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Formulation of Evaluation of Anti- Infammatory Syrup of Cynodon Dactylon

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Abstract: *Cynodon dactylon, a traditional medicinal plant, has been explored for its anti-inflammatory potential. This study aimed to formulate and evaluate an anti-inflammatory syrup of Cynodon dactylon extract. The syrup was prepared using a hydroalcoholic extract of Cynodon dactylon, standardized for flavonoid and phenolic content.*

The formulation was optimized for viscosity, pH, and stability. Anti-inflammatory activity was emonstrated significant anti-inflammatory activity, comparable to standard drugs. Stability studies showed no significant changes in physicochemical parameters or anti-inflammatory activity .

The formulated syrup exhibited acceptable viscosity, pH, and palatability. This study validates the traditional use of Cynodon dactylon and provides a potential phytopharmaceutical product for inflammatory conditions.

Keywords: Cynodon dactylon, anti-inflammatory syrup, phytopharmaceuticals, formulation, evaluation

I. INTRODUCTION

Inflammation is the body's natural protective response to injury, infection, or irritation, characterized by redness, swelling, heat, and pain. While it plays a critical role in healing, chronic inflammation is associated with various diseases such as arthritis, asthma, and cardiovascular conditions.

In more recent times, the term inflammation has been defined as the sequential set of changes that happens in a living tissue when it is damaged, with the condition that the injury is not severe enough to destroy both structure and the health of the tissue at the same time .

Cynodon dactylon (Bermuda grass) is known in traditional medicine for its anti- inflammatory and wound-healing properties due to its rich phytochemical content.

Zingiber officinale (Ginger) is widely recognized for its anti-inflammatory and analgesic effects, attributed to compounds like gingerols and shogaols.

This study aims to formulate and evaluate a herbal syrup combining extracts of Cynodon dactylon and Ginger. The syrup form enhances palatability and ease of administration. The project focuses on assessing its physicochemical stability and anti-inflammatory potential, offering a natural and safe alternative to synthetic drugs.

The evaluation includes physical, chemical, and biological testing to ensure the stability, safety, and effectiveness of the herbal formulation. Such an approach not only validates traditional knowledge with scientific evidence but also contributes to the development of safer alternatives to synthetic drugs.

Benefits of anti – inflammatory syrup :-

1. flavonoids, alkaloids, terpenoids, and gingerols which contribute to antioxidant, anti-inflammatory, and immune-boosting effects.
2. Natural Pain Relief: Acts as a herbal analgesic, reducing pain and discomfort associated with inflammation without the side effects of synthetic NSAIDs.
3. Supports Immune Function: Strengthens the immune system with the combined effect of both herbs, helping the body resist infections and recover faster.

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4. Antioxidant Protection: Neutralizes harmful free radicals, protecting cells from oxidative stress and slowing down tissue damage and aging.
5. Gastroprotective Properties: Ginger aids in digestion and prevents gastrointestinal irritation, often caused by conventional anti-inflammatory medications.
6. Improved Circulation and Heart Health: Helps reduce cholesterol levels and supports healthy blood circulation, contributing to cardiovascular wellness.
7. Blood Sugar Regulation: May assist in maintaining healthy blood glucose levels, making it suitable for diabetic or pre-diabetic individuals.
8. Antimicrobial Defense: Exhibits antibacterial and antifungal properties, helping to prevent infections commonly associated with inflammation.

