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ANALYSIS OF CALCIUM LACTATE

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ABSTRACT

Calcium is the most readily available mineral in the body required in building and maintaining strong bones and teeth; it also helps in muscle, nerve, and blood vessel functions. Calcium lactate is a calcium supplement often used to treat calcium deficiencies and maintain strong bones. It is also used as a food additive to enhance texture and flavor. It cannot be emphasized more that calcium is a crucial nutrient and its deficiency is a cause of several health conditions, including osteoporosis, osteopenia, and hypocalcemia. Thus, calcium supplements, like calcium lactate, may be a useful means of supplementation for nutrition and general health. Other than being helpful in maintaining the bones, it has been related to lowering blood pressure, protecting the colon against cancer, and promoting weight management. The calcium lactate compound was analyzed by several methods, including flame tests and complexometric titration. The outcome indicated a percentage purity of 98.64% w/w, thus making it highly pure. In conclusion, calcium lactate is a valuable supplement that can support bone health and overall well-being. Its high purity and efficacy make it an excellent choice for individuals looking to supplement their diet with calcium.

KEYWORDS: Osteoporosis, osteopenia, hypocalcemia, complexometric.

INTRODUCTION

Calcium is the most abundant mineral in the body. Almost all calcium in the body is stored in bones and teeth, giving them structure and hardness. Your body needs calcium for muscles to move and for nerves to carry messages between your brain and every part of your body.

Lactic acid can be produced biochemically by fermentation or chemically by synthesis of petrochemical compounds. According to Offendable the biotechnological production of lactic acid has the following advantages over the chemical synthesis: environment protection, the natural resources used for biotechnological production are renewable, the lactic

acid isomer produced can be chosen because it is well known that only L (+)-lactic acid isomer is used in food industry and pharmaceutical compounds. Calcium lactate is now used to preserve various foodstuffs and prolong shelf life of food. Its main applications include preservation of vegetables, fruits, meat and meat products, also being added in beverages, jelly, chewing gum, candy products, calcium lactate can be used in food industry as calcium source, dietary supplement, for preserving fresh food as antioxidant and stabilizer, as antimicrobial. It can be produced by chemical reaction between lactic acid and calcium carbonate. The calcium carbonate can be used as a pure, commercial substance, or can be obtained from egg shells or crustacean shells. It is recommended to use calcium from eggshells because eggshells are considered to be a waste product, and according to Omi, the calcium from eggshell powder is more easily absorbed by the rat small intestine than the commercial calcium carbonate. Calcium lactate has antimicrobial activity against aerobic and anaerobic microorganisms that can be found in meat. Although calcium lactate, sodium lac.

What is calcium good for?

Your body needs calcium to build and maintain strong bones. Your heart, muscles and nerves also need calcium to function properly. Some studies suggest that calcium, along with vitamin D, may have benefits beyond bone health: perhaps protecting against cancer, diabetes and high blood pressure.

What Are Synthetic and Natural Nutrients?

Here's the difference between natural and synthetic nutrients:

- **Natural nutrients:** These are obtained from whole food sources in the diet.
- **Synthetic nutrients:** Also referred to as isolated nutrients, these are usually made artificially, in an industrial process.

Synthetic nutrients do not include "whole food supplements," which are made from concentrated, dehydrated whole foods.

The majority of supplements available on the market today are made artificially. These include vitamins, antioxidants, minerals and amino acids, among others.

They can be taken in pill, capsule, tablet, powder or liquid form, and are made to mimic the way natural nutrients act in our bodies.

To figure out if your supplement is synthetic or natural, check the label. Natural supplements usually list food sources or are labeled as 100% plant or animal-based.

Supplements that list nutrients individually, such as vitamin C, or use chemical names like ascorbic acid, are almost certainly synthetic.

What Are Natural and Synthetic Nutrients Different?

The accepted view is that synthetic nutrients are almost chemically identical to those found in food.

However, the production process of synthetic nutrients is very different to the way plants and animals create them. So, despite having a similar structure, your body may react differently to synthetic nutrients.

Additionally, it's unclear how well synthetic nutrients are absorbed and used in the body. Some may be more easily absorbed, not others.

This is because when you eat real food, you're not consuming single nutrients, but rather a whole range of vitamins, minerals, co-factors and enzymes that allow for optimal use by the body.

