INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

Exploring The In Vitro Anti-Inflammatory and Hypoglycemic Effects of Bunchosia Argentia Leaf Extracts

Aiswarya S.[1], Sarankumar M. S.[2]*, Preetha Peter[3], Karishma[4], Adina Aslam[5]

[1] *Department of pharmaceutical chemistry, College of Pharmaceutical Sciences, Government Medical College, Thiruvananthapuram.*
[2]*Shri Jagdishprasad Jhabarmal Tibrewala University, University in Jhunjhunu, Rajasthan.*
[3]*Annamalai University, Tamil Nadu.*
[4,5]*KVM College of Pharmacy*

ARTICLE INFO

Published: 24 June 2025
Keywords:
Anti-inflammatory; Hypoglycemic activity; Bunchosia argentea; HRBC method; glucose uptake by yeast cell method.
DOI:
10.5281/zenodo.15731353

ABSTRACT

Bunchosia argentea also known as silver peanut butter fruit is an edible red coloured fruit belonging to the acerola family, Malpighiaceae was used for the study. Dried and powdered leaves of Bunchosia argentea were subjected to maceration using water and ethanol to obtain aqueous and ethanolic extracts, respectively. The dried extracts were then analyzed through preliminary phytochemical screening. Phytochemical analysis revealed the presence of various bioactive compounds, including alkaloids, glycosides, saponins, flavonoids, tannins, proteins and amino acids, sterols and triterpenoids, and carbohydrates. The extracts were evaluated for anti-inflammatory activity using the Human Red Blood Cell (HRBC) membrane stabilization method, and hypoglycemic activity was assessed through the glucose uptake by yeast cells method. The results obtained from the study indicate that Bunchosia argentea leaves possess both anti-inflammatory and hypoglycemic activity.

INTRODUCTION

Medicinal plants have been used for centuries in traditional healing practices and ethnomedicinal systems across the globe[1]. According to WHO estimates, approximately 75% of the global population relies on herbs and other forms of traditional medicine for treating various ailments. Indian traditional medical systems such as Ayurveda, Siddha, and Unani largely depend on the use of plant-based materials[2]. Medicinal products derived from plants have long drawn global scientific interest because of their minimal side effects and beneficial impact on human health[3]. Plant-based medicines have played a

***Corresponding Author:** Sarankumar M. S.
Address: *Shri Jagdishprasad Jhabarmal Tibrewala University, University in Jhunjhunu, Rajasthan*
Email ✉: sarankumarkvm@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

crucial role both as therapeutic agents and as essential raw materials in the production of various traditional and modern drugs. The use of medicinal plants for treating illnesses and ailments likely dates back to the earliest stages of human civilization. Medicinal plants naturally produce and store various secondary metabolites such as alkaloids, sterols, terpenes, flavonoids, saponins, glycosides, cyanogenic compounds, tannins, resins, lactones, quinones, and essential oils[4].

Bunchosia argentea known as silver peanut butter fruit is a species of flowering plant in the acerola family, Malpighiaceae. The plant is a native to the north western South America (Colombia, Ecuador, Bolivia, Venezuela, Brazil and Peru). Also known as Bunchosia fruit tree, it is the plant that is grown as an ornamental for its vibrant yellow blooms and red fruit which produces simultaneously. Some of the popular common names of the plant are **Bunchosia, Green Plum, Monk's Plum, Peanut Butter Fruit and Peanut Butter Tree**. The name Bunchosia is said to come from an Arabic word, bunchos meaning coffee, for the resemblance of the seed-containing pyrenes of the fruit to the mericarps of coffee Arabica. It is also called peanut butter fruit because of its texture, but not its taste, that is similar to peanut butter.