II. LITERATURE REVIEW

1. Tanna et al. (2013)Performed pharmacognostical and physicochemical evaluations of C. Murugesan et al. (2000) Investigated the anti-inflammatory activity of Cynodon dactylon extract using the carrageenan-induced paw edema method in rats. The ethanol extract significantly reduced inflammation, supporting its traditional use in inflammatory disorders.
2. Joshi et al. (2009) Evaluated the phytochemical and antioxidant properties of Cynodon dactylon extract. The presence of flavonoids and phenolic compounds was confirmed, which play a key role in anti-inflammatory activity by neutralizing free radicals.
3. Ravikumar et al. (2011) Identified alkaloids, tannins, and flavonoids in C. dactylon through phytochemical screening. These components are known for their inhibitory effects on pro-inflammatory mediators, highlighting the plant's therapeutic use.
4. Panchal et al. (2015) Conducted in-vitro anti-inflammatory assays (protein denaturation and membrane stabilization methods) with C. dactylon extract, showing significant inhibition of inflammation markers, suggesting its use in non-steroidal herbal anti- inflammatory formulations
5. Chaudhary et al. (2017) Provided a general framework for the formulation of herbal syrups, discussing key excipients like sweeteners, preservatives, and solubilizers. It emphasized the importance of pH and viscosity for syrup stability and palatability.
6. Mali and Mehta (2012) Formulated and evaluated a herbal syrup containing polyherbal extracts including C. dactylon. The syrup showed good physicochemical stability, microbial safety, and patient acceptability over a 90-day storage period.
7. Prajapati et al. (2003) Reported luteolin and apigenin as major flavonoids in Cynodon dactylon, which have been shown to suppress inflammatory cytokines like TNF-α and IL- 1β, supporting its mechanism as an anti-inflammatory agent.
8. Patel and Patel (20111) Developed a syrup formulation using standardized herbal extracts. They highlighted formulation challenges like solubility and microbial stability, and how natural preservatives (e.g., honey, sorbic acid) can enhance syrup shelf life.
9. dactylon extracts, showing consistency in parameters like total ash, extractive values, and pH—important for standardizing herbal formulat

PLANE OF WORK :

- Selection of topic
- Selection of herbs
- Selection of excipient
- Material and instrument
- Formulation of product

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Evaluation test

- Viscosity
- PH determination
- Organoleptic properties
- Phytochemical test

III. DRUG PROFILE

1. Cynodon dactylon

Fig. 1 :- cynodont doctylone

Cynodon doctylon is one of the most ubiquitous weeds in India. Other frequent names for it are durba (Bengali), garikoihallu (Kanarese), Durva (Marathi), haritali (Sanskrit), arugampullu (Tamil), garikagoddi (Telugu), and dhubkhabbal (Punjabi). It is commonly known as dhub, doob, or harialil. This hardy perennial grass is found all throughout the world, although it is native to warm temperate and tropical climates in particular.

It is a pale green, coarse-textured, creeping grass that grows quickly and is incredibly resilient to drought. It is found as short cylindrical segments that are 2 to 3 mm in diameter and 3 to 20 mm length, occasionally up to 4 mm.

India's traditional medicine uses cynodon dactylon, which is well known for treating minor treatments. This plant has anti-diabetic, anti-arrhythmic, cardiovascular anti-microbial, anti- ulcer, anti-oxidant, dermatological, anti-nephrolithiasis, CNS, diuretic, analgesic anti- inflammatory, anti-viral, antipyretic, antidiarrrhoeal activity etc.

Taxonomical Classification of Cynodon Dactylon :

- Kingdom – Plantae
- Division – Magneliophyta
- Class – Liliopsida
- Order – Cyperales
- Family – Poaceae
- Genus – Cynodon
- Species – Cynodon dactylon

Chemical Constituents:

Chemical components with varying biological activities, including as flavonoids, glycoside sugars, phenols, sterols, steroidal saponins, alkaloids, tannins, proteins, carbohydrates, and amino acids, are present in Cynodon dactylon plant extract.

Use : Antimicrobial, Anti-inflammatory, Analgesic, Antioxidant, Antiseptic, Anti-acne.

2. Ginger

Ginger’s antibacterial power may also brighten your smile. Active compounds in ginger called gingerols keep oral bacteria from growing. These bacteria are the same ones that can cause periodontal disease, a serious gum infection. ginger is considered good for its anti-inflammatory properties.

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Ginger contains various compounds, including gingerols, shogaol, and zingerone, which have demonstrated anti-inflammatory effects.

Fig.2 Ginger

These compounds work by inhibiting the production of inflammatory molecules and activating signaling pathways that reduce inflammation. A key compound in ginger, gingerol, has been shown to have anti-inflammatory effects.

