

FORMULATION AND EVALUATION OF HERBAL ELIXIRS FOR UROLITHIASIS ACTIVITY

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ABSTRACT

They are clear, sweetened hydroalcoholic solutions intended for oral use and are usually flavoured to enhance their palatability. The main ingredient of elixirs are ethyl alcohol (5- 40%) v/v water, glycerine, flavourings agent, colouring agent and preservative. The leaves of plant soaked in ethanol and water (70:30) for three days. By using maceration process extract of kalanchoe pinnata obtained. By using extract and other excipients herbal elixir was prepared. Evaluation parameter like phytochemical screening performed. Saponin, Flavonoids, steroids, Alkaloids, Tannins, Carbohydrate are present. Saponin and flavonoids are main constituent and it eliminate the calcium oxalate crystals.

KEYWORDS: Elixirs, alcohol, Kidney stone, cardenolides, Kalanchoe Pinnata, Fever.

1. INTRODUCTION

Elixir

They are clear, sweetened hydroalcoholic solutions intended for oral use and are usually flavoured to enhance their palatability. The main ingredient of elixirs are ethyl alcohol (5- 40%) v/v water, glycerine, flavorings agent, colouring agent and preservative. They are of two types:

- Nonmedicated elixirs which are employed as vehicles
- Medicated elixirs which are used for the therapeutic effect of the medicinal substances they contain.^[1]

The proportion of alcohol in elixirs varies widely because the individual components of the elixirs have different water and alcohol solubility characteristics. Each elixir requires a specific blend of alcohol and water to maintain all of the components in solution. Naturally, for elixirs containing agents with poor water solubility, the proportion of alcohol required is greater than for elixirs prepared from components having good water solubility. In addition to alcohol and water, other solvents, such as glycerine and propylene glycol, are frequently employed in elixirs as adjunctive solvents.

Elixir having a high alcoholic content usually use a syrup as a sweetner which is only slightly soluble in alcohol. Elixir also contains flavorings agent and colourants, elixir containing more than 10% to 12% alcohol are Self preserving.

Elixirs are simpler to make than syrups because there are fewer ingredients that need to be dissolved. The technique is as follows if there are chemicals in the formulation that are both water and alcohol soluble. Water is used to dissolve all of the substances that are water soluble.

All the elements that might dissolve in alcohol were added, combined, and allowed to thoroughly dissolve. The second solution was then combined with the first solution. The elixir is filtered to make it clearer. The last book is created with water. Sucrose will increase viscosity while decreasing water solubility. Talc or siliceous earth are utilised to make the elixir apparent as to which is required. When taste is your first priority, syrup is the finest option. To prepare a pediatric paracetamol elixir using trustworthy, safe, and affordable natural colouring additives and compare it to the commercial product to gauge the color's stability.^[1]

Advantages

- Elixir is more fluid than syrup.
- It often is desirable, it is more effective is masking such taste.
- Elixir is more readily prepared and manufactured the syrups.
- An elixir may contain both water and alcohol soluble ingredients.^[2]

Disadvantages

- Alcohol is not good for children.

- Because they contain volatile materials, it must be stored in a watertight screw top jar and away from sources of ignition.^[2]

Kalanchoe pinnata



Fig No.1 Kalanchoe Pinnata plant

- **Synonyms:** Bryophyllum Calycunum, germinans.
- **Common Name:** Ranakalli, Miracle leaf, Mexican love plant, Katakataka, Cathedral Bells, Air plant, Life plant, Goethe Plant.
- **Family features:** Crassulaceae are usually terinnial herbs to shrub, rarely small trees. The leaf arrangement is usually alternate or decussate stem is succulent had secondary growth dominating in the parenchyma of cortex and pith. The floam is poorly developed.^[3]

Kalanchoe pinnata is a medicinal plant largely used in folk medicine for the treatment of kidney stones, gastric ulcer, pulmonary infection, rheumatoid arthritis etc. Kalanchoe pinnata has become naturalized in temperate regions of Asia, Australia, New Zealand, West Indies, Macaronesia, Mascarenes, Galapagos, Melanesia, Polynesia, and Hawaii.^[4]

The purpose of these study was to implement a bioassay screening of kalanchoe pinnata from Guyana, in order to determine the molecules responsible for the kidney stone. In ayurveda the leaves are bitter poisonous to insects. While in unani the bark is bitter and poisonous; tonic, alexipharmic, astringents to the bowels, analgesic, carminatives; useful in diarrhea and vomiting, inflammations; in snake-bite and scorpion sting.

