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THE MOST IMPORTANT ORGANIC COMPOUNDS USED IN BREAKING UP KIDNEY STONES

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Abstract: In this research, we talked about the most important organic compounds used in breaking up kidney stones, what are their types and causes, and the benefit of each compound or treatment.

It discusses the most important treatments used to break up kidney stones, such as cystone, U_Urayl, and other treatments. It deals with organic compounds, their composition, and nomenclature according to the IUPAC system.

Introduction:

Stones Urinary she crystals, In a way major from oxalate, wow Phosphate And the urine that It takes shape in College . showed Studies Statistics that People Who Ranging Their ages Between 20 and 40 years old they Most susceptible To danger . It takes shape most Stones because of factors nutritional, like Eat products Dairy The high or Salts that from Like her more amount Ca in Urine . And who Affair decrease Eat Water that He increases Lineage Centenary For stones in UrinePearle et al 2005, Delvecchio et al 2003, Menon et al 2002, Mandel N. 1997, E.D. Edelson. Antiquities genetic, Eat vitamin C may He plays also role in Configurations Stones . Pointing Pain in lowest noon lowest Ribs And blood in Urine to presence to forbid . usually what Dates Stones - the smallest From 5 mm - across Flour . And usually what is used Evaluation Laboratory Clinical For stones Urinary Methods Chemical For analysis [Pearle et al 2005, GM, Assimos et al 1997, Chandhoke 2005] and usually what Done Recognition on Stones from during Its content Metallic The first . Done classification Stones on that it Contain on ingredients multiple, And describe pattern Metals different in Stones not Homogenous . Therefore, Done classification Stones usually on that it Oxalate Calcium or phosphate Calcium or mix from These two The two crystals Bimetallic It is called (Hypercalciuria) , Composed Stones Struvite From ammonite A And phosphate And usually what produces on Infections Urine Bacterial . produce Bacteria urease, And he Enzyme enhances development Crystals Struvite on road to make Urine Alkali . Bacteria Most Popularity associated With stones Struvite

she Proteus Mirabilis . It takes shape Stones Acid Uric when He is there a lot from Acid in Urine . Related this Type from Stone Relatedly closely By system Nutritional

And often what affects on People Who They consume quantities Great from Protein Animal . Stones Cysteine rare, where Represent About 1 in The hundred only from all Stones Urinary . And it has Decide that The majority Great from Stones Contain actually on more from type one from Minerals [Chandhoke 2002, Qiang et al 2004, Borghi et al 1996]. And to know Installation Metallic For stones the patient value Clear in to set plan Treatment Purpose from This is amazing the study he presentation methodology Simplified To analyze formation Stone Poly . in This is amazing the study, We noticed Providing installation Chemist For stones Urinary Humanity And discrimination between six Metal components Shared using group analysis account differentiation And integration Urinary Local Klee et al 1991,GRASESF ET) AL1990,krambeck et al 2006,Finkielstein et al 2006)[1]

Historical overview

Over the past 50 years, chemolysis as a primary or adjuvant treatment for urinary tract stones has been in favour And a loss. We review the literature to gain a historical perspective on the origins and chronology of renazidine therapy, focusing on historical studies and impractical aspects that seem to have doomed it to history. Chemical analysis for urinary tract calculations. Historical literature was reviewed regarding stone formation, treatment methods, outcomes and complications. A total of 61 articles were reviewed, 40 of which were case series, representing a total of 817 patients studied. foot

Renacidin was first introduced in 1959 as a modification of Suby and Albright's solution of 1943. Due to the overabundance of nonstandard irrigation protocols, six deaths were reported in the early 1960s which led to an FDA ban on the practice of dissolving upper urinary tract stones. Over time, Renacidin returned to the urologist's arsenal, appearing first as an aid for dissolving catheters and bladder stones and later (1990) as an approved agent for renal pelvic and ureteric use. This feat was almost single-handedly the result of a successful hemicidrin case series published in 1971 by Nemoy and Stamey . Using daily urine cultures and prophylactic antibiotics, and through careful monitoring of intrarenal pressure, Nimoy and Stamey eliminated virtually all major irrigation complications, paving the way for a series of studies. Importantly, they have established the link between residual struvite stones, persistent infection, and recurrent struvite stone formation. Urinary stone dissolution by chemical dialysis has been shown to be safe and effective if performed with sterile urine cultures, prophylactic antibiotics, and low intrapelvic pressures. The pioneers of this treatment are remembered for their attempts to develop an alternative to open surgery, and in the process, they promoted the “stone-free” concept of infection-based stones Arthur R. Israel (1981) said, “Any urologist who treats stone disease should Familiarity with the basics of chemical degradation and its potential role in the management of urinary tract stones ” Arthur D. Smith, 2002 Urology uses chemicals and solutions to convert insoluble kidney and bladder stones into more water-soluble forms. This process, known as dissolution or chemical decomposition, makes sense for a number of reasons. First, a variety of dissolution products have been found to be effective in laboratory and animal studies. Second, the urethra in the renal pelvis and bladder are designed to transit fluids. Thus, as long as the system is adequately drained, the chemicals used for dissolution should exit the urinary tract with minimal absorption. 3Finally, open surgeries for kidney stones in the mid-20th century were extremely troublesome. Dissolving the stone will eliminate the need to make incisions in the flank to relieve renal colic and obstruction. With these factors in place, human experiments on stone disintegration ensued.