PLANT PROFILE

Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Malpighiales
Family	Malpighiaceae
Genus	Bunchosia
Species	*Bunchosia argentea*

Table no.1 Taxonomical classification of *Bunchosia argentea*

PLANT DESCRIPTION

Peanut butter fruit is a small, highly ornamental and hardy tropical, evergreen perennial tree or shrub that grows about 2-4m tall. The plant is found growing in dry and moist limestone forests near the coast, normally prefers moist, fertile loamy soil rich in organic matter.

Stem : They are persistently sericeous, the older woody stems are glabrate. The tree is stiff, spreading branches.

Leaves : Short petiolate leaves are simple, opposite, lanceolate to ovate, chartaceous, 10-27cm long and 5-10 cm wide, rounded to wedge-shaped, marginally striped, spiky, sparsely scaly on both sides, has 6-7 lateral veins.



Fig 1: Morphology of *Bunchosia argentea* leaves

Flowers: Carrying numerous yellow hermaphrodite flowers, on a 0.5-1 cm long pedicel provided with glandular tubercles, with penta partid calyx, compact axillary racemose inflorescences, 5 ungiillated petals with 5-6mm long, with an oval laminate and fringed serrated margin. The peanut butter plant will go through several blooming cycles from March until October.



Fig 2: Morphology of *Bunchosia argentea* flower

Fruits : Fruits are borne in clusters. They are ovoid, 2.5cm long, ellipsoid to obovate berry with thin pale green skin turning to orange then red at maturity. The internal pulp of the peanut butter fruit is very thick and slightly sticky similar to that of soft persimmon and surrounds a large central seed.



Fig 3: Morphology of *Bunchosia argentea* ripen fruit

TRADITIONAL USES

Eating peanut butter help to reduce the problems of heart as it reduces the cholesterol levels which is the main reason behind heart ailments. Not only it solves heart problems but also makes our nerves function effectively[5].

ANTI-INFLAMMATORY ACTIVITY

Inflammation is a complex biological response that serves to protect and repair tissues following injury caused by mechanical damage, infections, or autoimmune triggers. It can manifest as either an acute, short-term reaction or a chronic, long-lasting condition[6]. Inflammation is triggered by various factors such as mechanical injury, autoimmune reactions, or infections. It can be categorized as either acute or chronic. Chronic inflammatory conditions, such as rheumatoid arthritis, continue to pose significant health challenges worldwide. Although synthetic drugs currently dominate the market for inflammation treatment, their long-term use is often associated with serious side effects, including gastrointestinal bleeding and peptic ulcers. Therefore, there is a pressing need to develop new anti-inflammatory agents that are both safe and effective. In this context, the search for plant-based anti-inflammatory compounds has become a major focus in scientific research within the field of herbal medicine[7]. NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) are among the most widely used medications globally for the treatment of inflammation and related conditions. Most NSAIDs are carboxylic acid-containing compounds, including salicylate derivatives (such as aspirin), heterocyclic and carboxylic acid derivatives (like indomethacin), propionic acid derivatives (such as ibuprofen, ketoprofen, and flurbiprofen), and phenylacetic acid derivatives (like diclofenac). These drugs exert their anti-inflammatory effect by binding to the active site of the cyclooxygenase (COX) enzyme, thereby blocking the access of arachidonic acid and inhibiting the COX pathway[8]. The serious side effects associated with both steroidal and non-steroidal anti-inflammatory drugs have prompted the search for new anti-inflammatory agents derived from natural botanical sources, which are expected to offer therapeutic benefits with fewer adverse effects[9].

Studies have shown that bioactive compounds found in medicinal plants—such as alkaloids, saponins, phytosterols, tannins, and flavonoids—exhibit significant anti-inflammatory properties. Several mechanisms have been proposed to explain the anti-inflammatory effects of these plant-derived compounds, including:

1. Inhibition of 15-Lipoxygenases (15-LOX): Lipoxygenase enzymes (including 5, 8, 12, and 15-LOX) play crucial roles in various inflammatory processes. Among them, 15-LOX is involved in the synthesis of leukotrienes from arachidonic acid. Since leukotrienes are potent mediators of inflammation and allergic responses, inhibiting 15-LOX activity is considered a promising therapeutic approach in managing inflammatory conditions.