Taxonomical Classification of ginger Taxonomic :- ginger plant

Domainv :- Eukaryota

Kingdom :- Plantae Phylum :- Spermatophyta Subphylum :- Angiosperms Class :- Monocotyledonho Family :- Zingiberacea Genus :- Ginger

Chemical constituent :

Ginger (Zingiber officinale) contains key bioactive compounds such as gingerols, shogaols, and zingerone, which are mainly responsible for its anti-inflammatory and antioxidant properties. It also contains essential oils like zingiberene, cineole, and citral, contributing to its antimicrobial and aromatic effects

Use : Ginger is widely used for its anti-inflammatory, antioxidant, and digestive properties. It helps reduce inflammation and pain in conditions like arthritis, relieves nausea and vomiting, and improves digestion by stimulating gastric secretion

IV. MATERIAL AND METHOD

Materials :

1. Plant Material : Cynodon dactylon (Durva grass or Bermuda grass)
2. Solvents: Ethanol, water,
3. Sweetening Agents: invert Sugar
4. Preservatives: Sodium benzoate .
5. Excipients: Glycerin, flavorings,

Methods :

1. Extraction: maceration other suitable methods to obtain the bioactive compounds from Cynodon dactylon.
2. Syrup Preparation: Mixing the extract with sweetening agents, preservatives, and excipients in a suitable vehicle
3. pH Adjustment: Adjusting the pH to ensure stability and compatibility
4. Viscosity Adjustment: Adjusting the viscosity to optimize pourability and patient compliance.
5. Evaluation: Assessing the syrup's physicochemical properties, in vitro and in vivo anti- inflammatory activity, and stability.

Table 1 : Role of ingredients in herbal syrup

Sr. no .	Ingredients	Role
1.	cynodon dyctlon	anti - infalmmatory
2.	sucrose	swettner

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3.	sodium bicarbonate	preservative
4.	ginger	anti inflammatory

PREPARATION

Preparation of anti inflammatory syrup

Table. 2: Formulation No.1 (F1) - For 50ml.

sr no.	Ingredients	Quantity
1.	Cynodon dyctlon extract	15 .5 ml
2.	Ginger extract	9 .75 ml
3.	Invert sugar syrup base	20 ml
4.	Sodium benzoate	0.2 g
5.	Water	5 ml

Procedure :

1. Preparation of Extracts:

Cynodon dactylon: Wash, dry, and powder the plant. Perform aqueous extraction by boiling the powder in distilled water for 30 minutes. Filter and concentrate under reduced pressure.

Ginger: Crush fresh ginger and extract juice or perform aqueous extraction. Filter and concentrate.

2. Syrup Base Preparation: Heat the required quantity of invert sugar in a clean stainless steel container with a portion of purified water until fully dissolved .Cool to room temperature.

3. Mixing Active Extracts: Add Cynodon dactylon and ginger extracts to the syrup base.Stir continuously to ensure uniform mixing.

4. Addition of Excipients: Add citric acid ,sodium benzoate under constant stirring..

5. Make up the Volume: Add remaining purified water to make up to 50 ml.

6. Filtration : Filter syrup filter.fill into clean dry amber glass bottles.

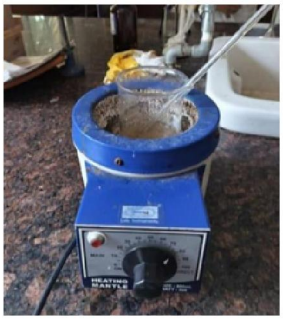

Fig.3: preparation of invertrted syrup

Fig.4 syrup

Fig.5: filtration of syrup

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Table. 3: Formulation 2 (F2) - For 50ml

Sr no.	Ingredients	Quantity
1.	cynodon dyctlon extract	16. 10 ml
2.	ginger extract	8.65 ml
3.	Invert sugar syrup base	20 ml
4.	Sodium benzoate	0.1 g
5.	Water	5 ml

Table. 4: Formulation 3 (F3) - For 50ml.

Sr no.	Ingredients	Quantity
1.	cynodon dyctlon extract	17.10 ml
2.	ginger extract	7 ml
3.	Invert sugar syrup base	20 ml
4.	Sodium benzoate	0.1 g
5.	Water	5ml

EVALUATION PARAMETRE

A. Phytochemical test

1. Alkaloid test (Mayers reagent / Dragendroffs reagent):

Add 1ml of extract to a few drops of Mayers reagent or Dragendroffs test Result: Formation of a cream ppt indicates alkaloids.