The earliest realization of dissolving stones came in the form of a solution called Renacidin (10% hemiazedrine). The triumphs, disasters, controversy surrounding the use of Renacidin, and its apparent downfalls will be chronicled in this review. At the height of its popularity, Renacidin was used to achieve stone-free status in recurrent struvite stone makers as a means of eliminating bacterial infection, a concept that is still in effect today. Although it is impossible to catalog the entire 60-year history of Renacidin , the

recency of its use in urology is worth noting and gives perspective on potential future treatments in the Museum of Urology.

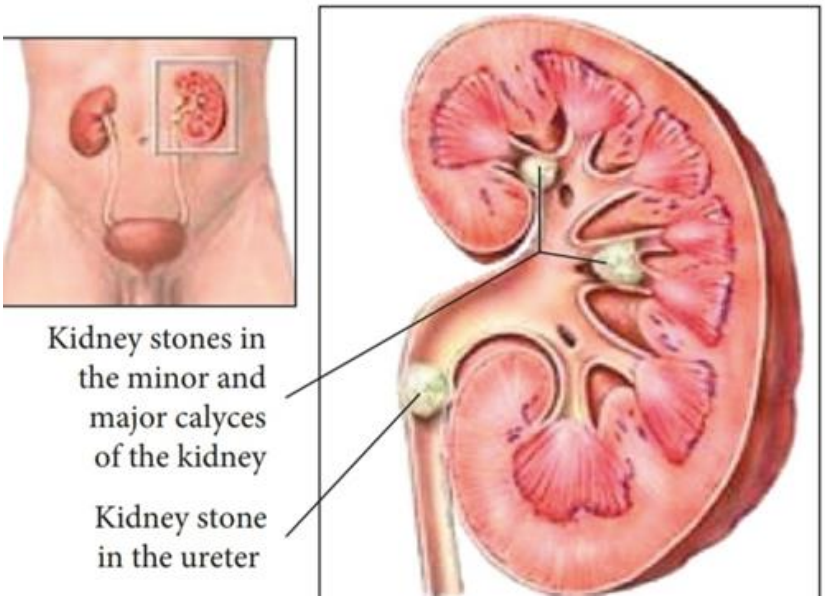


Figure 1: The shape of kidney stones [2]

Types of kidney stones

1.Calcium stones

Calcium stones are the most common, and are often made up of calcium oxalate, a chemical found in many types of food; Such as potato chips, nuts, chocolate, and some types of fruits and vegetables. Calcium stones may sometimes consist of calcium phosphate.[3][4]

2.Uric acid stones

This type of stone is more common in men, and occurs when the urine is too acidic Uric acid stones can occur in gout patients or patients undergoing chemotherapy.[6][12]

3.Cystine Stones

Cystine stones are rare and occur in patients who suffer from the hereditary disease cystinuria.Struvite stones [7] [8]

This type of stone is often found in women who suffer from urinary tract infection These stones can be large and lead to blockages in the urinary system. Because these stones occur as a result of infections; Treating infections will reduce the risk of them occurring. [9] [10] [11]

Figure 2: shows the size of the stones in millimeters ml [24]

Causes of kidney stones

Decreased urine volume

The risk of developing kidney stones increases if you do not drink sufficient amounts of water, as water helps reduce the acidity of the urine resulting from the presence of uric acid, so it is recommended to drink at least eight to ten glasses of water daily [13].

