IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

A Research Analysis of Tridax Procumbens Linn : Historical Background, Botanical Characteristics, Soap Formulation, and Evaluation Parameters

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Abstract :-

Tridax procumbens Linn, also known as "Coat Button" or "Tridax Daisy," is a tropical herb with significant historical use in traditional medicine for wound healing, diabetes management, hypertension control, and pain relief. This review covers the plant's botanical characteristics and details the process of formulating soap with its extracts. The formulation involves integrating Tridax procumbens extract into a soap base of carrier oils and lye. Evaluation parameters include physical and chemical properties, antimicrobial activity, stability, foam test, skin sensitivity, and cleansing efficacy. The review highlights Tridax procumbens' potential in modern personal care products, emphasizing the need for rigorous evaluation to ensure safety and effectiveness.
The review incorporates current knowledge on Tridax procumbens emphasizing its potential as a valuable ingredient in both traditional and modern healthcare products. The findings underscore the importance of rigorous formulation and evaluation methods to ensure the safety and efficacy of Tridax procumbens-based products.

Introduction :-

Tridax procumbens, commonly known as "coat buttons," is a widespread species with significant medicinal properties. This plant belongs to the Kingdom Plantae and falls within the order Asterales, under the family Asteraceae. It doesn't belong to a subfamily but is part of the genus Tridax, with the species being procumbens. Native to the tropical Americas, it has adapted to various global locales, thriving in tropical, subtropical, and some temperate climates. Tridax procumbens has been used to treat wounds, manage diabetes, control hypertension, and relieve pain. Recent interest has focused on incorporating its extracts into personal care products, such as soap. This review explores the soap formulation process with Tridax procumbens extract and evaluates its physical, chemical, and antimicrobial properties, as well as its stability, skin sensitivity, and cleansing efficacy. By merging traditional knowledge with modern scientific methods, the review underscores the plant's potential in contemporary therapeutic and cosmetic applications.

Plant Profile :-

In present days, the therapeutic value of medicinal plant is increasing at significant rate for developing new drugs and combatting emerging diseases. Drug developers are targeting new sources of active materials to cope up with multi drug resistance (MDR) of different microorganisms. Tridax procumbens L. was targeted in this study as it is widely spreaded as a common weed in Indian subcontinent as well as all over the world Tridax procumbens is native to many parts of Africa, Asia, America, Australia and some part of Europe. They are given many names depending on the regions; some of the common names are given in Table 1.

❖ **Common names and botanical classification of Tridax procumbens :-**

Sr no.	Common name	Language of Tribe
1	English	Coat Buttons and Tridax Daisy
2	Hindi	Ghamra
3	Sanskrit	Jayanti Veda
4	Marathi	Dagadi Pala
5	Telugu	Gaddi Chemanthi
6	Tamil	Thatapoodu
7	Malayalam	Chiravanak
8	Spanish	Cadillp Chisaca
9	French	Herbe Caille
10	Chinese	Kotobukigiku
11	Oriya	Bisshalyakarani
12	Japanese	Kotobukigiku
13	Thai	Gecko feet
14	Yoruba	Yunyun

Table :-1

Kindom	Plantae
Subkingdom	Tracheobionta
Division	Magnoliophyte
Class	Magnoliopsida
Subclass	Asteridae
Clade	Angiosperms
Order	Asterales
Clade	Eudicots
Family	Asteraceae
Tribe	Heliantheae
Genus	Tridax
Species	T.Procumbens
Binomial name	Tridax procumbens

Table :- 2

Geographical Source :-

Tridax procumbens, commonly known as coatbuttons or tridax daisy, is native to the tropical Americas, including Mexico, but has been introduced to tropical, subtropical, and mild temperate regions worldwide. It is a widespread weed and pest plant, listed as a noxious weed in the United States and having pest status in nine states. Tridax procumbens is found in various regions globally, including India, Seychelles, South Africa, West Indies, Central Africa,

Brazil, China, Comoros, Madagascar, Mauritius, Mayotte, New Caledonia, Nicaragua, Reunion, and more.This plant thrives in ruderal environments along roadsides and as a weed in crops and disturbed areas. It can grow from sea level up to 1700 meters in altitude and is adaptable to various soil types and climates.The geographical source of Tridax procumbens is native to Central and South America but has been introduced into tropical, subtropical, and mild temperate regions worldwide.

