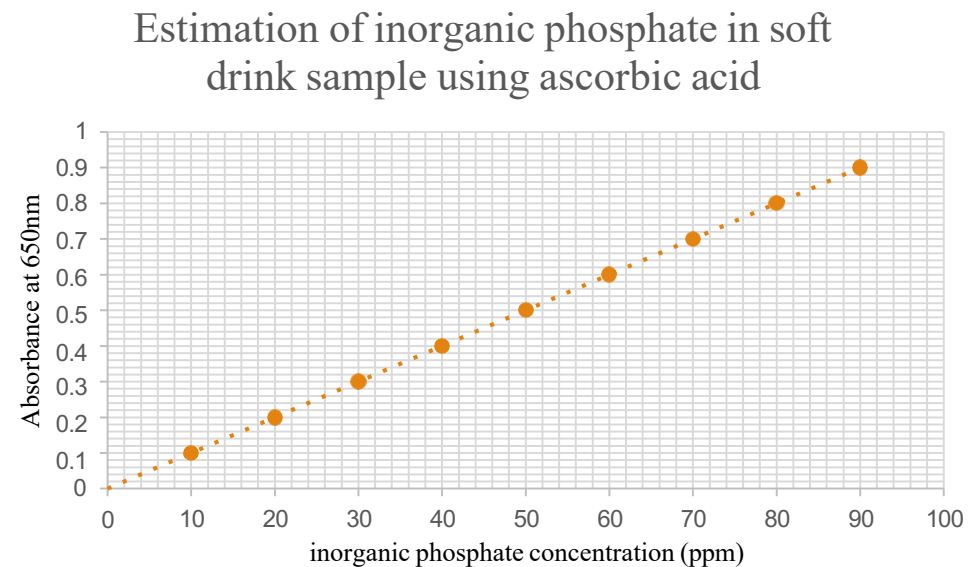
| | Standard | Soft drink sample | Water | Ammonium molybdate | Ascorbic acid |
|----------------------------------|----------|-------------------|-------|--------------------|---------------|
| Blank | ---- | ---- | 2 | 0.5 ml | 0.5 ml |
| 3 ppm | 2 | ---- | --- | | |
| 4.5 ppm | 2 | ---- | --- | | |
| 6 ppm | 2 | --- | --- | | |
| 12 ppm | 2 | --- | --- | | |
| 15 ppm | 2 | --- | --- | | |
| SD (try different concentration) | | | | | |

Mix thoroughly after each addition  Allow to stand for 10 min
 (a deep blue/green colour should develop)  Measure the absorbance at 650 nm.

Results:

- Plot a graph between absorbance and concentration of phosphate in various standard solutions and obtain the calibrated curve.
- From the curve determine the amount of phosphate in the test solution.

| Tube | Absorbance at 650nm |
|---------|---------------------|
| Blank | |
| 3 ppm | |
| 4.5 ppm | |
| 6 ppm | |
| 12 ppm | |
| 15 ppm | |
| Sample | |



Calculations:

- **Inorganic phosphate concentration**= dilution factor x concentration from the curve = ----- ppm

- **Dilution factor**= final volume / aliquot volume

→SD1=

→SD2=