Diet

- **Not getting sufficient amounts of calcium**

Translational Andrology and Urology found that following a diet lacking in calcium may increase the likelihood of stone formation, contrary to what many people with calcium stones believe, so they stop consuming calcium sources, but In fact, a low level of calcium may lead to increased deposition of oxalate in the kidneys, which promotes the formation of stones. However, a person should consume calcium in moderation, as excessive consumption may lead to the percentage of calcium in the body exceeding its natural limit.

- **Follow diets high in salt or refined sugars**

Consuming it is not a good choice, as it may increase the level of calcium in the urine.[14] [15]

- **Drink soft drinks**

These drinks contain phosphate, which in turn increases the level of calcium in the urine, thus increasing the possibility of calcium and phosphate stones forming

- **Eating plenty of foods rich in oxalate**

Although these foods bring many health benefits to those who eat them consuming them above the normal limit increases the level of oxalate in the urine, which in turn stimulates the formation of calcium and oxalate stones. Therefore, doctors advise reducing the intake of foods rich in oxalates rather than abstaining from them completely. Examples of foods rich in oxalate T include: potato chips, spinach, fried potatoes, beets, nuts, and others. In addition, it is recommended to try to eat oxalate T alongside sources rich in calcium in order to enhance the bonding of both calcium and oxalate together. In the stomach and intestines before they reach the kidneys, thus reducing the amount of oxalate absorbed by the body, which in turn reduces the risk of kidney stones forming. Therefore, it is recommended to eat dairy products and other

calcium-rich foods equivalent to two to three times a day. It is also worth noting that Oxalate is produced as a final compound from the metabolism of ascorbic acid, known as vitamin C. Therefore, obtaining high doses of vitamin C may play a role in stimulating the formation of kidney stones.[16][17]

- **Eating animal proteins**

Animal proteins obtained from oysters and red meat contribute to increasing calcium levels and lowering citrate levels , which in turn encourages the formation of kidney stones. Excessive intake of sources rich in this type of protein may lead to an increase in the amount of uric acid in the body, which It ends up in the kidneys, causing stones to form there, or it may settle in the joints, causing an increased chance of developing gout. [18] [19]

Taking certain medications

The use of some types of medications may increase the possibility of kidney stones forming again after treatment, and we mention among these medications the following:

- ✓ Diuretics
- ✓ Some antiepileptics
- ✓ Some types of antibiotics. Antacids
- ✓ Aspirin
- ✓ Some antiretroviral medicines
- ✓ used to treat HIV[20][21][22]

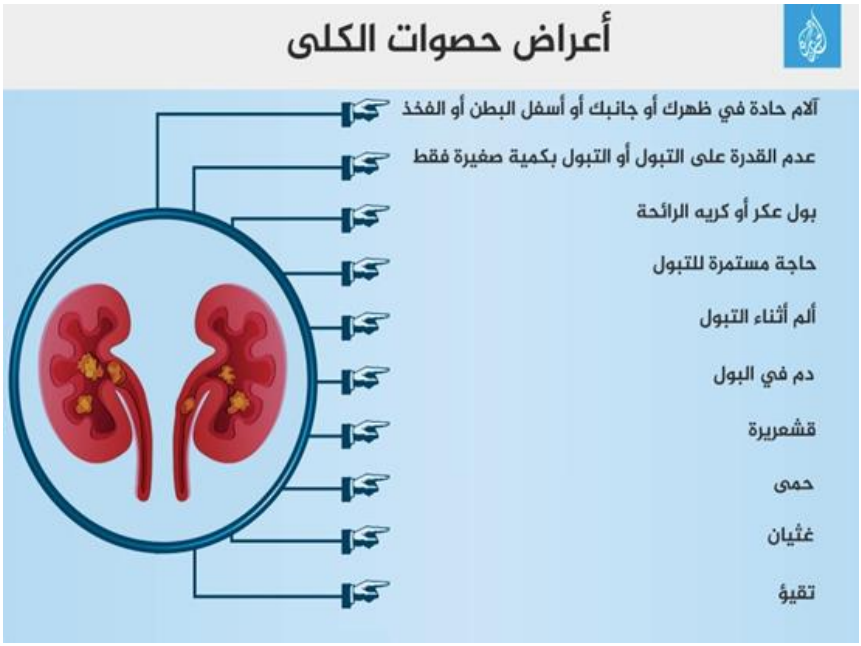


Figure 3 : shows the symptoms of kidney stones [23]