In Ayurveda, the plant is also known as pasanabheda which means dissolver of stone “the leaves of Kalanchoe pinnatum are widely used in traditional practices for the treatment of urinary insufficiency and stone disorder. The present study evaluates the effect of alcoholic and hydroalcoholic extract of Kalanchoe pinnatum leaves on formation of urinary calcium.

The herb Kalanchoe pinnata is an aromatic plant with a tart and sweet scent. On the basis of their flavour, many Kalanchoe pinnata have been described. Plants can grow up to 1.5 meters tall. It is a glabrous herb 0.3-1.2m Hight.^[5]

Green plants with a sweet, tart flavour are known as Kalanchoe pinnata. Due to the presence of essential oils in the leaves and other plant components, many Kalanchoe pinnata species and cultivars have a characteristic scent and aroma. Lipids, alkaloids, bufadienolides, triterpenes, steroids, glycosides, cardienolides, and flavonoids are all abundant in this plant. The "bufadienolides" found in its leaves, such as bryotoxin-C, bryotoxin-B, bryotoxin-A. In Singapore, its juice is used as a febrifuge, and the soup made from its leaves is used as a tonic to treat kidney and stomach ailments. Kalanchoe pinnata preparations contain quercitrin flavonoids, which are highly beneficial at preventing formation of calcium oxalate crystals. Kalanchoe Pinnata (Crassulaceae) is an erect, succulent perennial Shrub that grows to be approximately 1.5 meter's tall and reproduces both vegetatively and via seeds. It features tall Hollow stems, black bell-like pendulous blooms, and newly Dark green leaves that are scalloped and trimmed with red. This plant may be readily propagated by cutting stems or Leaves.^[3]

Reproduction

It is reproduced by vegetative propagation by using either a peace of its steam or leaves. The leaves of kalanchoe pinnata plant have special buds in their margins which may get detached from the leaves, fall to the ground and grow to produce a new plant. Plant somatic cells have the remarkable ability to regenerate an entire organism. Many species in the genus Kalanchoe known as mother of thousands develop plantlets on the leaf margins. Using key regulators of organogenesis and embryogenesis processes, we analyzed asexual reproduction in Kalanchoe leaves.^[6] Reproduced asexually by forming plantlets along their leaf margine.

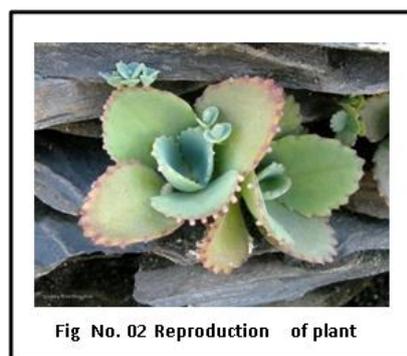


Fig No. 02 Reproduction of plant

Leaves

The leaves are usually simple or occasionally compound, 8-12 and 6-8cm in size, the upper usually 3-5 or sometimes 7- folio late, long pointed, the petioles united by a ridge round the stem. Leaflets ovate or elliptic, crenate or serrate. The leaves often produce, on their crenature at the extremities of the lateral nerves, buds furnished with root, stems and leaves, which drop off and at once become new plants.^[7]

Its leaves are known to have numerous anti-ulcer compounds such as triacontane, taraxerol, syringic acid,

succinic acid, stigmasterol, steroids, quercetin, pyruvate, peposterol, pseudotaraxasterol, protocatechuic acid, phosphoenolpyruvate, patuletin, palmitic acid, oxalic acid, oxaloacetate, kaempferol, isofucosterol, hentriacontane, glutinol, friedelin, flavonoids, ferulic acid, epigallocatechin, coumaric acid, codisterol, clionasterol, clerosterol, cinnamic acid, cardenolides, campesterol, caffeic acid, bufadienolides, bryotoxin-C, bryophynol, bryophyllol, bryophyllin-A and bryophyllin-C, bryophyllin, bryophollone, bryophollenone, β -sitosterol, β -amyrin, benzenoids, behenic acid, astragalin, arachidic acid and many more. *Kalanchoe pinnata* is known to exhibit wound healing, insecticidal, anti-inflammatory, anti-allergic, anti-microbial, anti-tumor and CNS depressant activities along with anti-oxidant and anti-diabetic potentially.