2. Flavonoid test (Lead Acetate test): Add a few drops of lead acetate soln to 1 ml of extract

Result: yellow ppt confirms flavonoids

3. Saponin test (Foam test):

Shake 1ml of extract with 5ml of distilled water

Result: Persistent froth for 10 minutes indicates saponins.

4. Tannin test (Ferric Chloride Test):

Add a few drops of 5% ferric chloride soln to 1ml of extract Result: Green or blue-black color indicates tannins.

5. Glycoside Test (Keller-Killiani Test):

Add glacial acetic acid and ferric chloride to extract, then add sulfuric acid Result: Reddish-brown ring at the interface indicates glycoside.

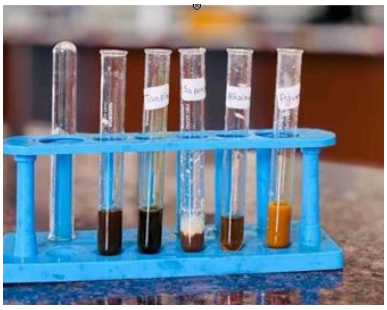

Fig.6 : phytochemical test Table.5: Phytochemical test

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Sr no.	Phytochemical test	Method used	Observation	Inference
1.	Alkaloid	Dragendroffs/mayers reagent	Reddish brown precipitate	present
2.	Flavonoids	Alkaline reagent test Intense	yellow color	present
3.	Tannins	Ferric chloride test	Blueblack/greenish precipitate present	present
4.	Saponins	Foam test	Persistent foam	present
5.	Glycosides	Keller-killiani test	test Reedishbrown ring	present

B. Procedure to determine Viscosity Procedure:
1. Take 100 ml of the syrup sample in a clean beaker.
2. Set up the viscometer on a flat surface.
3. Select the spindle suitable for syrup
4. Immerse the spindle in the syrup without touching the beaker sides.
5. Set the speed (e.g., 20 rpm).
6. Start the viscometer and let it run until a constant reading is achieved.
7. Record the viscosity value shown in centipoise

PH determination: The pH determination of syrup by using two techniques.
a) Glass electrode. b) pH paper.

Procedure for glass electrode
1) Prepare 30ml buffer of each pH. The volume of the stock solution to be taken. Prepare the buffer by mixing appropriate volume.
2) Allow the solution for 15minutes to establish equilibrium.
3) Measure the pH of solution using a pH meter.


Fig. 7: Viscosity


Fig. 8: a) pH Meter.


Fig. 8: b) pH

RESULT :

Sr. No.	Parameter	F1	F2	F3
1.	Viscosity	3.70cp.	3.60cp.	3.66cp.
2.	pH Determination			
	a) pH paper	Neutral	Neutral	Neutral
	b) pH meter	6.01	6.43	6.53
	Organoleptic Characters			

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3.	1) Color	Yellowish green	Yellowish green	Yellowish green
	2) Odor	Aromatic	Aromatic	Aromatic
	3) Taste	Sweet	Sweet	Sweet
	4) Appearance	Clear	Clear	Clear

Table. 6: Result of evaluation parameter.

CONCLUSION

The formulated anti-inflammatory syrup containing Cynodon dactylon and ginger demonstrated promising potential in reducing inflammation due to the synergistic action of their bioactive compounds. The syrup was stable, palatable, and showed effective anti-inflammatory activity, suggesting it could be a beneficial herbal alternative to synthetic drugs with fewer side effects.

REFERENCES

[1]. Punchard NA, Whelan CJ, Adcock I (2004) The journal of inflammation. J inflamm 1(1): 1) Anti-inflammatory and antioxidant activities of Cassia fistula Linn bark extracts. African journal of traditional, complementary and alternative medicines 2(1): 70-85.

[2]. Lazzaroni M, Bianchi Porro G (2004) Gastrointestinal side‐effects of traditional non‐steroidal anti‐inflammatory drugs and new formulations.Alimentary pharmacology & therapeutics 20: 48-58.

[3]. Vane JR, Botting RM (1998) Anti-inflammatory drugs and their mechanism of action. Inflammation Research 47(2): 78-87.