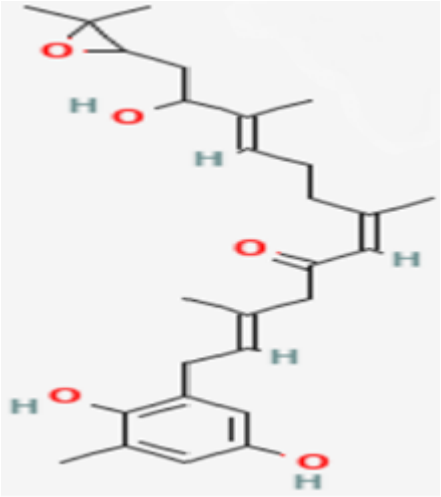
In this research, we will discuss treatments for kidney stones. The most important organic compounds used in its breakdown

The most important treatments used to break up kidney stones

Cystone

phrase on combination Herbal , It was completed Its design And develop it For management From urolithiasis or kidney stones. back this Product in 1943 and since that Now It was completed Use this Product in all Around the world To manage lithiasis Polly And inflammation Tract Urinary . in Studies that conducted until now , Prove Cystone it. He is very high In a way Significant (80%) in Sick Count Polly gets up medicine Cystone By preventing form gravel Kidney And break it down on road Its effectiveness in eviction Vehicles that You get up on formation gravel Kidney from body And about road Prevent him To form material Mycin ALT It works on link ingredients gravel Kidney With each other . He rises medicine Cystone on equation acidity Urine And this Helps on treatment And ease feelings Heartburn when Peeing And it works medicine Cystone As an antibiotic for oxidation, Which Considered Sunday Reasons form gravel Kidney in Body . Stimulates medicine Cystone practical Urinating And it works Cmdr for urine, Than Helps on exit Stones Small And expelled Bacteria from Hungarian Poly

He owns medicine Cystone Properties counter for inflammation, Than Helps on Prevention And preservation on safety Hungarian Polycarbonate And the kidneys after exit Gravel [25] [26]



cystone is composed of Pasanabheda :

features counter for microbes, So Help in Calm down Tissue Interior For the device Polycarbonate And ease inflammation, And swelling, And pain Urinating . as she has impact A diuretic For urine And this Helps in eviction Gravel The little one

Shilapushpa :

Help in to forbid Be Stones Tract Urinary or Melt it And break it up, when she has from features counter For bacteria And germs

2, 4_Dihydroxy-6′-methoxy-3 , 5′-dimethylc halcone 2_amino-3-methylbutanoic acid

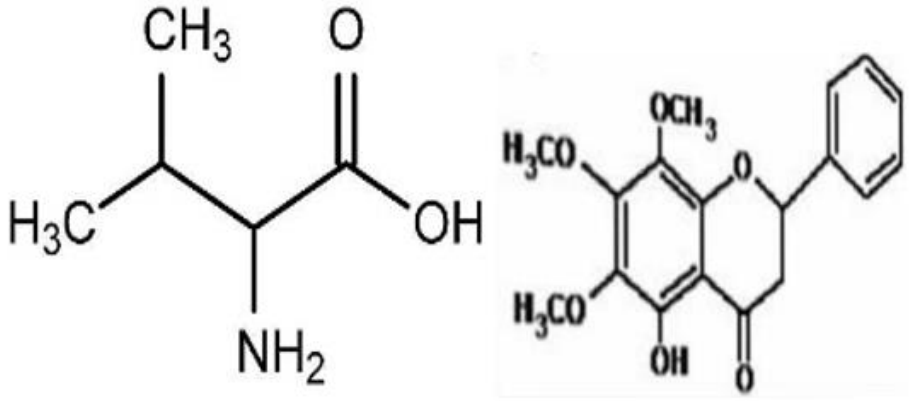


Figure 4: Chemical structures of the two compounds (Pasanabheda) and Shilapushpa

U-Urally

phrase on grains Sparkling Composed Its composition from Potassium Citrate Sodium hydrogen, which increases the basicity of urine, which helps remove stones, dissolve uric acid stones (kidney stones) and prevent the formation of new stones. It is also used as an adjuvant treatment to dissolve cystine stones and cystinuric urine, and increase the basicity of urine during treatment with certain medications such as (immune-reducing medications). [27] Ural consists of (the four most important compounds)

Citric acid

Indicated for the treatment of urinary bladder stones, anticoagulation, metabolic acidosis and other conditions

Sodium Bicarbonate

Used for the treatment of urine alkalization, acidity in the blood , gastric lavage in cases of methanol poisoning , heartburn And other cases.

