

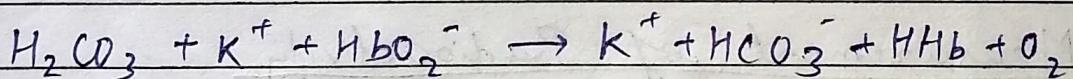
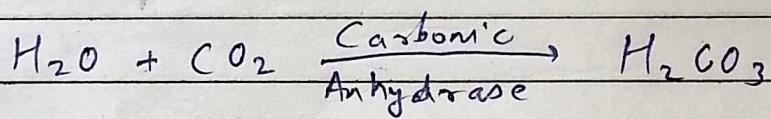
Physiological Acid-Base balance:

Acids are constantly being produced during metabolism. Most of the metabolic reaction occurs only during a very narrow pH range of 7.38 to 7.42.

Therefore, the body utilises several efficient buffer system. Two of them are ① bicarbonate-carbonic acid (HCO_3^{2-} : H_2CO_3) present in plasma entity.

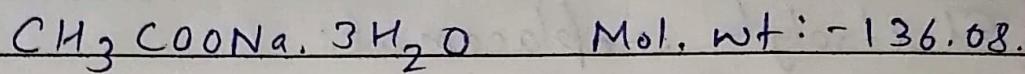
② monohydrogen phosphate-dihydrogen phosphate (HPO_4^{2-} : H_2PO_4^-) - found in cells and kidney.

Carbonic Anhydrase:



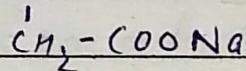
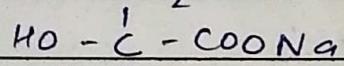
Electrolytes used in Acid-Base Therapy.

① Ex:- Sodium acetate.

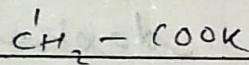
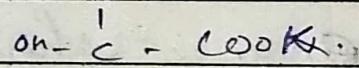


② Potassium acetate - CH_3COOK , Mol. wt - 98.14

③ Sodium Citrate $\rightarrow \text{CH}_2\text{COONa}$;



④ Potassium citrate $\rightarrow \text{CH}_2\text{-COOK}$



Electrolyte Combination Therapy:

- Fluid Maintenance. → Glucose of saline solution required for short term therapy
- Electrolyte replacement:
 - ↓ severe deficit.
 - additional electrolyte required.

Test

Fluid Maintenance:

- Intravenous.
- All maintenance should contain at least 5% dextrose; the other ions are sodium (25-30 mEq/L), Potassium (15-20 mEq/L), chloride (22 mEq/L), bicarbonate (20-33 mEq/L), Magnesium (3 mg/L) and Phosphorous (3 mEq/L).

Replacement Therapy:-

Conditions:- Excess loss of Electrolytes and water, due to fever, severe vomiting and diarrhoea.

Two types of solutions are used in replacement therapy.

- i) a solution for rapid initial replacement.
- ii) a solution for subsequent replacement.

- iii) a solution for rapid initial replacement

→ Almost similar to the electrolyte conc. found in the extracellular fluid.

Electrolytes	Concentration in 1.mEq/l	Concentration in 2.mEq/L
Na ⁺	130-150	40-120
K ⁺	4-12	16-35
Cl	98-109	30-103
HCO ₃	28-55	16-53
Ca ⁺²	3-5	0-5
Mg ⁺²	3	3-6

Oral Rehydration Therapy (ORT)

The oral administration of fluid that contains suitable combinations of carbohydrates and electrolyte is known as oral rehydration therapy.

0.9% NaCl solution and glucose and electrolytes.

There are two basic treatment phases

i) Rehydration phase:

ii) Maintenance phase:

Sodium - 130-150 mmol / L

Potassium - 20-25 mmol / L

Lactate

Glucose - 56-140 mmol / L

Multible Electrolyte powder

* Oosal Rehydration Salt.

→ Each packet (35g) contains

- Sodium chloride (1.25 g)
- Potassium chloride (1.50 g)
- Sodium Citrate (2.90 g)
- Anhydrous dextrose (27 g).

* Electrolytes

- Sodium (52) mEq/L
- Potassium (20) mEq/L
- Chloride (91) mEq/L
- Citrate (30) mEq/L
- dextrose (150) mmol/L

* Oosal rehydration salt (WHO, UNICEF).

→ It contains for 1L sol :-

- Sodium chloride (3.5 g)
- Potassium chloride (1.5 g)
- Sodium bicarbonate (2.5 g)
- Sodium citrate dihydrate (2.9 g), and
- Anhydrous glucose (20 g).