[4]. Harlan JR, De Wet JMJ (1969) Sources of variation in Cynodon dactylon (L). Pers. 1. Crop Science 9(6): 774-778.

[5]. Shendye NV, Gurav SS (2014) Cynodon dactylon: A systemic review of pharmacognosy, phytochemistry and pharmacology. Int J Pharm Pharm Sci 6(8): 7-12.

[6]. . Debnath B, Singh WS, Das M, Goswami S, Singh MK, et al. (2018) Role of plant alkaloids on human health: A review of biological activities. Materials today chemistry 9: 56-72.

[7]. Kumar S, Shachi K (2020) Hypoglycemic Medicinal Effects of Cynodon Dactylon in Alloxan Induced Diabetic Albino Rats. Adv Endoc and Daib: AEAD, pp. 110.

[8]. Ashokkumar K, Selvaraj K, Muthukrishnan SD (2013) Cynodon dactylon (L.) Pers.: An updated review of its phytochemistry and pharmacology. Journal of Medicinal Plants Research 7(48): 3477-3483.

[9]. Patel MR, Bhalodia YS, Pathak NL, Patel MS, Suthar K, et al. (2013) Study on the mechanism of the bronchodilatory effects of Cynodon dactylon (Linn.) and identification of the active ingredient. Journal of ethnopharmacology 150(3): 946-952.

[10]. RA Devi, SK Tandan, D Kumar, SP Dudhgaonkar, J Lal (2008) Analgesic Activity of Caesalpinia bonducella Flower Extract. Pharm Biol 46(10-11): 668-672.

[11]. . S Ahmed, A Naved, RA Khan, S Siddiqui (2015) Analgesic Activities of Methanol Extract of Terminalia chebula Fruit. Pharmacol Amp Pharm 6(6): 547-553.

[12]. Fereidoni M, Ahmadiani A, Semnanian S, Javan M (2000) An accurate and simple method for measurement of paw edema. Journal of Pharmacological and Toxicological Methods 43(1): 11-14

[13]. Stohs SJ, Bagchi D (2015) Antioxidant, anti‐inflammatory, and chemoprotective properties of Acacia catechu heartwood extracts. Phytotherapy Research 29(6): 818-824.

[14]. . Ilavarasan R, Malika M, Venkataraman S (2005) Anti-inflammatory and antioxidant activities of Cassia fistula Linn bark extracts. African journal of traditional, complementary and alternative medicines 2(1): 70-85.

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[15]. Pieczykolan A, Pietrzak W, Gawlik-Dziki U, Nowak R (2021) Antioxidant, Anti-Inflammatory, and Anti-Diabetic Activity of Phenolic Acids Fractions Obtained from Aerva lanata (L.) Juss. Molecules 26(12): 3486.

[16]. Ahmad F, Misra L, Tewari R, Gupta P, Mishra P, et al. (2016) Anti-inflammatory flavanol glycosides from Saraca asoca bark. Natural product research 30(4): 489-492

[17]. Sindhu G, Ratheesh M, Shyni GL, Helen A (2009) Inhibitory effects of Cynodon dactylon L. on inflammation and oxidative stress in adjuvant treated rats. Immunopharmacology and Immunotoxicology 31(4): 647-653.

[18]. Hayes RL, Bennett GJ, Newlon PG, Mayer DJ (1978) Behavioral and physiological studies of non-narcotic analgesia in the rat elicited by certain environmental stimuli. Brain research 155(1): 69-90.

[19]. 19 .Saha A, Masud MA, Bachar SC, Kundu JK, Datta BK, et al. (2007) The analgesic and anti-inflammatory activities of the extracts of Phyllanthus reticulatus. in mice model. Pharmaceutical Biology 45(5): 355-359.

[20]. Lu TC, Ko YZ, Huang HW, Hung YC, Lin YC, et al. (2007) Analgesic and anti- inflammatory activities of aqueous extract from Glycine tomentella root in mice. Journal of ethnopharmacology 113(1): 142-148.

[21]. Abdullahi MH, Anuka JA, Yaro AH, Musa A (2014) Analgesic and anti inflammatory effects of aqueous leafextract of Combretum micranthumg. Don (Combretaceae). Bayero Journal of Pure and Applied Sciences 7(2):