Sodium Citrate

Indicated for the treatment of kidney stones, acidity, stomach problems and other conditions

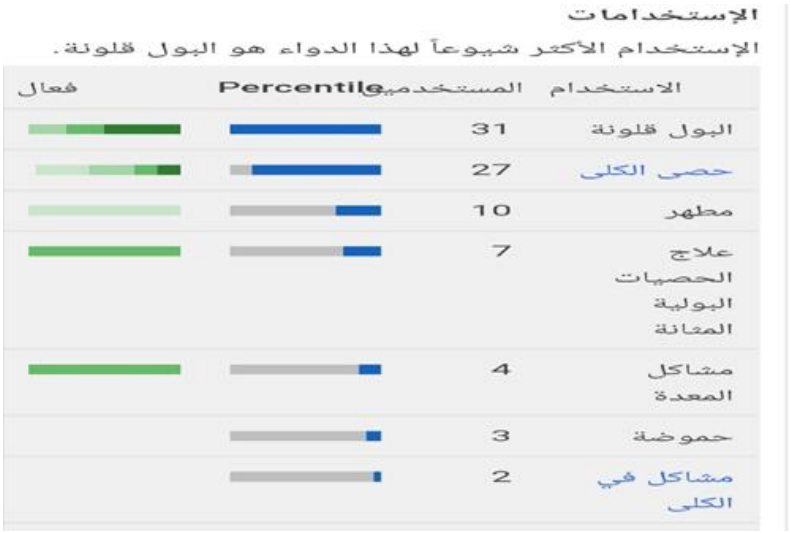
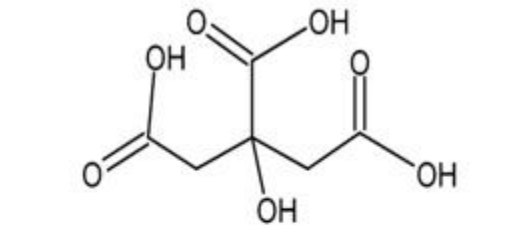


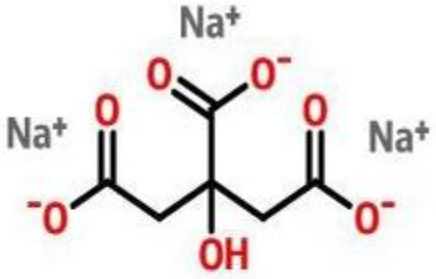
Figure 5 : shows the most common uses of U-Uraly treatment [28]

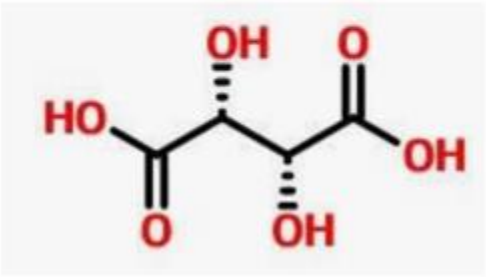
Tartaric Acid

Indicated for antiseptic, antiseptic and other conditions

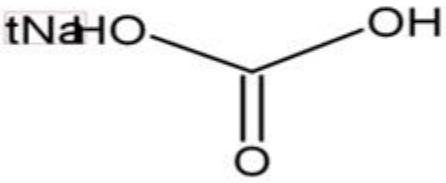


2-hydroxypropane-1,2,3-tricarboxylic acid





Tartaric Acid Sodium Citrate



carbonic acid

Figure 6 shows the chemical compositions (Citric acid and sodium bicarbonate and Sodium Citrate and Tartaric Acid)

UrlCoL.4.3

Uricol is an effervescent drug, used to treat urinary tract infections, treat cramps, and get rid of stones[29]

URlCoL effervescent consists of

Hixamine

Hexamine works as an antiseptic, and as a result of the acidity of the urine, hexamine decomposes into formaldehyde, which acts as an antimicrobial, whether fungi or positive and negative bacteria, and hexamine is considered safe for use for a long time.[[30]