2. Inhibition of Nitric Oxide Synthase (NOS): Although not a universal feature of all plant flavonoids, some have been found to suppress the production of nitric oxide (NO) by downregulating the expression of inducible nitric oxide synthase (iNOS). Flavones and their amino-substituted derivatives have particularly shown potential in inhibiting NO production.

3. Inhibition of Cyclooxygenases (COX): Flavonoids, a class of polyphenolic compounds, can inhibit prostaglandin biosynthesis by targeting cyclooxygenase enzymes. Both COX-1 and COX-2 isoforms are implicated in inflammation, and many plant extracts and phytochemicals have demonstrated inhibitory activity against these enzymes, contributing to their anti-inflammatory effects.

4. Inhibition of Phospholipase A2 (PLA2): Phospholipase A2 releases arachidonic acid from membrane phospholipids, initiating the production of eicosanoids such as prostaglandins, thromboxanes, and leukotrienes. By inhibiting PLA2, plant-based agents can effectively block both the COX and LOX pathways, disrupting the inflammatory cascade and providing relief from inflammation.

5. Suppression of Pro-inflammatory Cytokines: Certain plant-derived compounds can inhibit the production or activity of pro-inflammatory cytokines, which play key roles in amplifying the inflammatory response either directly or by inducing the expression of adhesion molecules and other cytokines in target cells.

6. Modulation of Pro-inflammatory Gene Expression:
Herbal compounds often affect cellular regulatory pathways by targeting protein kinases involved in signal transduction, such as protein kinase C and mitogen-activated protein kinases (MAPKs). Inhibiting these enzymes alters the DNA-binding activity of key transcription factors like nuclear factor-kappa B (NF-κB) and activator protein-1 (AP-1), ultimately reducing the expression of genes involved in inflammation.

These mechanisms highlight the potential of medicinal plants as sources of novel anti-inflammatory agents with multiple molecular targets and fewer side effects compared to conventional drugs[10].