Fig 1 . Whole Plant of Tridax Procumbens Linn.

Morphology :-

T. procumbens is a semi prostate, annual, creeper herb with stem ascending to 30-50 cm in height, branched, sparsely hairy and rooted at nodes. Leaves are simple, opposite, serrate or dentate, acute, fleshy, pubescent, exstipulate, lanceolate to ovate in shapewith 3-7 cm long, irregularly toothed margin with wedge shaped base, shortly petioled and hairy on both surfaces (fig. 1). The leaves are dorsiventral; epidermis is single layered on both the surfaces and covered with a thick cuticle. Upper epidermis shows single layered,multicellular covering trichome and lower epidermis is single layered, elongated cell and closely arranged . Xylem vessel shows the presence of calcium oxalate crystals. Vascular bundles are concentric in shape. Meristeel consists of single, centrally located collateral vascular bundle surrounded by some parenchymatous cells. Flowers are tubular in nature, yellow in color with hairs having a capitulum inflorescence. This has two types of flowers: ray florets and disc florets with basal placentation .

Microscopical character and histology :-

Petiole: Kidney shaped towards the distal end and crescent shaped towards the laminal side. Single layered epidermis covered with cuticle and interrupted by simple, multicellular, 3- 5 celled trichomes. Hypodermis 1- 2 celled collen-chymatous. Ground tissue parenchymatous; vascular bundles 5, the size of the vascular bundles various from centre to margin i.e. large to small. These are centripetal i.e. xylem surrounded by the phloem.

Leaf: Transverse section (T. S.) of leaf showed dorsiventral, epidermis single layered on both the surfaces and covered with thick cuticle. T.S. passing through the mid rib region shows slight depression on ventral side and slightly protuberated on dorsal size. Trichomes were of covering type which are simple, multicelled (3-6 celled) and more in number on dorsal side. The basal cells of the Trichome are swollen and Trichome looks like claw. Meristeel consists of single centrally located collateral vascular bundle surrounded by some parenchymatous cells filled with dark

content. T. S. passing through the laminar region shows single layered palisade cells just below the epidermis followed by 5-7 celled mesophyll, parenchyma mostly devoid of inter cellular spaces.

Powder analysis of Tridax procumbens L.:

It is dark green, fine, odorless powder with slight bitter taste. The powder microscopy reveals the presence of different types of (Glandular and Non
Glandular) Trichomes, trichome base, fibres, stone cells, laticifers with adjacent parenchyma. Spiral thickenings vascular bundles.