The leaves contain a group of chemicals called bufadienolides which are very active. Bufadienolides like bryotoxin A, B, C which are very similar in structure and activity as two other cardiac glycosides, digoxin and digitoxin and possesses antibacterial, antitumorous, cancer preventative and insecticidal actions. Bufadienolides-Bryophyllin A Bryophyllin B Bryophyllol, Bryophollone, Bryophynol.^[8]

Morphological features: Leaves are smooth, glossy, fleshy, with brownish creanate margins. Leaflet ovate or elliptic, serrate.

Clinical Uses

- The leaves are useful in burns, bites of insects.
- In Diarrhoea, Haemorrhoids, Blood oozing piles.
- The leaf juice is useful in cholera.
- Burning in urination and blocked urination.
- The leaves roasted over fire apply on wound and surgical sutures.^[9]



Fig No.3 Leaves of *Kalanchoe Pinnata*

Kidney stone

Stone formation is assumed to be the result of an abnormal increase in urine calcium, oxalate, and uric acid, which reduces urinary citrate levels. Lack of citrate and magnesium inhibitors in the urine could lead to stone formation if this function is compromised. Both men and women are affected by this, however it is more prevalent in males than in females, and it is more prevalent in young women. The most alarming development

nowadays, though, is the occurrence of kidney stones in young children as young as 5 years old.^[10]

Up to 80% of renal stones are believed by some studies to be caused by calcium oxalate and calcium phosphate, while struvite, which contains 10% magnesium ammonium phosphate, 9% uric acid, and 1% cystine or ammonium acid urate due to drug-related stones, contains 1% ammonium acid urate. According to study, people between the ages of 20 and 30 are most likely to get kidney stones. The results show that Asians experience more kidney stone problems than do Africans and Americans. This is according to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). Focusing on a history of kidney stone formation can increase our danger because kidney stones run in our family. Dehydration, past kidney stones, inflammatory bowel conditions that enhance calcium absorption, diuretics (water pills), relatives with kidney stones, obesity, and a high protein, sodium, or sugar diet are additional risk factors. Food, hyperparathyroidism, excessive levels of cysteine, oxalate, uric acid, or calcium, gastric bypass surgery, and not getting enough water, salt, glucose, or food. To treat conditions like rheumatism, body pain, arthritis, heartburn, skin ulcers, peptic ulcers, diabetes mellitus, and microbial infection, the herbal plant *Kalanchoe Pinnata* is frequently used as traditional medicine in India, America, China, Australia, and Africa.^[11]

Kidney stones are mineral deposits in the renal calyces and pelvis that are found free or attached to the renal papillae. They contain crystalline and organic components and are formed when the urine becomes supersaturated with respect to a mineral. Calcium oxalate is the main constituent of most stones, many of which form on a foundation of calcium phosphate called Randall's plaques, which are present on the renal papillary surface.



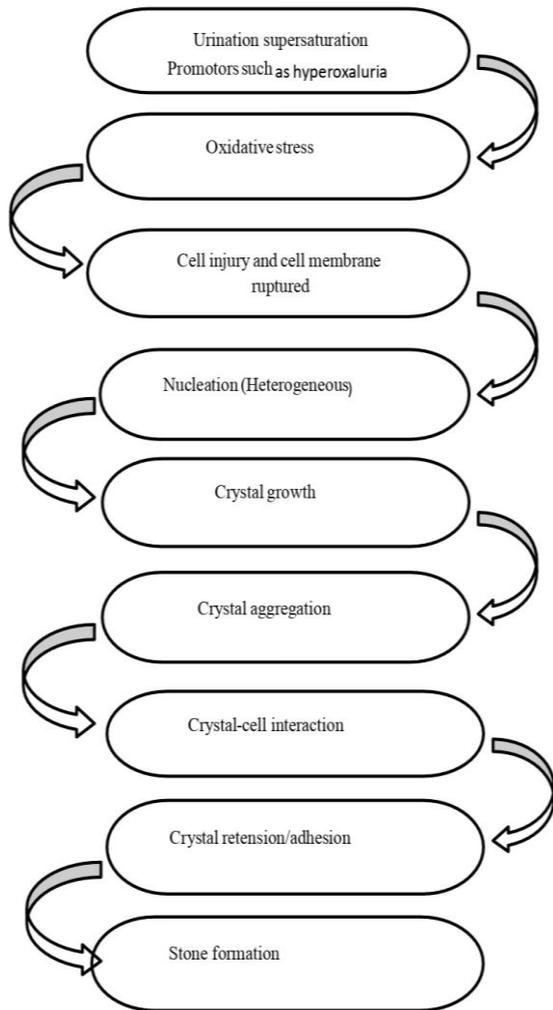
Fig. No.04 Kidney stone symptoms

Symptoms

1. Dizziness
2. Blood in urine

- 3. Backache
- 4. Vomiting

1.3.2 Pathophysiology of Kidney Stone^[15]



TAXONOMY

Table No. 01: Taxonomy of kalanchoe pinnata.^[16]