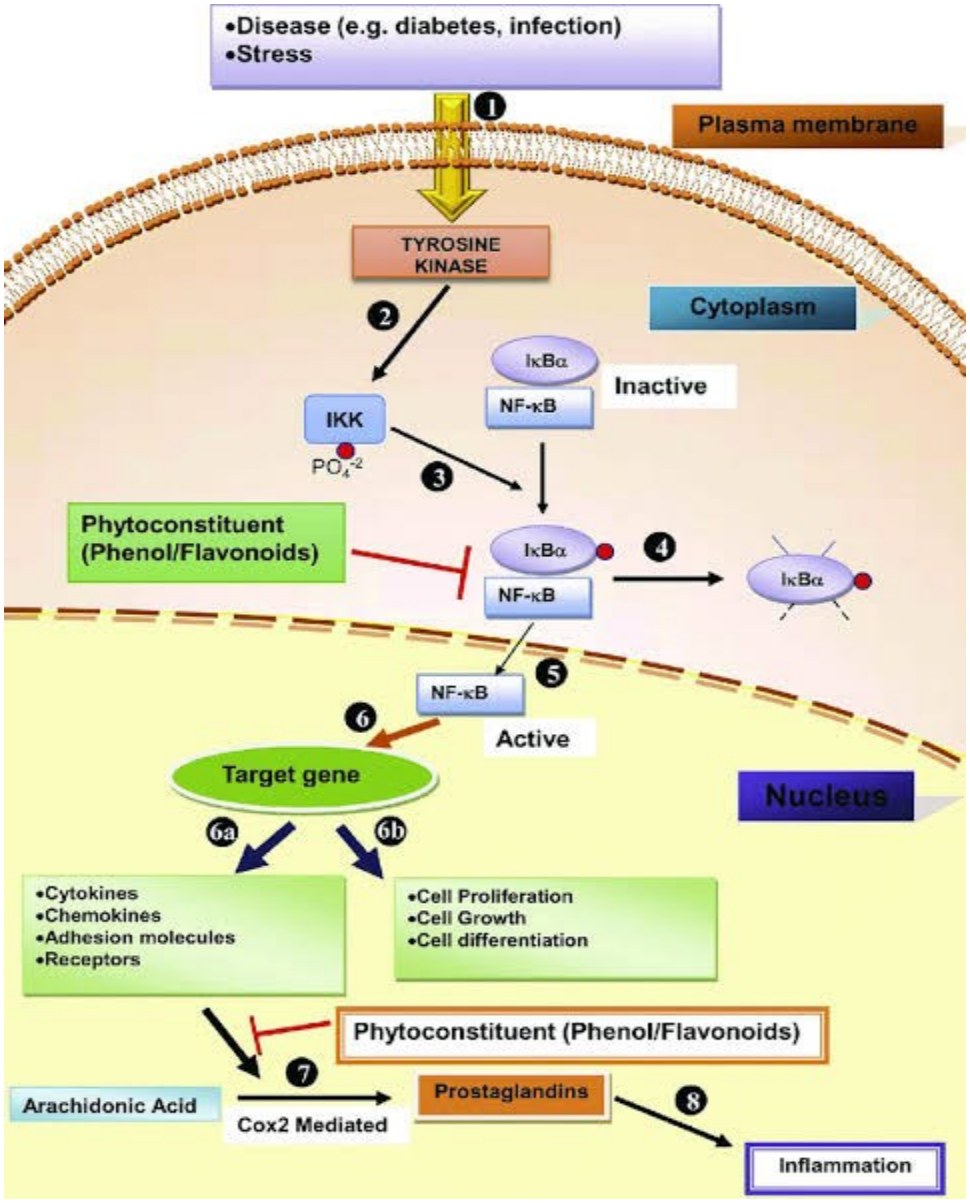


Fig 4: Mechanism of anti-inflammatory activity on medicinal plants

HYPOGLYCEMIC ACTIVITY

Diabetes mellitus is an increasingly prevalent global health concern, placing a significant financial burden on healthcare systems and posing serious challenges for medical policy development. It is one of the most common endocrine metabolic disorders, characterized by impaired glucose homeostasis and disturbances in carbohydrate, fat, and protein metabolism due to defects in insulin secretion, insulin action, or both.

The human body is equipped with both enzymatic and non-enzymatic antioxidant defense mechanisms that help reduce the generation of reactive oxygen species (ROS), which are implicated in the development of numerous degenerative diseases, including diabetes. The incidence of diabetes is rising rapidly across all regions of the world[11].

Among the various types of diabetes, type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM) are the most widely studied.

T1DM, also known as insulin-dependent diabetes, is typically caused by autoimmune destruction of pancreatic islet beta cells, leading to insufficient insulin production. It commonly manifests in children and adolescents. In contrast, T2DM—also known as non-insulin dependent diabetes—is primarily associated with insulin resistance and impaired insulin utilization, resulting in persistent hyperglycemia. T2DM accounts for approximately 90–95% of all diabetes cases worldwide[12].

According to the World Health Organization (WHO), the global diabetic population is expected to exceed 300 million by the year 2025. Furthermore, the WHO projects that diabetes will become the seventh leading cause of death by 2030.

Current therapeutic options for diabetes include insulin and various classes of oral hypoglycemic agents, such as sulfonylureas, biguanides, and glinides. However, many of these treatments are associated with significant adverse effects, highlighting the need for safer and more effective alternatives.

Traditional medicine, particularly plant-based remedies, holds significant promise for the development of new antidiabetic drugs. Many medicinal plants contain bioactive compounds such as glycosides, alkaloids, terpenoids, flavonoids, and carotenoids, which have demonstrated antidiabetic potential. The hypoglycemic effects of several such plants have been validated, and ongoing research is focused on elucidating the mechanisms underlying their antidiabetic activity[13].