Without these additional compounds, synthetic nutrients are unlikely to be used by the body in the same way as their natural counterparts. For example, studies show that natural vitamin E is absorbed twice as efficiently as synthetic vitamin E.

Should You Take Synthetic Nutrients?

There is no clear evidence to suggest that most synthetic nutrients are beneficial for healthy, well-nourished people. However, there are certain groups who may benefit from supplementing with synthetic nutrients. These include:

- **The elderly:** This group tends to be at a higher risk of vitamin D deficiency and may also need more vitamin B12 and calcium for bone health.
- **Vegans and vegetarians:** As certain vitamins and minerals are found mainly in animal products, this group is often at a high risk of deficiency for vitamin B12, calcium, zinc, iron and vitamin D.
- **Pregnant and breastfeeding women:** These women may have to supplement their diet with extra vitamins and/or minerals (such as vitamin D) and avoid others (such as vitamin A).
- **Women of childbearing age:** This group is often encouraged to take a folic acid supplement to reduce the risk of neural tube defects if they do become pregnant. However, taking more than you need may have some risks.
- **People with nutrient deficiencies:** Certain dietary supplements may treat nutritional deficiencies, such as iron supplements for treating iron deficiency anemia

CALCIUM AND CALCIUM SUPPLEMENT

- Calcium is a mineral in your body needs to build and maintain strong bones and to carry out many important functions. Calcium is the most abundant mineral in the body.
- Almost all calcium in the body is stored in bones and teeth giving them structure and hardness.
- Your body needs calcium for muscles to move and for nerves to carry messages your brain and every part of your body.
- Calcium also helps blood vessels move blood throughout your body and helps release hormones that affect in many functions in your body.
- Vitamin D helps in your body absorb calcium.[1]

Fig. 1: Calcium Products.

CALCIUM-RICH FOODS

- People can obtain calcium from a range of foods and drinks.

The following are good sources Trusted Source:

- Yogurt, milk.
- Fortified dairy alternatives, such as soy milk.
- Sardines and salmon.
- Cheese, tofu.
- Green leafy vegetables, such as broccoli, turnip leaves, watercress, and kale.
- Fortified fruit juices.
- Nuts and seeds, especially almonds, sesame, and chia.
- Cornmeal and corn tortillas.
- Some dark green vegetables, such as spinach, contain calcium. However, they also contain high levels of oxalic acid.

Fig. 2: Calcium Rich Foods.

HOW MUCH DO WE NEED?

According to the Office of Dietary Supplements Trusted Source (ODS), people need the following amounts of calcium:

- 0–6 months: 200 milligrams (mg)
- 7–12 months: 260 mg
- 1–3 years: 700 mg
- 4–8 years: 1,000 mg
- 9–18 years: 1,300 mg
- 19–50 years: 1,000 mg
- 51–70 years: 1,000 mg for males and 1,200 mg for females
- 71 years and above: 1,200 mg
- Pregnant and breastfeeding women require 1,000–1,300 mg depending on age.

A doctor may recommend additional calcium for people who:

- Have started menopause
- Have lactose intolerance or a cow’s milk allergy.

CALCIUM DEFICIENCY

The following conditions or lifestyle habits may result in low calcium levels, also known as hypocalcemia:

- Bulimia, anorexia, and some other eating disorders.
- Mercury exposure.
- Overconsumption of magnesium.
- Lack of parathyroid hormone.
- People who eat a lot of protein or sodium may excrete calcium.
- Some cancers.
- Some Conditions such as celiac disease and inflammatory disease, Crohn's disease, and some other digestive diseases.
- Some surgical procedures, including removing the stomach.
- Kidney failure.
- Vitamin D deficiency.
- Phosphate deficiency.

The body eliminates some calcium in sweat, urine, and feces. Foods and activities that encourage these functions may reduce the levels of calcium in the body.

Fig. 4: Calcium Disorder.

CALCIUM SUPPLEMENTS

- A doctor may recommend calcium supplements for people who have a calcium deficiency.

People who use calcium supplements should:

- Check first with their doctor whether they need supplements.
- Follow the dosage the doctor recommends.
- Take the supplement with food for best absorption and to minimize possible adverse effects.
- Consume the supplements at intervals, usually two or three times a day.
- According to the ODS, around 43%trusted source of all adults in the united states take calcium supplements, including 70% of older females. Taking supplements can increase daily calcium intake by about 300 mg of calcium a day, on average.
- Many calcium supplements also contain vitamin d. Vitamin d encourages the synthesis of proteins in the body and helps the body absorb calcium. Magnesium also plays a role in strengthening bones, and calcium supplements may also contain magnesium.