Kingdom	Plantae (plants)
Subkingdom	Tracheobionta (Vascular plants)
Super division	Spermatophyta (seed plant)
Division	Magnoliophyta (flowering plant)
Class	Magnoliopsida (Dicotyledonous)
Subclass	Rosidae
Order	Saxifragales
Family	Crassulaceae Stonecrop family
Genus	Kalanchoe
Species	Kalanchoe pinnata (Lam)per

Uses

- Diuretic and antiurolithic activity.
- Hepatoprotective activity.
- Antimicrobial activity.
- Antifungal activity.
- Andibabetic activity
- Antileishmanial activity.
- Wound healing propret.^[17]

2. Plan of Work

- Review of literature
- Collection of the plant
- Preformulation study of plant

- Morphological study Leaves: Thick, Fleshy, curved. Steam: Reddish, Speckled Flowers: Reddish Purple Fruits: Enclosed in the persistent papery calyx and corolla. Seeds: Small smooth oblong

- Microscopic study
- Preparationn of herbal extract
- Phytochemical analysis of herbal extract
- Formulation of herbal elixir
- Evaluation test of herbal elixir
- Presentation of data^[10].

3. MATERIALS AND METHODS

Materials and Chemicals

- Extract of kalanchoe pinnata
- Glycerine
- Alcohol
- Syrup
- Orange oil
- Molish reagent
- Dil.HNO₃
- Suphuric acid
- Fehling solution A &B
- Mayer’s reagent
- Lead acetate solution

Apparatus

- Beakers
- Stirrer
- Measuring cylinder
- Iodine flask
- Viscometer

Equipments

- Refracto meter
- PH meter

Method of Preparation

Stage 1: Preparation of herbal extract

- In maceration technique, fresh leaves of kalanchoe pinnata placed with a ethanol and water (70:30) in a stopperd container and allowed for specific time (3 days) at room temperature with frequent agitation till the soluble bioactive material has dissolved.
- After 3 days, filter the whole mixer and collect the extract.

Stage 2: Method of preparation of herbal elixir

- Weight accurately 5ml extract of kalanchoe pinnata.
- Add required amount of glycerine and alcohol mixed together.
- Add 3ml syrup into solution.
- As a flavoring agent add 0.01ml orange oil.

- Make up volume with a purified water.
- Transfer in ambered colour bottle.^[17]



Fig No. 05 Extract of Kalanchoe Pinnata

EVALUTION OF HERBAL ELIXIR

Prepared herbal elixir was inspected visually to check their characters like Viscosity, PH, Refractive index, etc.

Physicochemical Evaluation

Physical parameter of Herbal Elixir such as colour, odour, appearance and clarity were evaluated.^[19]

Viscosity Determination

To determine the viscosity of herbal elixir, you can use various viscometers, such as Brookfield viscometer or the Ostwald viscometer. The Brookfield viscometer measures viscosity by observing the resistance of the elixir to rotation, while the Ostwald viscometer measures the time it takes for herbal elixir to flow through a capillary tube.^[19]

pH of Herbal Elixir

The pH of an herbal elixir can vary depending on the specific ingredients and formulation, but it typically falls within a range of 4-7.6. Some herbal elixirs, particularly

those with acidic ingredients like lemon or certain fruits, may have a pH below 4, while others, especially those with alkaline-rich ingredients, may have a pH above 7.^[19]

Refractive Index

Refractive index (RI) is a measure of how much light bends when it passes from one medium (like air) to another (like the elixir). It's a valuable parameter for characterizing the composition and quality of elixirs.