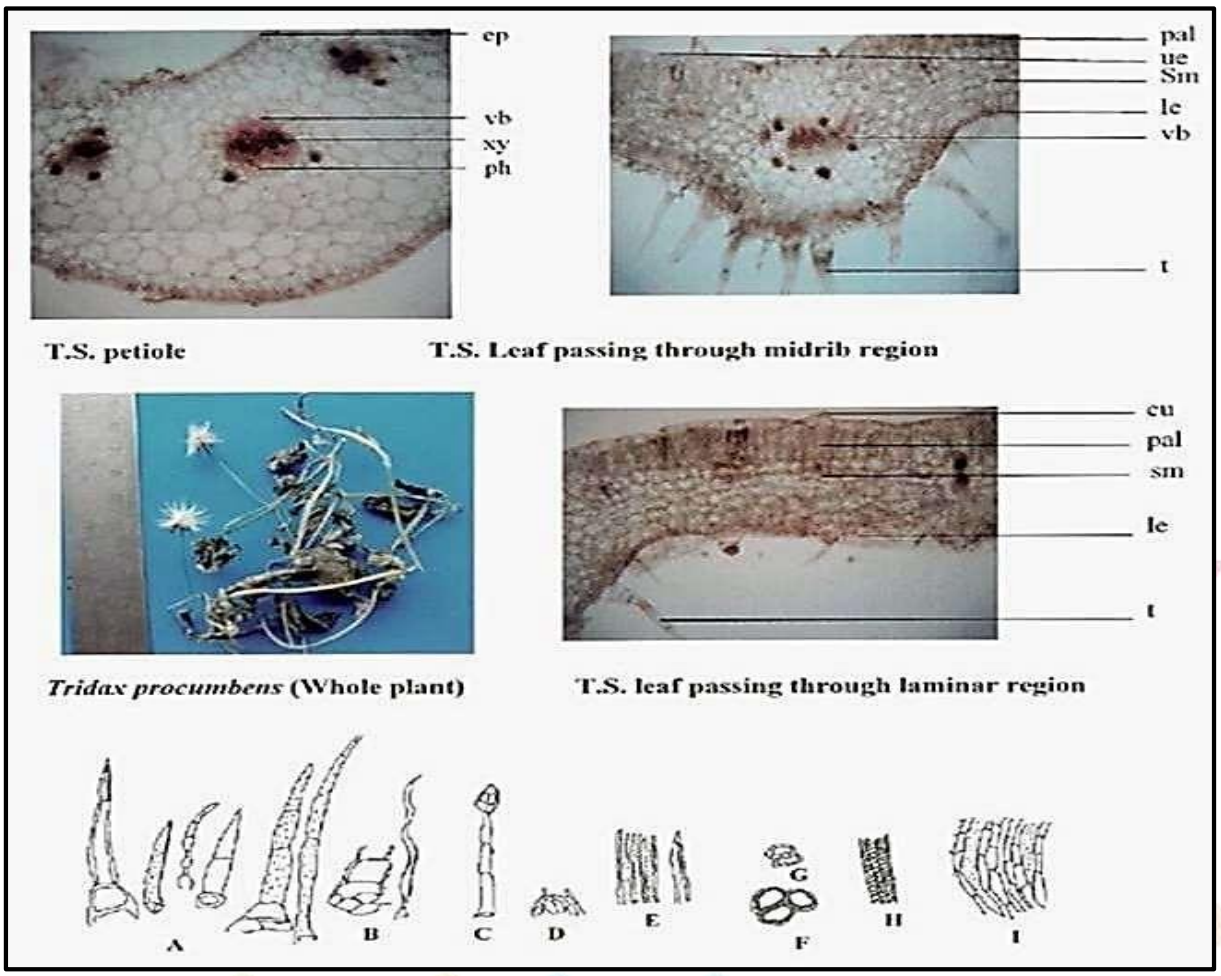


FIG. 2: SHOWING MICROSCOPY OF LEAF OF TRIDAX PROCUMBENS L. AND ITS POWDER CHARACTERISTICS

Abbreviations: cu-cuticle, **le**-lower epidermis, **pal**-palisade cells,**sm**-spongy mesophyll, **t**-Trichome, **vb**-vascular bundle.

Powder :- **A and B**-simple Trichome, **C** - glandular Trichome, **D** - Trichome base, **E** - laticifers and vessels, **F and G** - stone cell, **H** -spiral vascular bundle, **I** - laticifers and with adjacent parenchyma

Phytochemical Review :-

	Compound Type	Specific Compounds	Potential Benefits
Leaves	Proximate Composition	• Crude Proteins: 26% • Crude Fiber: 17% • Soluble Carbohydrates: 39% Calcium Oxide: 5% • Calcium Oxide: 5%	Nutritional supplementation
	Polysaccharides	• WSTP-IA (L-arabino-D-galactan) • WSTP-IB (linear β-(1→6)-D-galactan)	
	Minerals	• Sodium • Potassium • Calcium	
	Secondary Metabolites	• Carotenoids • Saponins	
Flowers	Flavonoids	• Luteolin • Glucoluteolin • Quercetin • Isoquercetin	
Aerial Parts	Flavonoids	• Procumbenetin (3,6-dimethoxy-5,7,2',3',4'-pentahydroxyflavone 7-O-β-D-glucopyranoside)	
	Fatty Acids and Esters	• Linolenic acid • Lauric, myristic, palmitic, arachidic, and linoleic acid	
General	Alkaloids, Tannins, and Other Phenolics	• Alkaloids • Carotenoids • Flavonoids (catechins and flavones) • Tannins	Plant defense mechanisms
	Terpenoids and steroids	• Oleanolic acid • Taraxasteryl • Acetate • Beta-amyrenone • Lupeol • Fl-sitosterol	Antidiabetic properties
	Other Components	• Fumaric acid • Tridbisbithiophene • Bis-bithiophene • Novel compounds from extracts	
Minerals		• Calcium • Magnesium • Potassium • Sodium • Selenium	Nutritional supplementation