Fig. 5: Calcium Supplement.

Types of supplements

- There are different types of supplements. A doctor can recommend the best option. This will depend on the individual's needs and preferences, any medical conditions they have, and whether they are taking any medications.
- Elemental calcium is the pure mineral, but calcium in its natural form exists with other compounds.
- Supplements may contain different proportions of calcium compounds and elemental calcium. For example:
- **Calcium carbonate**: This contains 40% elemental calcium. This type is commonly available, and it is relatively cheap and convenient. A person should take it with food, as stomach acid helps the body absorb it.
- **Calcium lactate**: This contains 13% elemental calcium.
- **Calcium gluconate**: This contains 9% elemental calcium.
- **Calcium citrate**: This contains 21% elemental calcium. A person can take it with or without food. It is useful for people with inflammatory bowel disease, achlorhydria, and some absorption disorders.

Fig. 6: Calcium Lactate.

Risks of supplements

- Research has found conflicting evidence regarding the benefits and drawbacks of supplement use.
- Most experts Trusted Source agree that it is better to obtain nutrients from natural food sources, although sometimes it is not possible to get enough in this way.
- Some studies have suggested, however, that calcium supplementation could be hazardous.

Side effects

- Some people report gastrointestinal symptoms, such as bloating, constipation, gas, or a combination of all three when using calcium supplements.
- Calcium citrate usually has fewer and less pronounced side effects than calcium carbonate. Taking the supplements with food, or spreading their intake throughout the day may help reduce the occurrence or intensity of the side effects.[2]

Fig. 7: Pain in bones.

Possible complication

Past studies have raised concerns that taking calcium supplements may increase the risk Trusted Source of:

- Kidney stones.
- A reduction in iron absorption.
- A higher risk of a heart attack.
- However, more recent studies have suggested that these concerns may be unfounded.
- Calcium may interact with some drugs.[3]

NUTRACEUTICALS

Nutraceutical is a latest term for health food, first innovated by Stephen Deffice, founder of the Foundation for Innovation in Medicine of New Jersey, USA.

Word nutraceutical is on amalgamation of the term **NUTRITION** and **PHARMACEUTICAL** or it can be more correctly defined as parts of a food that have a medical or health benefit including the prevention and treatment of disease.

The three main constituents, which make-up nutraceutical are **Herbal and related extracts, vitamins, minerals and nutrients.**

Antioxidants and herbal teas also form an important part of the nutraceuticals market. The leading **antioxidant phytochemicals in demand are Vitamin A, C and E; carotenoids and flavonoids.**

The US demand for nutraceuticals increased from US dollar 830 million in 1987 to US dollar 1.7 billion in 1996 and was expected to reach US dollar 4.5 billion in 2005.

Japan is the third largest producer of nutraceuticals in the world and largest in the Asia pacific region. About half of all patents for nutraceuticals have been developed in Japan.

Nutraceuticals are the most progressing sector for the health food and pharmaceutical industry based on plants. Many function food/nutraceutical companies are part of large food or pharmaceutical industries. A number of large food pharmaceutical companies, such as Abbott Laboratories, Himalayas, Dabur, Allen laboratories are also manufacturing nutraceuticals.

Recently Ranbaxy Pharmaceuticals Industry has also started its herbal research and development units.[4]

IMPORTANCE

For the consumers point of views functional foods and nutraceutical offer many benefits.

- Increase the health value of our diet.
- Nutraceuticals not only supplement the diet but also aid in the prevention and or treatment of disease and or disorder.
- Nutraceuticals are represented for use as a conventional food or as the sole time of meal or diet.
- Help us avoid to particular medical condition.
- Used for the prevention, treatment or cure of a conditions or disease.[5]

CLASSIFICATION OF NUTRACEUTICALS

In order to distinguish between the wide varieties of products there are multiple different types of products that fall under the category of nutraceuticals:

1) Dietary supplements

- A Dietary supplement is a product that contains nutrients derived from food products that are concentrated in liquid or capsule form.
- Dietary supplements include – vitamins, minerals, co-enzyme Q, carnitine, etc.
- The Dietary Supplementation Health Education Act [DSHEA] formally defined “dietary supplement” using several criteria.[6]

2) Functional Foods

Functional foods are designed to allow eating enriched foods close to their natural state, rather than by taking dietary supplements manufactured in liquid or capsule form. Sometimes, additional complementary nutrients are added, such as vitamin D to milk.[7] (E.g. Oats, bran, psyllium and lignin’s for heart disease and colon cancer Prebiotics - oligo fructose for control of intestinal flora, Canola oil with lowered triglycerides for cholesterol reduction, etc.