The refractive index of herbal elixirs varies depending on the specific ingredients and formulation. However, it generally falls within the range of 1.437 to 1.4623.^[19]

Alcohol Content Determination

To determine the alcohol content of a herbal elixir, a few methods can be used. The most common methods are distillation, gas chromatography, or density measurement using a hydrometer or pycnometer. The specific method chosen depends on the available equipment and desired accuracy.^[19]

Uniformity study Of Herbal Elixir

A key quality control test for herbal elixirs is content uniformity, ensuring consistent active ingredient levels across the product. This involves analyzing multiple samples to confirm that each dose contains the expected amount of the active herb or its extracts.^[19]

Stability Study

A stability study for an herbal elixir determines how the elixir's quality, safety, and efficacy change over time under various environmental conditions like temperature, light, and humidity. This helps establish a shelf life and optimal storage conditions for the elixir.^[19]

4. RESULT AND DISCUSSION

Evaluation of Herbal Extract

Phytochemical screening

Table No. 03 phytochemical screening of herbal extract.^[18]

Sr.No	Phytoconstituents	Name of the test	Procedure	Obeservation
1	Saponin	Foam test	2ml extract+4ml distilled water mixed well and shake vigorously	(+)
2	Flavonoids	Shinoda test	2ml extract+2ml of H ₂ SO ₄ the dissolve.	(+)
3	Steroid	Liebermann- burchard reaction	2ml extract with chloroform+1ml acetic unhydried+2drop of H ₂ So ₄ .	(+)
4	Alkaloids	Mayer's test	2ml extract+few drops of HCL+mayer's reagent.	(+)
5	Tannins test	ldbeater's skin test	2ml extract+1ml dil. HNO ₃ solution	(+)
6	Carbohydrate	Molish test		(+)

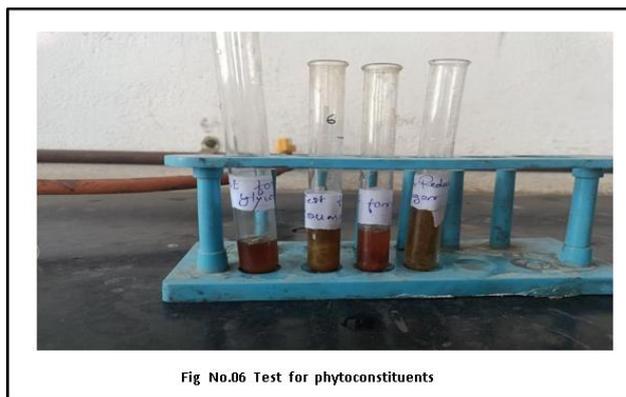


Fig No.06 Test for phytoconstituents

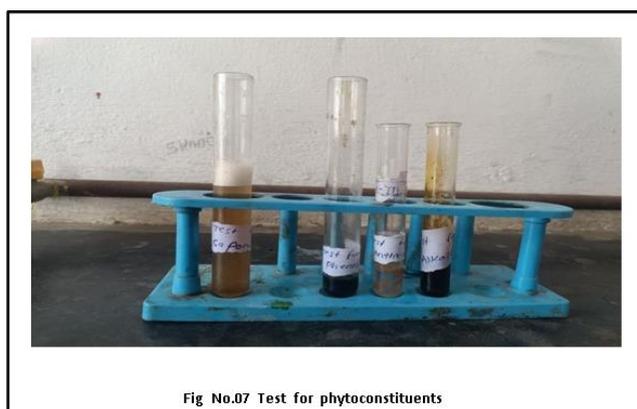


Fig No.07 Test for phytoconstituents

Evaluation of Herbal elixir^[19]

Physico chemical evaluation of herbal elixir

Table No. 04 Physicochemical evaluation.

Sr.No.	Parameter	F1	F2	F3	F4	F5
1	Colour	Green	Green	Green	Green	Green
2	Odour	Pleasant	Pleasant	Pleasant	Pleasant	Pleasant
3	Appearance	Smooth Fine				
4	Clarity	Clear	Clear	Clear	Clear	Clear

Viscosity Determination Measurement of the viscosity of the elixir using Ostwald viscometer.

pH Determination of Herbal Elixir

The PH of different formulations has been determined by using PH meter. PH of each formulation is performed in triplet.^[19]

Table No. 05: viscosity formulation.