Table :- 3

Pharmacological Activities :-

1) Wound Healing Activity :-

Wound healing involves a complex interaction between epidermal and dermal cells,the extra cellular matrix, controlled angiogenesis and plasma-derivedproteins all coordinated by an array of cytokines and growth factors.Tridax antagonized anti-epithelization and tensile strength depressing effect of dexamethasone (a known healing suppressant agent)without affecting anticontraction and antigranulation action of dexamethasone. Aqueous extract was alsoeffective in increasing lysyl oxidase but to a lesserdegree than whole plant extract. Further it has been shown that extract of leaves of this plant also promotes wound healing in both normal and immunocompromised (steroid treated) rats in dead space wound healing model. The plant increase not only lysyl oxidase but also, protein and nucleic acid content in the granulation tissue, probably as a resultof increase in glycosamino glycan content.

2) Anti – Inflammatory Activity :-

Tridax procumbens shows significant anti-inflammatory effects by reducing exudate volume, leukocyte migration, edema fluid, granuloma tissue, and γ-glutamyl transpeptidase levels. It has minimal ulcerogenic potential and exerts its anti-inflammatory action through COX-1 and COX-2 enzyme inhibition and free radical scavenging, likely due to flavonoids. In studies, its aqueous extract did not significantly increase fibroblast counts or collagen synthesis compared to ibuprofen, but it did comparably inhibit edema at higher doses. Tridax procumbens combined with ibuprofen enhanced anti-inflammatory activity more than ibuprofen alone. Its effectiveness in reducing inflammation suggests it could be a valuable alternative or adjunct in anti-inflammatory treatments.

3) Anti-cancerous activity :-

Tridax procumbens demonstrates notable anti-cancer activity. Extracts from its flowers, whether aqueous or acetone-based, have shown efficacy against PC3 prostate cancer cells through the MTT assay, which measures cell viability. A key compound identified in the aqueous extract, Lupeol, significantly reduced cell viability in human lung cancer cells at a concentration of 320 µg/ml and exhibited considerable anti-cancer effects. Additionally, ethanol and acetone leaf extracts of T. procumbens displayed strong anti-cancer activity against A549 (lung) and Hep G2 (liver) cancer cell lines. The essential oil from T. procumbens, containing major components like dibutyl phthalate and trans-(α)-caryophyllene, demonstrated anti-cancer activity against MCF-7 breast cancer cells with an IC50 value of 96.6 µg/ml, suggesting the presence of effective terpenes.

4 Antimicrobial activity :-

The methanolic extracts of Tridax procumbens leaves exhibit broad-spectrum antibacterial activity against both Gram-positive and Gram-negative bacteria, with strongest effects against *S. Typhi* and *S. flexneri* and least against *E. coli*. The whole plant extract was effective only against *Pseudomonas aeruginosa*. A new flavone, identified as 5, 7, 4'-trihydroxy-6, 3'-dimethoxy flavone-5-O-alpha rhamnopyranoside, isolated from the leaves, showed antibiotic activity superior to Penicillin G when formulated in a mineral base. Aqueous extracts also showed antibacterial activity against *Aeromonas hydrophila* and *Bacillus cereus*. The n-hexane extract of flowers was active against *E. coli*, *Mycobacterium smegmatis*, *Salmonella group C*, and *Salmonella Paratyphi*. Ethyl acetate extracts targeted *Bacillus cereus* and *Klebsiella spp.* The aerial parts extract was active against *Mycobacterium smegmatis* and *Staphylococcus aureus*, while the aqueous extract showed no antimicrobial activity.