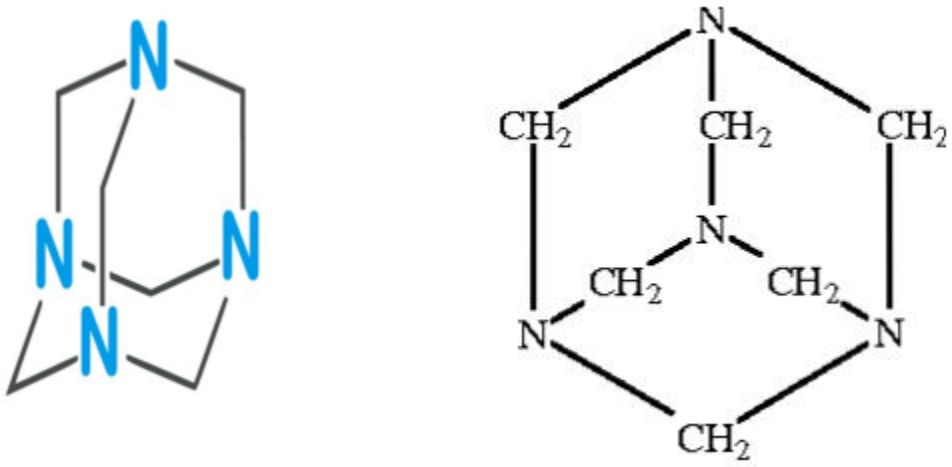
Piperazine citrate

Piperazine Citrate works to control the acidity and alkalinity of the urine, bringing it to a certain percentage that helps dissolve uric acid (produced by the body breaking down substances called purines, which are one of the bases found in DNA, and the body gets rid of excess uric acid through the kidneys, But it may increase in a sick way as a result of kidney problems or as a result of other diseases), and piperazine also prevents the formation of urate stones.[31]

Khellin

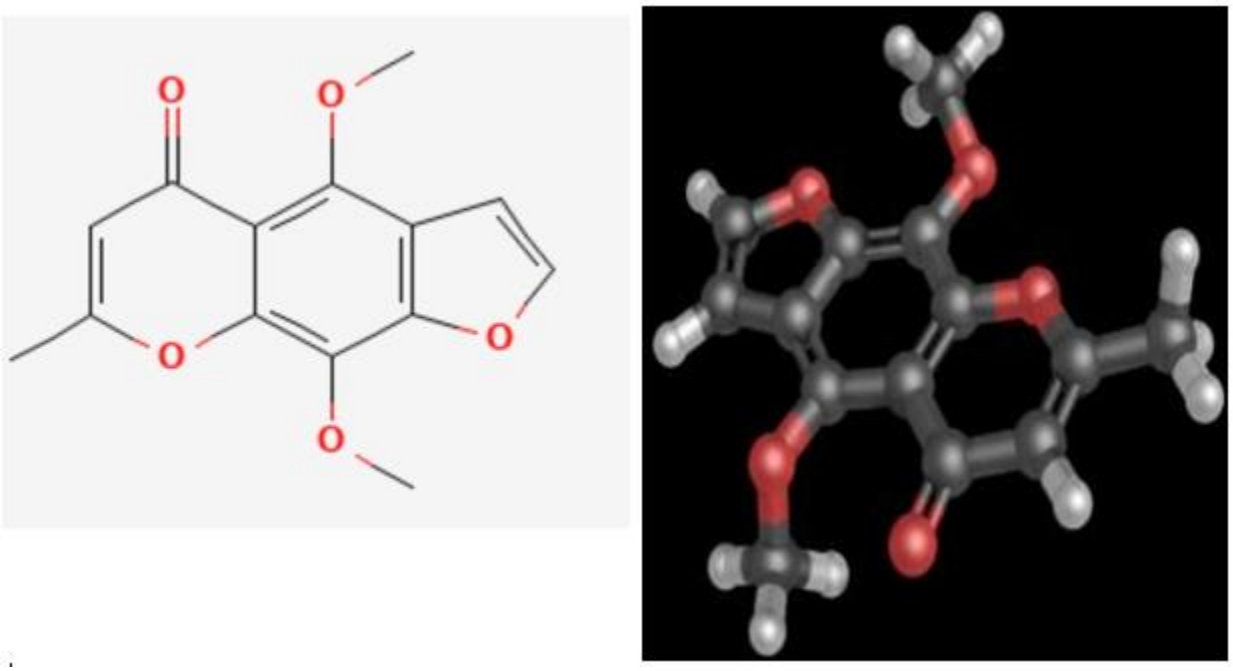
Khaleen acts as a muscle relaxant and antispasmodic of the urinary tract, and also calms excessive bowel movement

The components of the drug complement each other to a great extent, and this explains why the drug is effective [32][33]



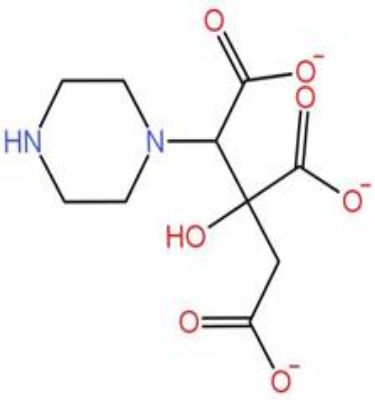
Hexamethylenetetramine.

