PRACTICES

Quantity Determination of Calcium Lactate

$[CH_3CH(OH)COO]_2\ Ca\ .5\ H_2O$

Dissolve the 0.5 g of the sample in 100 ml of water and 5 ml of 5% HCl and heat to 90 °C. Add 10 ml of 10% ammonium oxalate. Neutralize with 10% ammonia solution and check by litmus paper. Then, add 1ml of ammonia solution and heat for one hour on a water bath. Cool the mixture and filtrate the precipitate. Wash the precipitate with water several times to remove the chloride ions. Pure calcium oxalate is obtained. The precipitate is suspended in 15 ml of water. Add 50 ml of diluted H_2SO_4 and filter the calcium oxalate precipitate. The filtrate is titrated with 0.1 N $KMnO_4$ until forming pink colour at 70 °C.

1 ml 0.1 N $KMnO_4$ is equivalent to 10.911 mg calcium lactate

Reaction equation:

$$[CH_3CH(OH)COO]_2Ca + 2\ HCl \longrightarrow 2\ CH_3CH(OH)COOH + CaCl_2$$

$$CaCl_2 + \begin{matrix}COONH_4\\COONH_4\end{matrix} \longrightarrow \begin{matrix}COO\\COO\end{matrix}Ca\downarrow + 2\ NH_4Cl$$

$$\begin{matrix}COO\\COO\end{matrix}Ca + H_2SO_4 \longrightarrow \begin{matrix}COOH\\COOH\end{matrix} + CaSO_4$$

Reaction:

$$5\ (COOH)_2 + 2\ KMnO_4 + 3\ H_2SO_4 \longrightarrow K_2SO_4 + 2\ MnSO_4 + 10\ CO_2 + 8\ H_2O$$

Preperation of 0.1N Potassium Permanganate Solution:

($KMnO_4$ M.W.: 158.04) Dissolve 3.3 g of potassium permanganate in 1 L of purified water and heat on a steam bath for one hour. After cooling, filter through a fine porosity sintered glass crucible (ideally, solution is allowed to stand for 48 hrs before filter). Avoid exposure to direct sunlight and heat. Keep in colored bottles with glass lid.

Adjustment of Potassium Permanganate Solution:

Weigh accurately 0.2 g sodium oxalate ($Na_2C_2O_4$) (dried 2 hrs., 105-110 °C). Add 250 ml of water and 7 mL sulfuric acid. Heat the solution to 70 °C (Maintain temperature during titration). Titrate by slow dropwise addition of potassium permanganate solution until the appearance of a pink color which persists for 30 secs.

1 ml 0.1 N $KMnO_4$ solution is equivalent to 6.700 mg pure sodium oxalate

Primary standard compounds: sodium oxalate ($Na_2C_2O_4$), Arsenic trioxide (As_2O_3), potassium iodide (KI).