4) Antioxidant activity :-

The oxygen free radicals generated from phagocytes activates transcription factor NF-κB inducing the formation of inflammatory cytokines and activation of cyclooxygenase-2 (COX-2). This initiates tissue damage cascade mechanism which needs to be neutralized. T. procumbens shows anti-oxidant activity. This was validated by DPPH (2, 2-diphenyl-picrylhydrazyl hydrate) and ABTS [2, 2'-azino-bis (3-ethyl benzothiazoline-6-sulphonic acid)] methods. Chloroform andethyl acetate fractions of ethanol extract showed maximum activity in DPPH method with IC50 Hepatoprotective property values of 37.39 µg/ml. In addition, methanol extract also showed antioxidant activity in DPPH method. Flavonoids and alkaloids of the extracts are mainly responsible for the activity.

5) Anti-arthritic activity :-

Arthritis is an inflammatory disorder involving damage to one or more joints. The ethanolic extract of the T. procumbens displayed a significant role in the anti-arthritic activity in Freund's Complete Adjuvant (FCA) induced rat model compared with that of the standard drug, indomethacin. An evaluation was done by an increase in the body weight, RBC count, Hb level and a decrease in ESR level, WBC count, pannus formation and bone destruction. The rheumatoid arthritis is characterized by loss of articular cartilage leading to diminished joint spaces due to severe swelling of soft tissues through a variety of pathological mechanisms and bone resorption which was normalized by the administration of ethanolic extract of the T. procumbens confirming the anti-arthritic activity of the extract.

6) Immunomodulatory activity :-

The ethanolic extract of T. procumbens has immunostimulatory property as it enhanced the uptake of particulate matter by phagocytes. This also stimulates a cell-mediated immune response by increasing the number of leukocytes, plasma cells and splenic leukocytes in turn increasing the phagocytic index. The active component 'sesquiterpene lactone', majorly present in the ethanolic extract, is known to induce delayed type hypersensitivity reaction. The extract prevents BSA sensitized anaphylactic reaction by producing IgG antibodies blocking the BSA-IgE interaction, thereby inhibiting mast cell degranulation. This was also observed in Pseudomonas aeruginosa infection

7) Hepatoprotevtive activity :-

The liver, a key detoxifying organ, releases enzymes into the blood when hepatic cells are damaged, indicating the extent of liver injury. Tridax procumbens has shown hepatoprotective effects in various models. Its chloroform extract reduced liver damage caused by lipopolysaccharide (LPS) and D-galactosamine, as evidenced by lower levels of liver enzymes such as AST, ALT, and bilirubin. This extract also promoted liver cell regeneration. Similarly, aqueous and ethanolic extracts of T. procumbens, used with chloroquine, protected against liver damage from different sources including carbon tetrachloride and paracetamol. In rats with d-GalN/LPS-induced hepatitis, the extracts helped restore levels of antioxidants and detoxifying agents. Histopathological studies confirmed that T. procumbens extracts prevented liver cell necrosis and inflammation. The methanolic extract was effective in reducing liver fibrosis caused by bile duct ligation. The hepatoprotective effects are likely due to saponins and flavonoids in the plant, which stabilize cell membranes and inhibit fatty acid buildup.

8) Antihypertensive activity :-

Increased pulse pressure predicts cardiovascular and coronary artery disease, myocardial infarction (MI) and congestive heart failure, which is independent of diastolic blood pressure and systolic blood pressure. Whereas, the high heart rate (tachycardia) is associated with an increased risk of death from cardiovascular and non-cardiovascular causes. The aqueous extract of the T. procumbens leaves lowered the mean arterial blood pressure and heart rate in the Sprague–Dawley rat models.

9) Vasorelaxant activity :-

Smooth muscle contraction is involved in many physiological activities such as blood circulation, organ maintenance and peristalsis of biological tracts. The aqueous extract of T. procumbent leaves induced relaxation of isolated aortic rings from rat by decreasing the calcium supply from the extracellular fluid. The extract also neutralized the phenylephrine/high potassium induced smooth muscle contraction by NO synthase pathway (either by increasing endothelial production of NO or premature activation of NO production).