Figure (7: shows the chemical structure of (Hixamine



[34] (Khellin) 4,9-dimethoxy-7-methyl-5H-furo[3,2-g] chromen-5-on.

Figure (8 Chemical composition of (Khellin



2-hydroxy-1-(piperazin-1-yl)propane-1,2,3-tricarboxylate

Piperazinecitrate

Figure (9 shows the chemical structure of (piperazine citrate

Jedcorene_4.4 Coli- Urinal_or pharocol or They are similar in terms of organic compounds and uses A complementary combination of three active ingredients that is effective in treating urinary system infections and promoting the excretion and elimination of uric acid in the urine. It treats many urinary tract infections, including: pyelitis, cystitis, urethritis, and pyelonephritis. An adjuvant treatment in the case of urinary stones and kidney stones. Frequent cramps in the urinary tract[35]

The three most important compounds in the treatment of jedcorene

Hexamine

The urinary tract disinfectant inside the body decomposes into formaldehyde which has antibacterial activity against most causes of urinary tract infections

The two errors

A natural smooth muscle relaxant in the urinary tract, it helps relieve muscle spasms associated with urinary disorders

Piperazine

It helps dissolve uric acid crystals, thus preventing their deposition in the urinary tract

Piperazine.

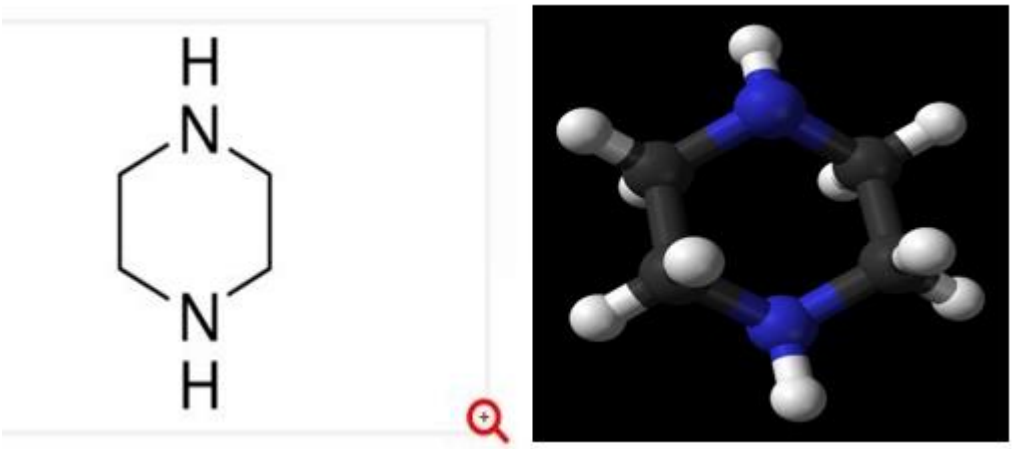
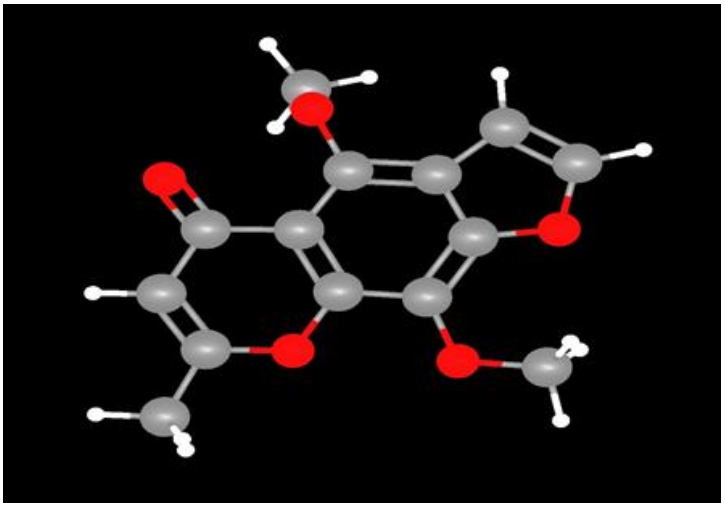


Figure (10): shows the chemical structure of Piperazine .