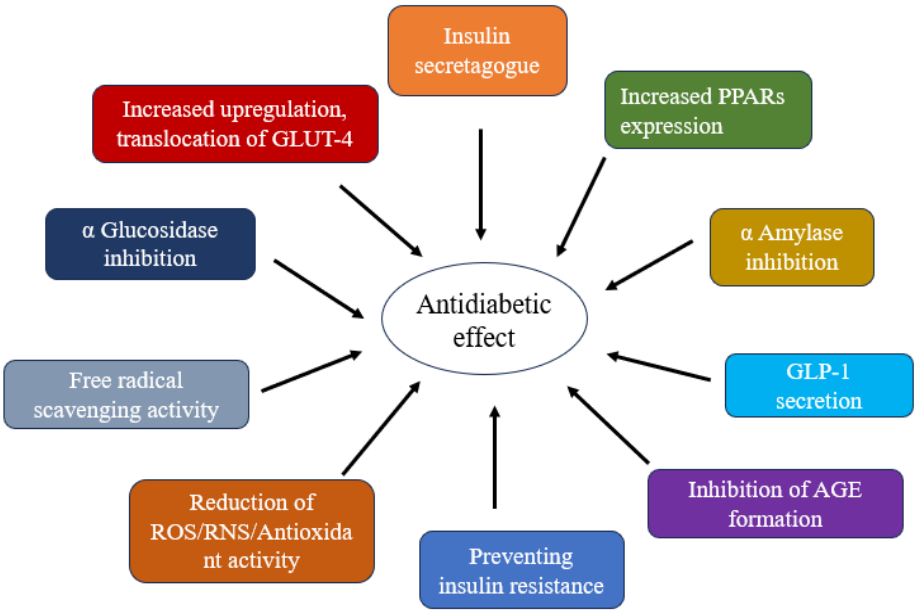


Fig 5: Medicinal plants with multiple effect on DM.

MATERIALS AND METHODS

PLANT COLLECTION AND AUTHENTICATION

Bunchosia argentea, a flowering plant grows as a perennial tree or shrub. Fresh leaves of *Bunchosia argentea* were collected in the month of November from North Paravoor, Ernakulam district of

Kerala. Parts including bud, flower and leaves was taken to SD College, Alappuzha for authentication. The plant was authenticated as *Bunchosia argentea* (Jacq.) DC. of Malpighiaceae family by Dr. Jose Mathew, Assistant professor, Department of Post Graduate Studies & Research in Botany, SD College.

EXTRACTION

Maceration was a popular and inexpensive homemade technique for the preparation of tonic since a long time. Moreover, this technique was used for the extraction of essential oils and active compounds from plant materials. Generally, the maceration procedure consists of multiple steps in extraction. The whole or coarsely powdered crude drug undergoes grinding to increase the surface area for proper mixing of powdered materials with the solvent. This process is done in a closed vessel where an appropriate solvent (menstruum) is added. Next, the solvent is strained off followed by pressing the solid residue of the extraction process known as marc to recover an optimum amount of occluded solution. Both the obtained pressed out liquid and the strained solvent are mixed together and separated from unwanted materials by filtration. Frequent agitation during maceration facilitates extraction by two processes: (1) promotes diffusion, (2) separates concentrated solution from the sample surface by adding new solvent to the menstruum for increasing the extraction yield[14].

PROCEDURE

The collected leaves material was shade dried and coarsely powered using mechanical grinder. The aqueous and alcoholic extract was prepared from the leaves of *Bunchosia argentea* separately. The coarsely powdered leaves were subjected to the process of maceration by 7 days with water and ethanol respectively at room temperature. After, was filtered, concentrated. Both the crude extract was stored at 4˚C separately[15].