10) Mosquitocidal :-

Alpha-Terpinene, α-Terpineol and β-Pinene, being the major chemical constituents in the essential oil extract from the T. procumbens plant, significantly showed repellent activity against the malarial fever mosquito Anopheles stephensi at 6 % concentration.

11) Water waste treatment :-

Activated biocarbon made from Tridax procumbens leaves is effective in removing heavy metals from wastewater. It efficiently adsorbs Zn(II) and Cd(II), performing better than standard charcoal. This biocarbon also removes hexavalent chromium from synthetic and industrial wastewater. Additionally, it functions as a biocarbon filter to remove fluoride ions from water and effectively removes mercury (II) ions. The powdered leaves help convert Cr(VI) to Cr(III) and remove both Cr(III) and Cd(II) from aqueous solutions**.**

12) Blood Coagulation :-

The aqueous leaf extract of Tridax procumbens decreases bleeding time. The extract also lowers blood clotting time and this is dependent on the dosage of the extract added to blood. This finding is consistent with claims by folk medicine practitioners of Ado L.G.A. of Benue State Nigeria that the aqueous leaf extracts stop bleeding.

Fig 3. Process of extraction

Methodology :-

Collection of materials :-

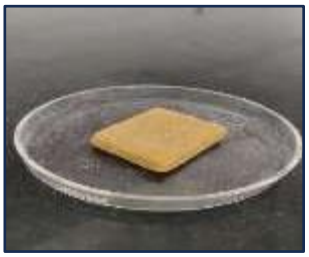
The Tridax procumbens plants collected from the herbal garden of Dr.Uttamrao Mahajan college of Pharmacy Chalisgaon. The collected leaves were separated from the plant material. The collected leaves were washed with water and shade dried for 5 days and grind into a fine powder using a mixer grinder. Cocoa butter, Sodium hydroxide, Glycerine, Sodium lauryl sulphate, Lemon oil, Stearic acid was taken from Department of Pharmaceutics. Vitamin E oil is purchased from a local pharmacy. Coconut oil, and honey of different brands were purchased from the local market and fresh Aloe vera gel is collected from herbal garden.

Preparation of plant extract :-

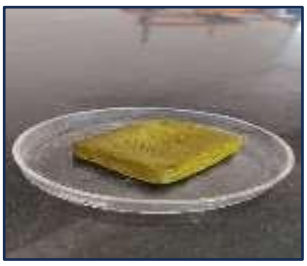
The dried leaf powder was used for the extraction of phytoconstituents. The powdered plant leaves were stored in an airtight container and the powder was extracted using Ethyl Acetate as solvent by the Soxhlet extraction method. Tridax procumbens dried leaf powder is weighed accurately and packed in a filter paper and then placed in the Soxhlet apparatus and the solvent is heated in the process of reflux. To 50 g of dried leaf powder 500 ml of Ethyl acetate is used in the extraction process. Continuous extraction was done and solvent was transferred into the reservoir from the chamber. This process is continued for 6hrs and the extract is collected and concentrated using a hot water bath. Final concentrated extract is used in the formulation.

Soap formulation :-

The glassware is sterilised by dry heat sterilisation technique. The 13 gm of Coco butter was weighed and melt, then add prepared mixture of Sodium hydroxide and Water. In another beaker plant extract (as per formulation design), vitamin E oil and other ingredients aloe vera gel, coconut oil, Stearic acid, SLS, Honey (as per the formulation design) were mixed until all the ingredients dissolve completely, Lemon oil is added for the fragrance to the mixture. The plant extract mixture is integrated into the melted soap base. This mixture is poured into moulds and allowed to solidify at room temperature. Five formulations were prepared. The formulation design for soaps were given in Table 4.