3) Medical Foods

- Medical foods are foods that are specially formulated and intended for the dietary management of a disease that has distinctive nutritional needs that cannot be met by normal diet alone.[8] Medical foods aren’t available as an over-the-counter product to consumers.
- The FDA considers medical foods to be “formulated to be consumed or administered internally under the supervision of a physician, and which is intended for the specific dietary management of a disease or condition for

which distinctive nutritional requirements, on the basis of recognized scientific principles, are established by medical evaluation."

- Medical foods can be ingested through the mouth or through tube feeding. Medical foods are closely monitored by medical supervision.

4) Pharmaceuticals

- The term pharmaceuticals are more frequently associated, in agricultural circles, with medical applications of genetically engineered crops or animals. Pharmaceutical is a melding of the words farm and pharmaceuticals. It refers to medically valuable compounds produced from modified agricultural crops or animals (usually through biotechnology). E.g. Transgenic cows and lactoferrin for immune enhancement, transgenic plants for oral vaccination against infectious diseases.[9]

Fig. 8: Nutraceutical Products.

Nutraceutical product contain calicum

1. CALCIUM CARBONATE: 1500 mg (providing 600 mg of elemental calcium per serving)

Role: Calcium Carbonate is a widely used form of calcium supplement due to its high calcium content and low cost.it provides a significant source of elemental calcium essential for bone mineralization and maintenance.[10]

2. VITAMIN D3 (Cholecalciferol):2000 IU

Role: Vitamin D3 plays a crucial role in enhancing calcium absorption from the gut and regulating calcium absorption from the gut and regulating calcium and phosphate metabolism. Adequate vitamin D levels are associated with improved bone density and reduced fracture risk.[11]

3. MAGNESIUM (Magnesium citrate): 250 mg

Role: Magnesium is a vital mineral that supports bone health by assisting in the regulation of calcium and vitamin D. It contributes to bone density and helps maintain a healthy bone structure.[12]

4. VITAMIN K2 (MK-7): 60 mcg

Role: Vitamin K2 supports calcium metabolism by directing calcium to the bones and teeth while preventing its deposition in the arteries. It is crucial for the activation of osteocalcin, a protein that helps bind calcium to the bone matrix.[13]

5. ZINC (Zinc Picolinate): 10 mg

Role: Zinc is essential for bone formation and repair. It influences the activity of osteoblast and osteoclast, which are responsible for bone remodeling.[14]

6. Boron (Boron citrate): 5 mg

Role: Boron contributes to bone health by enhancing the metabolism of calcium, magnesium, and vitamin D. It also plays a role in bone growth and repair.[15]

CALCIUM LACTATE

Calcium lactate is a white crystalline salt with formula $C_6H_{10}Cao_6$, consisting of two lactate anions $H_3CCO^-_2$ for each calcium cation Ca^{2+}. It forms several hydrates, the most common being the pentahydrate $C_6H_{10}Cao_6 \cdot 5H_2O$.

Formula: $C_6H_{10}CaO_6$

Molar mass: 218.22 g/mol

Solubility: Very Soluble in Methanol, Insoluble in Ethanol

Density: 1.49 g/cm³

Acidity (pK_a): 6.0-8.5

ATC code: A12AA05 (WHO).[16]

DEFINITION

Calcium lactate is a food additive that's typically added to a wide variety of foods to enhance their texture and flavor or help extend their shelf life.

This compound can also be used as an ingredient in medications or certain types of calcium supplements.

This article reviews everything you need to know about calcium lactate. [17]

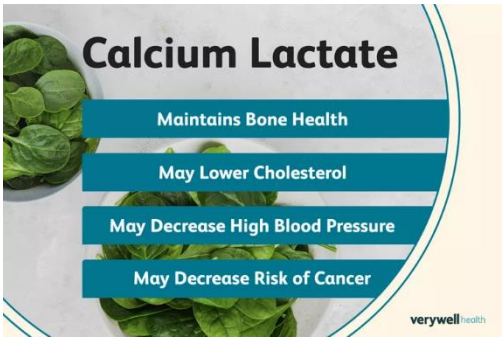

Fig. 9: Calcium Lactate.