PHYTOCHEMICAL SCREENING

The crude samples were subjected to qualitative chemical test for the detection various plant constituents like amino acids, proteins, glycosides, saponins, triterpenoids, flavonoids, carbohydrates, alkaloids, tannins.

Carbohydrates

Test	Experiment	Inference
Molisch test	Test solution is treated with few drops of alcoholic alpha naphthol. To the condense add few drops of conc. Sulfuric acid slowly along the sides of test tube.	Purple to violet colour ring appears at the junction of the two layers.
Benedict's test	The test solution is treated with few drops of Benedict's reagent. The contents are kept on a boiling water bath	Development of reddish-brown colour
Barfoeds test	It is a general test for monosaccharides. A test tube containing 1 ml of test solution and 1 ml of reagent is heated	Red colour (Cuprous oxide) develops within 2min,
Cameralisation	Carbohydrate samples when treated with strong sulphuric acid	Charring with the smell of a burning sugar.
Selwinoff test	Add few ml of test solution to about 5ml of selwinoff's reagent and boil	Appearance Red colour.

Tannins

Gelatin test	Test solution with 1% Gelatin solution containing 10% sodium chloride	White precipitate
Ferric chloride test	Test solution is treated with ferric chloride	Blue green colour
Vanillin hydrochloride test	Test solution when treated with few drops of vanillin hydrochloride reagent gives purplish red colour.	Purplish red colour
Alkaline reagent test	Test solution is treated with sodium hydroxide	Yellow to red precipitate
Metchells test	Test solution is treated with iron and ammonium citrate or iron and sodium tartarate	a water-soluble iron-tannin complex which is insoluble in solution of ammonium acetate

Glycosides

General test for the presence of Glycosides

a. Test A: Extract 200mg of the powdered drug material with 5ml of dilute (10%) sulphuric acid by heating in a test tube on a water bath for 2min. Centrifuge or filter, pipette off supernatant or collect the filtrate. Neutralize the acidic extract using alkaline such as Sodium hydroxide (5%). Add 0.1ml of Fehling's reagent A and B and heat on water bath for 2min. Observe the quantity of red precipitate formed and compare it with that formed in Test B.

b. Test B: Extract 200mg of drug material using 5ml of distilled water instead of sulphuric acid, after boiling add equal volume of water to that of the sodium hydroxide used in the above test. Add 0.1ml of Fehling's reagent A and B until alkaline and heat on a water bath for 2min. Note the quantity of red precipitate formed.

Saponin glycosides

Froth test	Place 1ml of solution in water in a semi micro tube and shake well.	Formation of foam

Anthraquinone glycoside

Borntragers test	The test material is boiled with 1ml of dilute sulphuric acid in a test tube for 5min (Anthracene glycosides are hydrolysed to aglycone and glycones by boiling with acids). Centrifuge or filter the contents while hot, pipette out supernatant or filtrate, cool and shake the contents with an equal volume of	A rose pink to red colour is produced in the ammoniacal layer

	dichloromethane or any other organic solvents. Separate the lower organic layer and shake with half its volume with dilute ammonia	
Modified borntragers test	200mg of powdered crude drug material is boiled with 2ml of dilute sulphuric acid and 2ml of 5% aqueous ferric chloride solution for about 5min). Centrifuge or filter the contents while hot, pipette out supernatant or filtrate, cool and shake the contents with an equal volume of dichloromethane or any other organic solvents. Separate the lower organic layer and shake with half its volume with dilute ammonia.	A rose pink to red colour is produced in the ammoniacal layer

Cardiac glycoside

Keddes test	Extract the drug with chloroform, evaporate to dryness, add one drop of 90% of alcohol and 2% of 3, 5-dinitro benzoic acid (Kedde's reagent) in 90% alcohol. The contents are made alkaline with 20% sodium hydroxide solution.	Purple colour is produced
Keller kiliani test	Powdered drug sample is extracted with chloroform and evaporate it to dryness. Add 0.4ml of glacial acetic acid with trace amount of ferric chloride. Transfer the contents to a clean dry test tube; add carefully 0.5ml of concentrated sulphuric acid along the sides of the test tube	Blue colour appears in the acid layer