→ Multiple Electrolyte solution

- i) Dextalyte Ready - p oral solution
- ii) Paediatric solution for Intravenous use.
- iii) Elliott's B solution.
- iv) Ringer's injection (U.S.P) 100 ml :-
A sterile solution containing NaCl (860 mg), KCl (30 mg), calcium chloride dihydrate (33 mg) and water for injection to 100 ml.

★ Dialysis solution :

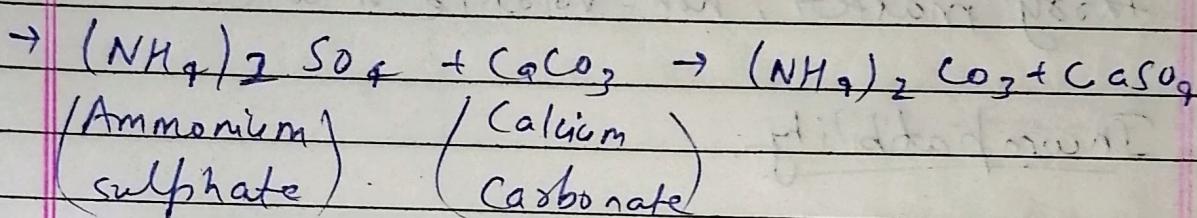
→ Intraoperative Dialysis Fluid (I.P.)

→ It contains :-

- Sodium chloride (5.56 g)
- Sodium acetate (4.76 g)
- Calcium chloride (0.22 g)
- Magnesium chloride (0.152 g)
- Sodium metabisulphite (0.15 g)
- Dextrose anhydrous (12.0 g)
- Purified water Q.S. to 1000 ml.

* Respiratory Stimulant:

- Chronic obstructive airways Disease.
- Chronic obstructive Pulmonary disease.
- It contain the equivalent of not less than 30% of NH_3 .
- Ammonium carbonate - $[\text{NH}_4\text{HCO}_3]_m \cdot [\text{NH}_2\text{CO}_2\text{NH}_4]_n$

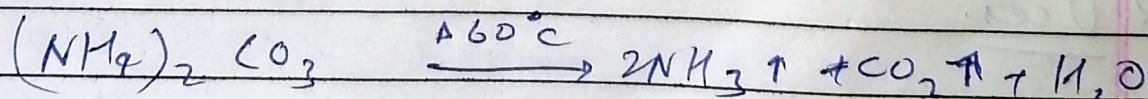
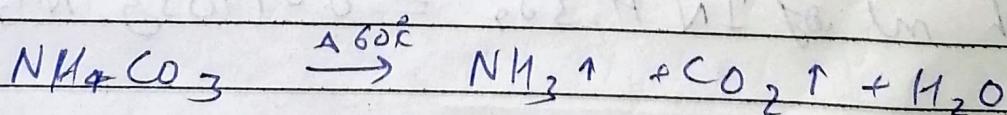


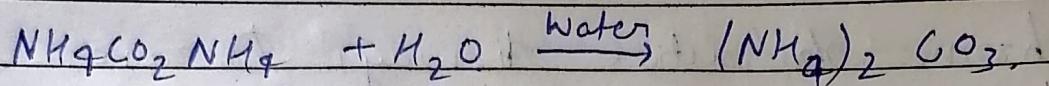
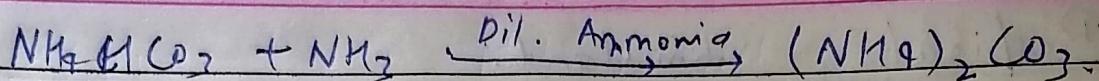
* Physical character:

It occurs as translucent, hard, crystalline masses.

- Odour is strongly ammonical, taste is pungent.
- It is freely soluble in water, alkaline to litmus. It volatizes at about 60° .

* Chemical properties





* Test for purity:

Test for iron, chloride, sulphate, tarry matter, non-volatile matter

* Incompatibility

Acid and acid salts, salt salt of iron, zinc, alkaloids, alum, calomel.

* Assay

2g of sample + 50ml of 1N H_2SO_4 + 5ml of H_2O .

↓ Boiled and then cooled.

Titrate with 1N NaOH, using methyl red solution as indicator.

Each ml of 1N $\text{H}_2\text{SO}_4 \approx 0.01703\text{g NH}_3$

* Uses:

Ammonium carbonate is used as respiratory stimulant, expectorant and bicentical aid.