What is calcium lactate?

Calcium lactate is a white or cream, almost odorless food additive derived from lactic acid, a compound that cells naturally create when trying to produce energy in low oxygen conditions.

It's produced commercially by neutralizing lactic acid with calcium carbonate or calcium hydroxide and most often used to stabilize, thicken, flavor, firm, or leaven foods. Calcium lactate is either referred to by its name or E number — E327.

Calcium lactate can also be added to calcium supplements or medications used to treat acid reflux, bone loss, a poorly functioning parathyroid gland, or certain muscle diseases.

It may also be added to animal feed or used to treat water to make it suitable for human consumption,

Despite its similar name, calcium lactate does not contain lactose. As such, it's safe for people with lactose intolerance.[18]

What foods contain calcium lactate?

Calcium lactate is commonly used as a food additive in packaged foods, such as:

- Nectars.
- Jams, jellies, and marmalades.
- Butter, margarine, and other types of fats used for cooking or frying.
- Canned fruits and vegetables.
- Beer.

It's sometimes also added to fresh foods, such as mozzarella cheese, fresh pastas, or precut fruit to help them maintain their firmness or extend their shelf life.

You can tell whether a food contains calcium lactate by looking for it on the ingredient label. Calcium lactate may also be labeled as e327.[19]

Possible health benefits

Very few studies have specifically researched the health benefits of calcium lactate.

That said, it can be used as a main source of calcium in calcium supplements, and some studies link calcium-rich diets to stronger and healthier bones, though research is inconsistent.

Though sourcing your calcium directly from foods remains the best way to ingest this mineral, supplements can be a helpful tool for those who are unable to get enough calcium through their diet alone.

When consumed as a supplement, calcium lactate may provide benefits similar to those associated with other calcium supplements, including:

- **Stronger bones.** When taken together with vitamin D, calcium supplements are thought to contribute to the development and maintenance of strong, healthy bones.
- **Reduced blood pressure.** Calcium-rich diets may help slightly lower systolic blood pressure (the top number) in those with elevated blood pressure. However, there seems to be little benefit among people with normal blood pressure levels.

- **Protection against preeclampsia.** High calcium intakes during pregnancy may lower the risk of preeclampsia, a serious complication that affects up to 14% of pregnancies worldwide.
- **Protection against colon cancer.** Studies suggest that a high calcium intake from foods or supplements may reduce colon cancer risk. Still, more research is needed to confirm these findings.

Therefore, to contain equivalent amounts of calcium, calcium lactate supplements may be larger than other types of calcium supplements, potentially making them harder to swallow. You may also need to take more pills.

Calcium lactate is likely less constipating than calcium carbonate, but it doesn't provide any additional benefits beyond those associated with calcium citrate. This explains why it's seldom used as a main ingredient in calcium supplements.[20]

Safety and precautions

According to the Food and Drug Administration (FDA), calcium lactate is generally recognized as safe (GRAS) and may be added to all foods except infant foods and formulas.

Calcium lactate is considered a safe source of calcium in calcium supplements. In addition, given that it contains less calcium than other forms, it's less likely to cause the constipation or upset stomach commonly associated with supplements containing calcium carbonate.

That said, it's important to note that excess intakes of calcium lactate may result in hypercalcemia, a condition characterized by dangerously high blood levels of calcium, which may cause heart or kidney problems.

It's best to not exceed the safe daily upper intake levels (UL) of 2,500 mg per day for adults under 50 years old and pregnant or breastfeeding people, 2,000 mg per day for those 51 years or older, and 3,000 mg per day for pregnant or breastfeeding people younger than 19.

Calcium lactate supplements may also interact with some medications, including diuretics, antibiotics, and anti-seizure drugs. Therefore, it's best to seek guidance from your healthcare provider before taking such supplements. [21]

Side Effects of Calcium Lactate?