Fats and fixed oils

Stain test	Press small quantity of test sample between two filter papers.	stain on the paper indicates the presence of fixed oils
Saponification test	Add few drops of 0.5N alcoholic potassium hydroxide to small quantity of test sample with a drop of phenolphthalein separately and heat on a water bath for 1-2hrs.	The formation of soap or partial neutralization of alkali indicates the presence of Fixed oils and Fats.

Vitamin C

Sodium nitroprusside test	Test solution is treated with sodium nitroprusside solution	Blue colour is produced
Sodium bicarbonate test	Test solution is treated with sodium bicarbonate solution	Violet colour is produced

Sterols

Libermann-Butchard Test	Test sample is treated with few drops of acetic anhydride, boil the contents and cool. Concentrated sulphuric acid is added from side of test tube.	Appearance of a brown ring at the junction of two layers.

Flavonoids

Shinoda Test	To the test solution add a piece of magnesium ribbon and few drops of concentrated hydrochloric acid	A pink scarlet or crimson red or occasionally green to blue colour appears after 1-2 min.
Zinc Hydrochloride reduction Test	The test sample is treated with a mixture of zinc dust and concentrated hydrochloric acid.	It gives red colour after few minutes.
Alkaline Reagent Test	To the test solution add a few drops of sodium hydroxide	Solution; formation of a strong yellow colour which become colourless with addition of few drops of diluted acid.

Proteins and amino acids

Millon's Test	To the test solutions add 2ml of millons reagent.	A white precipitate develops, which turns to red on heating indicates the presence of proteins.
Ninhydrin Test	Amino acids and protein sample's when boiled with a solution of 0.2% Ninhydrin	Development of violet colour indicates the presence of amino acids.
Xanthoproteic Test	The extracts were treated with few drops of concentrated nitric acid.	Formation of yellow colour indicates the presence of proteins.

Alkaloids

Mayer's test	Test solution is treated with Mayer's reagent	Appearance of cream colour precipitate
Dragendroff's Test	Test solution is treated with Dragendroff's reagent	Appearance of reddish-brown precipitate.
Hager's Test	Test solution is treated with Hager's reagent.	Appearance of yellow colour precipitate.
Tannic acid Test	Test solution is treated with 10% tannic acid solution.	Appearance of a buff colour precipitate.
Wagner's Test	Test solution is treated with Wagner's reagent	Appearance of reddish-brown precipitate[16].

Table no 1: Phytochemical screening of *Bunchosia argentea*

PROCEDURE

ANTI-INFLAMMATORY ACTIVITY

HRBC membrane stabilization method

The collected blood was mixed with equal volume of sterilized Alsever medium (2%w/v dextrose, 0.8% sodium citrate, 0.5.5 citric acid, and 0.42% sodium chloride in water). The blood was centrifuged at 3000rpm for 10min, and packed cell were washed with isosaline (0.85%, pH7.2) and finally 10%v/v suspension was made with isosaline. The assay mixture contained secondary metabolites from the plant extract, 1ml phosphate buffer (0.15M pH 7.4), 2ml hyposaline (0.36%) and 0.5ml HRBC suspension. Diclofenac was used as reference drug. Instead of hyposaline, 2ml of distilled water was used as control. The assay mixtures were incubated at 37˚c for 30 minutes and centrifuged at 3000rpm for 10 minutes. The HB content in the supernatant was estimated using UV-vis spectrophotometer at 560nm[17].

$$\text{Percentage protection} = 100 - \frac{(\text{OD of sample})}{(\text{OD of control})} \times 100$$