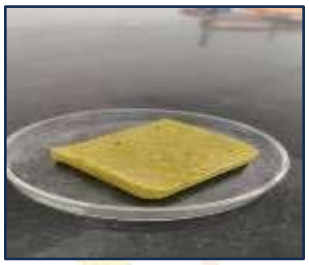


F1



F2

F3



F4

F5

Fig 4. Formulation of Soaps

Sr. No.	Ingredient	F1 (gm)	F2 (gm)	F3 (gm)	F4 (gm)	F5 (gm)
1	Cocoa butter	13	13	13	13	13
2	NaOH	2.5	2.5	2.5	2.5	2.5
3	Water	10	10	10	10	10
4	Glycerine	5	5	5	5	5
5	SLS	0.7	0.7	1	0.7	0.7
6	Lemon oil	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.
7	Stearic acid	0.5	0.5	0.5	0.7	0.5
8	Plant extract	0.10	0.15	0.05	0.5	0.3
9	Vit. E	-	0.4	0.4	0.4	0.4
10	Aloe vera gel	-	1	2	3	4
11	Coconut oil	-	-	2	-	-
12	Honey	-	2	1	0.5	3

(- means that the ingredient is not used in the formulation)

Table 4: Formulation design for soaps

Phytochemical Analysis of Plant Extract :-

1. Test for Flavonoids :-

- **Alkaline reagent test**

Add few drops of 10 % NaOH solution in 2 - 3 mL of extract in a test tube. After adding of dilute HCl the formation of an intense yellow colour that becomes colourless which indicates the presence of flavonoids.

2. Test for Phenols :-

Add 0.5 mL of alcoholic Ferric chloride (FeCl3) solution in 2ml of plant extract. The formation of an intense bluish-black colour indicates the presence of Phenols.

3. Test for Tannins :-

- **Gelatine test**

Take gelatine powder and mix in water by heating on water bath. To this solution, 2 mL extract was added. Then formation of a white precipitate indicates the presence.

4. Test for Alkaloids :-

- **Iodine test**

Add few drops of dilute Iodine solution in 3 ml of test solution. The formation of a blue colour which disappears on boiling and reappears on cooling shows the presence of alkaloids.

- **Foam test**

The plant extract was diluted with 20 ml of distilled water and shake vigorously for 15 min in a graduated cylinder. The formation of a foam layer indicates the presence of saponins.

Phytochemical Analysis Observation Results :-

Sr.No.	Test	Observation	Inference
1	Test for Flavonoids (Alkaline reagent test)	Dark yellow colour was formed	Present
2	Test for Phenol	Bluish-black colour was observed	Present
3	Test for Tannins (Gelatine Test)	White precipitate was formed	Present
4	Test for Alkaloids (Iodine test)	Blue colour was observed and disappears on heating	Present
5	Test for Saponins (Foam test)	Foam was generated on shaking	Present

Table :- 5

Evaluation tests :-

1. Examination of physical properties of formulated soap -

Colour and clarity and odour were checked by sensory evaluation test. These properties were examined in all the five formulation

2. Determination of pH -

5 gm of soap is dissolved in 100 mL of water. The pH of the soap solution was determined using a digital pH metre. pH for five formulations was determined separately.

Fig 5.Determination of PH

3. Determination of percentage free alkali -

10gm of sample soap was weighed using digital weighing balance and taken into a beaker, then add 150 ml of purified water and boil continuously for 30 minutes under reflux condenser in a water bath. The volume was made up to 250 ml in a beaker. It was titrated immediately with 0.1 M HCl in presence of 1ml of phenolphthalein indicator until the solution turns colourless.

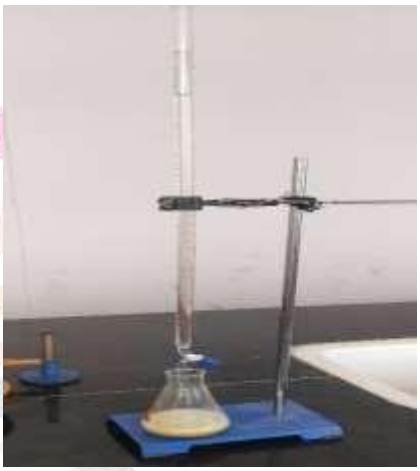


Fig 6. Determination of percentage free alkali

4. Determination of foam height -

0.5gm soap sample was dispersed in 25 ml purified water. It is transferred into a 100 ml measuring cylinder and volume was made up to 50 ml with water. 25 stroke was occurred. It is allowed to stand till the aqueous volume is reaching out up to 50 ml. Foam height above the aqueous volume was measured. Determination of foam height

5. Determination of foam retention -

1% soap solution was prepared. Take 25 ml of 1% soap solution in a 100 ml graduated measuring cylinder. The cylinder was covered and shaken continuously for 10 times. The time taken for the foam to disappear was recorded.