In smaller doses, calcium lactate seems to be well tolerated. However, high calcium intake can cause some side effects. These include:

- Constipation.
- Gas and bloating.
- Decreased absorption of iron and zinc.[22]

Interactions

Drug interactions may change how your medications work or increase your risk for serious side effects. This document does not contain all possible drug interactions. Keep a list of all the products you use (including prescription/nonprescription drugs and herbal products) and share it with your doctor and pharmacist. Do not start, stop, or change the dosage of any medicines without your doctor's approval.

Some products that may interact with this drug are: digoxin, cellulose sodium phosphate, certain phosphate binders (such as calcium acetate).

Calcium can decrease the absorption of other drugs such as bisphosphonates (for example, alendronate), tetracycline antibiotics (such as doxycycline, minocycline), levothyroxine, and quinolone antibiotics (such as ciprofloxacin, levofloxacin). Separate your doses of these medications as far as possible from your doses of calcium. Ask your doctor or pharmacist about how long you should wait between doses and for help finding a dosing schedule that will work with all your medications.

Check the labels on all your prescription and nonprescription/herbal products (such as antacids, vitamins) because they may contain calcium. Ask your pharmacist about using those products safely.[23]

EXPERIMENTAL METHOD

DEFINITION

Chemical name	**:**	Calcium dilactate, calcium dilactate hydrate, 2-Hydroxypropanoic acid calcium salt
C.A.S. number	**:**	814-80-2
Chemical formula	**:**	$C_6H_{10}CaO_6 \cdot xH_2O$ (x = 0 - 5)
Formula weight	**:**	218.22 (anhydrous)
Assay	**:**	Not less than 98.0% of on the dried basis
Description	**:**	White to cream colored, almost odorless, crystalline powder or granules. The pentahydrate is somewhat efflorescent.
FUNCTIONAL USES	**:**	Buffer, dough conditioner, yeast food.

CHARACTERISTICS

IDENTIFICATION

Solubility	**:**	Soluble in water, practically insoluble in ethanol
Test for lactate	**:**	Passes test
Test for calcium	**:**	Passes test
Flame test	**:**	Brick red or orange – red color due to calcium lactate

Fig. 10: Flame test.

PURITY

Loss on drying	**:**	Not more than 30% (120o, 4 h)
pH	**:**	6.0-8.0 (1 in 20 solution)
Magnesium and alkali salts	**:**	Not more than 1% mg/kg
Fluoride	**:**	Not more than 30 mg/kg
Lead	**:**	Not more than 2 mg/kg

STANDARDISATION OF DISODIUM EDTA

Weigh accurately about 0.3gm of anhydrous Mgso4 and dissolve 50 ml of water. Add 10ml of ammonia buffer and 50mg mixture of mordant black II and sodium chloride (1:99) as indicator and titrate with disodium edetate until the solution becomes blue. Each ml of 0.05m disodium edetate is equivalent to 0.012325g of Mgso4.

OBSERVATION

S. No	Content of conical flask	Burette readings		Volume of EDTA	Indicator	End point
		Initial (ml)	Final (ml)			
1.	0.3 g of Mgso4 +50 ml of water+ 10 ml of ammonia buffer + black mordant II	0 ml	25 ml	25ml	Mordant black II	Appearance of blue color

MOLARITY OF DISODIUM EDTA $= \frac{\text{Weight taken} \times \text{Expected molarity}}{\text{Titrate value} \times \text{Eq.factor}}$

$= \frac{0.3 \times 0.05}{25 \times 0.12325}$

= 0.05M

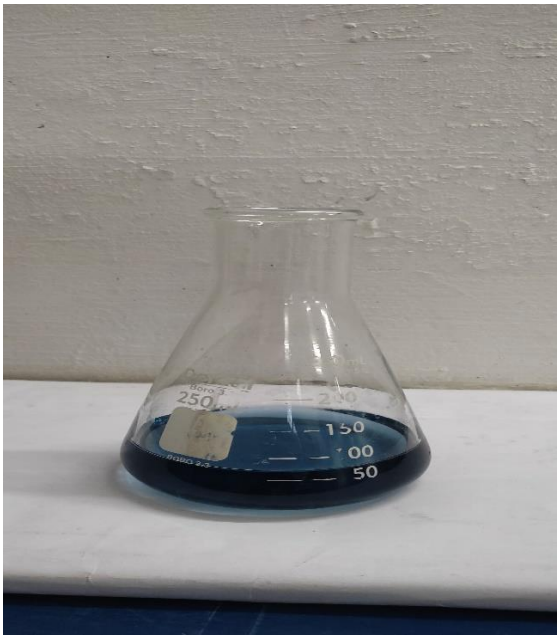

Fig. 11: Standardization 0.05M EDTA.