Formulation	Viscosity (cps)
F1	35
F2	39
F3	50
F4	57
F5	65

Formula of Viscosity

$$\text{Viscosity of elixir} = n_1/n_2 = t_1d_1/t_2d_2 \quad n_1 = t_1d_1/t_2d_2 \times n_2$$

Where;

n_1 = Viscosity of sample n_2 = Viscosity of water t_1 & d_1 = time of sample and water respectively d_1 & d_2 = density of sample and water respectively

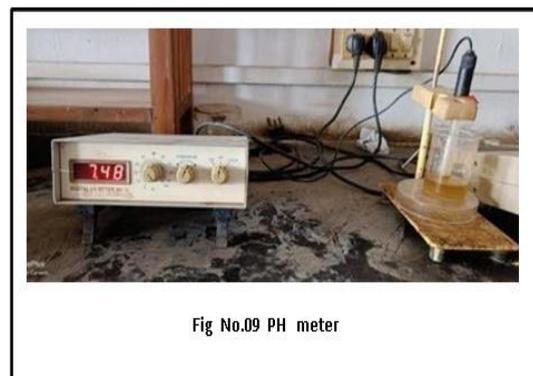


Fig No.09 PH meter

Table No. 06: pH Determination of Formulation.

Formulation	PH
F1	7.4
F2	7.1
F3	7.1
F4	7.3
F5	7.4

Refractive index

Plant-based elixir refractive index measured using the Abbes refractometer. It is used to measure water contained in the elixir.^[19]

Table No. 07 Refractive index of formulation.

Formulation	Refractive Index
F1	1.4105
F2	1.3355
F3	1.3415
F4	1.3425
F5	1.2415



Fig No.10 Refracto meter

Alcohol content determination

Weight a specific gravity bottle accurately. Fill the bottle with the alcohol distillate, insert the stoppered, remove the spill-over solution with a tissue paper and weigh. Transfer the solution back to the volumetric flask, a clean and fill the bottle with distilled water and read the alcohol percentage from table of specific gravity vs. alcohol percent by volume.^[19]

Formulation	Alcohol Content (%)
F1	11
F2	11.5
F3	11.9
F4	12.3
F	12.4

Table No. 09 Stability Study Of Herbal Elixir at Room Temperature.

SR NO.	PARAMETER	F1	F2	F3
1	COLOUR	NO CHANGE	NO CHANGE	NO CHANGE
2	ODOUR	NO CHANGE	NO CHANGE	NO CHANGE



Fig No.11 Alcohol determination

$$\frac{\text{Weight of known value of sample}}{\text{Weight of same volume of distillate water}} = \frac{(W_2 - W_1)}{(W_3 - W_1)}$$

Where,

W₁ = Weight of First Sample

W₂ = Weight of Second Sample

W₃ = Weight of Third Sample

Uniformity Study Of Herbal Elixir

A key quality control test for herbal elixirs is content uniformity, ensuring consistent active ingredient levels across the product. This involves analyzing multiple samples to confirm that each dose contains the expected amount of the active herb or its extracts.

Here's a more detailed look at how content uniformity is assessed in herbal elixirs

- **Homogeneity:** A uniform elixir means the active ingredients are evenly distributed throughout the liquid, and each portion (e.g., a teaspoonful) contains the same amount of the active ingredient.
- **Consistency:** Content uniformity ensures that the active ingredient concentration remains stable across different batches and over time.^[19]

Stability Study

Stability study of herbal elixir involves evaluating their quality and physical properties over time under various condition like temperature and humidity. This testing helps determine shelf life, recommended storage condition and how environmental factors might affects the herbal elixir effectiveness and safety.^[19]

The formulated Herbal Elixir was kept in room temperature at 40°C and 35% humidity for time period of 30 days. No changes in colour, odour, pH, etc were seen after 30 days of observtion. Therefore the formulated Herbal Elixir is safe to use.

3	PH	6.8	6.7	6.5
4	CLARITY	FINE	FINE	FINE

Content Uniformity

Content uniformity is one in a series of tests in a therapeutic product specification that assesses the quality of a batch. Testing for content uniformity helps to ensure that the strength of therapeutic product remains within specified acceptance limits. Typically the herbal elixir is composed of ethanol (3%-23%) and water. However, other excipients, such as glycerine, flavoring agent, preservatives and syrup, may be included as well.^[19]

RESULT

- In the herbal elixir of *Kalanchoe pinnata* the phytoconstituents are present like saponin, flavonoids, steroids, alkaloids, tannins, carbohydrate.
- The viscosity of herbal elixir was found to be in the ranged of 35 to 65cps.
- The range of PH of herbal elixir was found to be between 7.1 to 7.4
- The refractive index of herbal elixir was found to be in the range of 1.2415 to 1.4105.
- Alcohol content of herbal elixir was found to be in the range of 11 to 12.