Fig 7. Determination of foam height & foam retention

6. Determination of alcohol insoluble matter -

5gm of soap sample was taken in a conical flask to which 50 ml of warm ethanol was added and it was shaken vigorously until the sample was dissolved completely. The solution was filtered through filter paper along with 20 ml warm ethanol and dried at 105 C for 1 hour. The weight of the dried paper was noted.

$$\% \text{ Alcohol insoluble matter} = \frac{\text{Weight of residue} \times 100}{\text{Weight of sample}}$$

7. Determination of moisture Content -

The moisture content is used to estimate the percentage of water present in the soap. To estimate the moisture content 5gm of soap was weighed and noted as wet weight or initial weight. Using a hot air oven sample was dried at 100 to 115 C for one hour. The sample was cooled, weighed. This weight is recorded as the dry weight of the sample. Moisture content was determined using the below formula.

$$\% Moisture = \frac{Loss\ in\ moisture\ (g)}{Initial\ weight\ of\ sample\ (g)} \times 100$$

Table 6 :- Evaluation parameters for formulations

Sr. no.	Evaluation Parameters	F1	F2	F3	F4	F5
1	**Colour**	Faint Yellow	Dark Greenish	Dark Brown	Light Green	Dark Brown
3	**Odour**	Citrous Odour	Citrous Odour	Citrous Odour	Citrous Odour	Citrous Odour
4	**PH**	8.2	7.19	8.03	8.30	7.90
5	**% of free alkali**	0.28%	-	0.32%	0.33%	0.30%
6	**Foam Height**	62ml	75ml	21ml	24ml	31ml
7	**Foam Retention Time**	90 min.	108 min.	8 min.	118 min.	26 min.
8	**% alcohol insoluble matter**	27%	40%	58%	64%	48%
9	**Moisture Content**	0.51%	0.39%	0.42%	0.37%	0.45%

Conclusion :-

In this present study, herbal soaps were prepared using Tridax procumbens leaves extract with varying quantities of ingredients and drug. All the formulated soaps had good appearance, good colour, good odour. Naturally Tridax procumbens leaves have good antimicrobial properties. The other ingredients like coconut oil, aloevera gel, Glycerine, Vitamin E oil used were proven to be dermatologically safe and helps in providing additional benefits to skin like moisturising effect, and conditions skin. So, the potential use of the formulated soaps in treating skin infections can further be explored. Herbal drugs like Tridax procumbens can be formulated in the form of soaps. The potential use of the formulated soaps in treating skin infections can further be explored.

The Formulation F1 has the least content of free alkali (0.28%). As free bases in soap cause irritation, these should be as low as possible. When compared to other soaps F1 has least making it good when compared to other soaps. It has least amount of matter insoluble in alcohol, which is very less compared to other formulations. The moisture content of the F1 soap is also less compared to other soaps, which is another parameter, which makes it better than others. F1 had shown stable foam for more than 90 min. based on these considerations it can be concluded that F1 soap had shown better results than other soaps. So, the potential use of the formulated soaps in treating skin infections can further be explored. Herbal drugs like T. procumbens can be formulated in the form of soaps. But F1 had shown the best results among all for evaluation studies. It has good foaming property and the least number of impurities as per the standard requirements. Tridax procumbens remains a valuable asset in the re-aim of natural and alternative medicine, offering promising applications for health and wellness.

Acknowledgement :-

The authors would like to express their sincere gratitude to everyone who assisted in making this article possible. The authors additionally acknowledge the principal and faculty of Dr. Uttamrao Mahajan College of Pharmacy for their insightful thoughts and helpful discussions, which greatly enhanced the standards of this research.

Conflict Of Interest :-

The Authors declared that they do not have any conflict of interest.

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