Hixamine

Organic structures for both. Hexamine, Calhalin , Piperazine

Epimag

(Effervescent) is a medicine used to treat excess calcium oxalate salts present in the urine. It also contributes to the disintegration of calcium oxalate stones and helps prevent them from forming again. Epimag is mainly composed of the active ingredient magnesium citrate. Magnesium citrate works to dissolve salts. Calcium oxalate present in urine. Magnesium ions combine with oxalate, facilitating their exit through the urethra and preventing the deposition of calcium salts in the kidneys

Citrate ions make the urine medium basic, which dissolves uric acid salts facilitating their excretion in the urine. Citrate ions also combine with calcium to prevent calcium oxalate from being deposited in the form of kidney stones. This substance is characterized by its laxative properties, as it works effectively in getting rid of constipation in a short period of time, because it helps increase bowel movement by increasing the absorption of fluids in the intestine, and this is because magnesium citrate has the ability to water, which facilitates the process of excretion of stool from the stomach. Intestines.[36][37]

The active ingredient in Epimag is magnesium citrate

* **Magnesium citrate composition**

Hydroxypropane-1,2,3-tricarboxylic acid

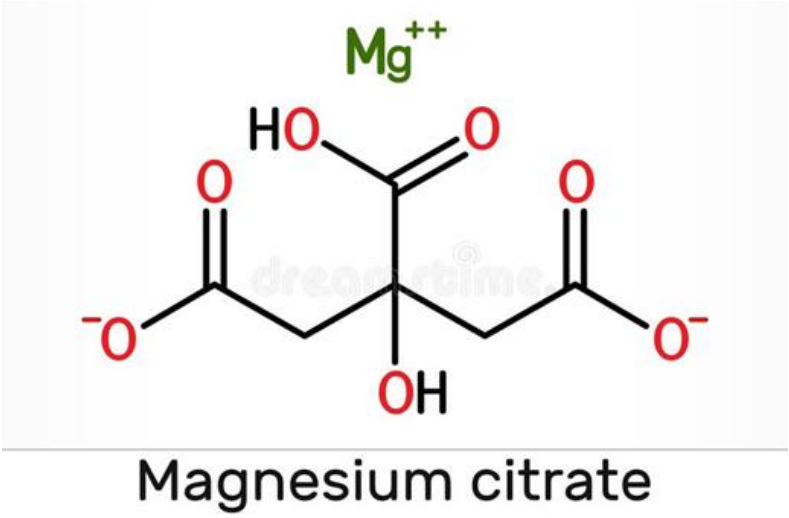


Figure 11: shows the chemical structure of magnesium citrate

Stonosolvin

This medication is used to make urine less acidic. Less acidic urine helps the kidneys get rid of uric acid, which helps with certain types of kidney stones. This medication can also prevent and treat certain metabolic problems (acidosis) caused by kidney disease

This medicine is composed of citric acid (Hydroxypropane-1,2,3-tricarboxylic acid)

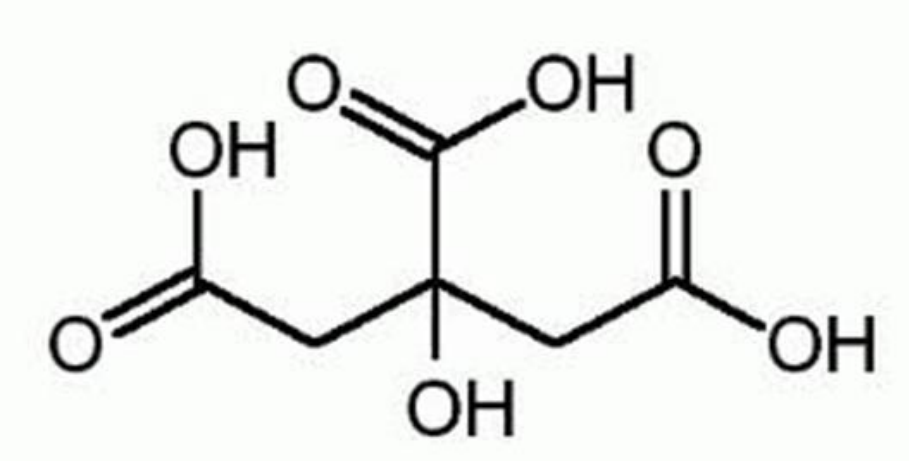


Figure 12: shows the chemical structure of citric acid

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