CONCLUSION

The *Kalanchoe pinnata* plant was collected from herbal garden of SInstitute of pharmacy. The leaves of plant soaked in ethanol and water (70:30) for three days. By using maceration process extract of *Kalanchoe pinnata* obtained. By using extract and other excipients herbal elixir was prepared. Evaluation parameter like phytochemical screening performed. Saponin, Flavonoids, steroids, Alkaloids, Tannins, Carbohydrate are present. Saponin and flavonoids are main constituent and it eliminate the calcium oxalate crystals.

Other evaluation parameter like viscosity determination, PH determination, UV spectroscopy, Refractive index, Alcohol determination was performed.

Herbal Elixir of *Kalanchoe pinnata* was prepared successfully. The evaluation test perform on the formulation on the basis of evaluation parameter the optimized formulation was found to be thus the formulation is used for urolithiasis activity and constant natural alternative for treating kidney stone.

The formulated Herbal Elixir was kept in room temperature at 40°C and 35% humidity for time period of 30 days. No changes in colour, odour, pH, etc were seen after 30 days of observtion. Therefore the formulated Herbal Elixir is safe to use.

Therefore, based on the evaluation parameters, F3 formulation containing Herbal Elixir is optimized as the

best formulation with good physical properties such as odour, pH, viscosity, etc.

REFERENCES

1. Jain M. K. Textbook of pharmaceutics 2 4th edition. Vallabh prakashan, 2015; 177.
2. <https://images.App.goo.gl/uS6d6hKpUkinvweP8>.
3. Kirtikar K.R., Basu B.D., Indian Medicinal Plants with illustration., Oriental enterprises, 2003; 5(2): 1394-1396.
4. Quazi m., The Miracle Plant (*Kalanchoe Pinnata*): A Phytochemical and Pharmacological Review, 2011; 2(5): 1478-1482.
5. Helena M.P., Graces Evolution and asexual reproduction in leaves of the genus *Kalanchoe* 2007.
6. Rafia R Phytochemical, Morphological, Botanical and Pharmacological aspects of a medicinal plant: *Kalanchoe pinnata*, 2019; 16: 5-10.
7. Bathini SA brief review on the potential medical plants and screening models of Urolithiasis, 2015; 6(1).
8. Saida E Bioactive molecules in *Kalanchoe Pinnata* leaves: extraction, identification and purification, 2010; 1329-1338.
9. Mahendra Y Bryophyllum pinnatum Leaf Extracts Prevent Formation of Renal Calculi in Lithiatic Rats, 2016; 36(2): 90.
10. Salman A Antiurolithiatic plants: Formulation used in different countries and cultures 2016; 5(1): 102-105.
11. B. Joseph Rare Medicinal Plant-*Kalanchoe pinnata*, 2011; 6(4): 322-327.
12. P.B Rajshekhar The wonder plant *Kalanchoe pinnata* (lins)pers, 2016(3); 151-158.
13. Renata Zawirska-Wojtsiak, Vitamin C and aroma composition of fresh leaves from *Kalanchoe pinnata* and *Kalanchoe daigremontiana* 2019.
14. <https://images.app.goo.gl/yZ1F2cAQw35cFSw9>.
15. <https://images.app.goo.gl/RTrQvnj7kjbv7YA>.
16. <https://images.app.goo.gl/kk2Rm4G2LaXBaKRXA>.
17. Textbook of Practical Pharmaceutics edition 1st Published by CBS publisher and distributor pvt.Ltd (54).
18. Sunder S M Traditional Methodology Used for Free kidney Stone Removal by Naturally Available Medicinal Plant *Bryophyllum Pinnata* (Lam) pers, 2022; 3(2).
19. Julia M. F *Kalanchoe Pinnata* an updated review about ethonpharmacolgy, phytochemistry, pharmacolgy and toxicology, 2019, 29(4): 529-558.
20. P.B Rajshekhar The wonder plant of *Kalanchoe pinnata* (linspers, 2016; 6(3): 151-158.
21. Baithini S A brief review on the potential medicinal plants and screening models of urolithiasis, 2015; 6(1).