Fig. 12: Standardization 0.05M EDTA End Point.

METHOD OF ASSAY

Dissolve about 0.3g of previously dried sample, accurately weighed, in 50 ml of water. While stirring, add about 5 ml 0.05 M of magnesium sulphate. Then add 10 ml of strong ammonia using 0.2g black mordant II indicator, and continue the titration to a blue end-point. Each ml of 0.05 M disodium ethylenediaminetetraacetate is equivalent to 0.01091 of C6H10CaO6.

OBSERVATION

S. No.	Content of conical flask	Burette reading		Volume of calcium lactate	Indicator	End point
		Initial (ml)	Final (ml)			
1.	0.3g of calcium lactate +50 ml of distilled water + 5ml of 0/05M magnesium sulphate + 10ml of strong ammonia	0 ml	27 ml	27 ml	Mordant black II mixture	Color change wine red to clear blue

$$\text{PERCENTAGE PURITY OF CALCIUM LACTATE} = \frac{(\text{Titrate value} - 5) \times \text{Equivalent factor} \times \text{Eq.factor}}{\text{weight taken} \times \text{Expected molarity}} \times 100$$

$$= \frac{(27-5)\times 0.02242 \times 0.05}{0.5 \times 0.05} \times 100$$

$$= \frac{22 \times 0.02242 \times 0.05}{0.5 \times 0.05} \times 100$$

$$= \frac{0.024662}{0.025} \times 100$$

$$= 0.9864 \times 100$$

= 98.64%

Fig. 13: Assay of Calcium lactate End Point.

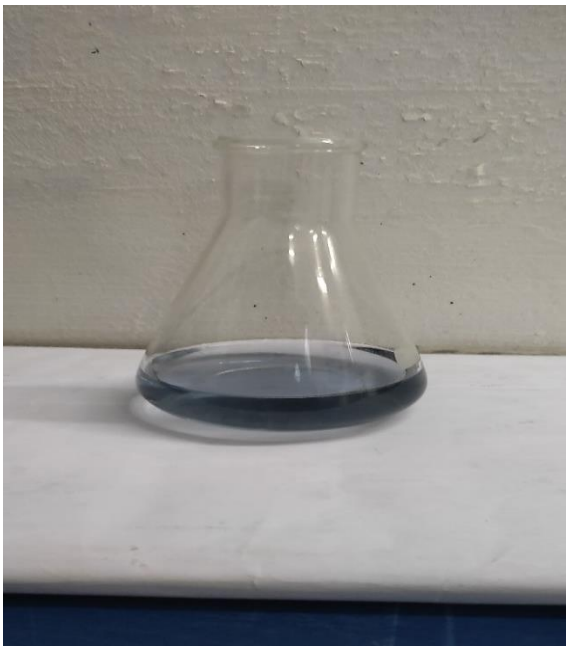

Fig. 14: Assay of Calcium Lactate.

CONCLUSION

Some of **c**alcium and its salts are used as nutrient supplement in nutraceutical and as diluent in pharmaceutical field.

In pharmacy practice school calcium lactate was selected and it is used as diluent pharmaceutical field. I carried out analysis of calcium lactate in pharmaceutical analysis lab for the qualitative and quantitative analysis from that it concludes.

For qualitative analysis of calcium lactate carried out with help of flame test and it shows presence of calcium.

A flame test is analytical procedure used in chemistry to detect presence of certain elements, primarily metal ions, waste on each element's characteristic emission spectrum. Calcium compounds orange red flame in flame test. It is due to the exaction of electron by the thermal energy which is then the followed by D – exaction of an electron grown state along with the liberations of visible range.

Quantitative analysis assay of calcium lactate carried out with help of titration and it shows. Complexometric titration (sometimes chelatometric) is a form of volumetric analysis in which the formation of a colored complex is used to indicate the end point of a titration. Complexometric titrations are particularly useful for the determination of a mixture of different metal ions in solution. Ethylenediaminetetraacetic acid (EDTA) complexometric titrations are based on the fact that many metallic ions form stable complexes with this tetradentate ligand, EDTA.Its percentage purity = 98.64% w/w.

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