22. Shashank M. Preliminary phytochemical studies of kalanchoe pinnta (Lam) Pers, 2015, 1(2).
23. Pathak, R Herbal Elixir Formulation and Evaluation. The American Journal Of Medical Sciences and Pharmaceutical Research, 2023; 5(10): 06-07.
24. Princy A, Anju G, Comparative quality assessment three different marketed brand of india poly herbal formulation, 2018; 5(4): 4686-4694.
25. Nagpal G Kalanchoe Pinnata and its remedial properties to treat kidney stone. A lesser known plant, 2020; 9(11): 3016-3023.
26. Patterwar, S. V. Klanchoe Pinnata: phytochemical and pharamcological profile. International Journal of Pharmaceutical Sciences & Research, 2012; 3(4): 993.
27. Firoz K. A., Compresive review on kidney stones, Its Diagnosis and treatment with allopathic and ayurvedic medicines, 2019; 7(4): 69-74.
28. Quazi Majaz, A., Tatiya, A. U., Khursid, M. Nazim, S., & Siraj S. The miracle plant (Kalanchoe Pinnata); a phytochemical and pharmacological review. Int J Res Ayurveda Pharma., 2011; 2(5): 1478- 1482.
29. El Abdelloui, S., Destandau, E., Toribio, A., Elfakir, C., Lafosse, M., Renimel, I., & Landermarre, L. Bioactive molecules in kalanchoe pinnta leaves; extraction, purification, and identification. Analytical and Bioanalytical Chemistry, 2010; 398: 1329-1338.
30. Nayak, B. S., Marshall, J. R., & Isitor, G, Wound healinf potential of ethanolic extract of Kalanchoe Pinnata Lam. Leaf—a preliminary study (2010).
31. Gomes, D. C. O., Muzitano, M. F., Costa, S.S., & Rossi Bergmann, B. Effectiveness of the immunomodulatory extract of kalanchoe pinnata against murine visceral leishmaniasis. Parasitology, 2010; 137(4): 613-618.
32. Morshed, A. Hossain, M. H., Shakil, S., Nahar, K., Rahman, S., Ferdousi, D., ... & Rahmatullah, M. Evaluation of Antinoceptive activity of two Bangladeshi medicinal plants, Kalanchoe pinnata (Lam.) Pers. And Lagastroemia Speciosa (L.) Pers. Adv Nat Appl Sci., 2010; 4(2): 193-197.
33. Muzitano, M. F., Tinoco, L. W., Guette, C., Kaiser, C. R., Rossi Bergmann, B., & Costa, S. S. The antileshmanial activity assessment of unusal flavonoids from Kalanchoe Pinnata. Phytochemistry (2006), 67(18): 2017-2077.
34. Yadav, N. P., & Dixit, V. K. Hepatoprotective activity of leaves of Kalanchoe Pinnata Pers. Journal of Ethnopharmacolgy, 2003; 86(2-3): 197-202.
35. Baqurian, J M. R., Manuel, K. E., Palatto, Z. Z. T., Punzal, L., Tumacay, J. D., & Manasala, E. J. (2023). Comprative Evaluation of Garlic (*Allium Sativum*) Bulb Syrup and Elixir as a Food Supplement: Nutritional Content, Quality and Stability Assessment. Journal of Advances in Allied Health Sciences Research (JAAHSR), 10.
36. Julia M. F. Kalanchoe Pinnata an updated review about ethnopharmacolgy, phytochemistry, pharmacology and toxicology, 2019; 29(4): 529-558.
37. Ms. Rutuja P. Formulation and Evaluation of Herbal Elixir for heamoglobin inhancer activity, 2022; 2456-4184.
38. Sunder S. M., Traditional Methodolgy Used for Free Kidney Stone removal by Naturally available Medicinal Plant Bryophyllum Pinnata (Lam) pers, 2022; 3(2).
39. Gahlaut A., Evaluation of clinical Efficancy of Bryophyllum Pinnatum Salisb for treatment of Lithiasis, 2012; 4(4).
40. Kawade R. A Review on Pharmacognostical Phytochemical and Pharmacological Potentials Of Kalanchoe Pinnata (Crassulaceae), 2014; 4(1).
41. Shashank M. Premliminary Phytochemical Stuiies Of Klanchoe Pinnat (Lam.) Pers 2015; 1(2).
42. Sinthya A. Analgesic and Neuropharmacolglcal activities of the ethanolic extract of leaves of Kalanchoe Pinnata (Lam.) 2012.
43. Aditya Sai R K., A review study on traditioal medicine in curing the kidney stone, 2017; 5(3).
44. Subrata K. B., Litratue review on pharmacolglcal potential of Kalanchoe Pinnata (Crassulaceae), 2011; 5(10): 1258-1262.