HYPOGLYCEMIC ACTIVITY

Glucose uptake by yeast cell method

PROCEDURE

Commercial baker's yeast was dissolved in distilled water to prepare 1% suspension. It is kept overnight at room temp.(25˚c). On next day, yeast cell suspension was centrifuged at 3000 rpm for 5 mins. The process was repeated by the addition of distilled water until a clear supernatant was obtained. Exactly 10 parts of the clear supernatant fluid were mixed with 90 parts of distilled water to get a 10% v/v yeast cell suspension. About 1-5 mg w/v of plant extract was mixed with DMSO till dissolution. The mixture was then supplemented with various concentration (5,10,25Mm) of 1 ml of glucose solution and incubated for 10 minutes. To initiate the reaction, 100µl of yeast suspension poured in the mixture of glucose and extract vortexed and incubated for 60 mins at 37˚c. After incubation, the tubes are centrifuged for 5 mins at 3800rpm and glucose was estimated by using a spectrophotometer(uv5100B) at 520nm. Absorbance for respective control was also recorded on same wavelength. Where control is the solution having all reagents excepts the test sample. Metformin was standard drug[18].

$$\% \text{ Increase glucose uptake} = \frac{\text{Absorbance of control} - \text{Absorbance of sample}}{\text{Absorbance of control}} \times 100$$

RESULT AND DISCUSSION

- 90g of dried leaf powder of *Bunchosia argentea* yielded 19.87g of crude aqueous extract which was about 22.07% w/w.
- 90g g of dried leaf powder of *Bunchosia argentea* yielded 7.84 g of crude ethanol extract which was about 8.71 % w/w.

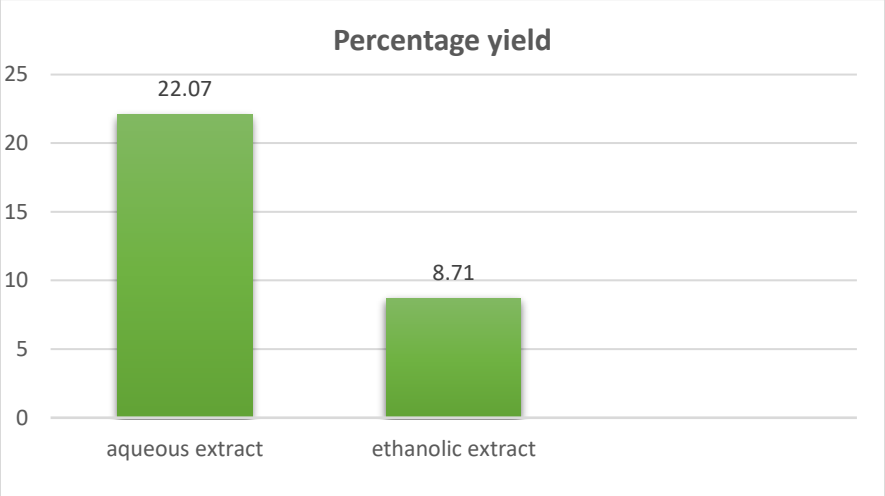


Fig 6: Percentage yield of different extract of Bunchosia argentea leaves.

Preliminary phytochemical screening of crude aqueous and ethanol extract of *Bunchosia argentea* leaves shows the presence of following constituents.

Sl no.	Phytochemicals	Aqueous extract	Alcoholic extract
1	Carbohydrate	+	+
2	Glycosides	+	+
3	Tannin	+	+
4	Saponins	+	+
5	Alkaloids	+	+
6	Proteins and amino acid	+	+
7	Sterols	+	+
8	Fixed oil and fats	+	+
9	Vitamin C	+	+

(+) indicate active constituents in high amount

ANTI-INFLAMMATORY ACTIVITY

Samples	Concentration (µg/ml)	Absorbance (560nm)	% Protection
Control		2.12	0
Aqueous	200 400	0.78 0.73	63.208 65.567
Alcoholic	200 400	0.70 0.66	66.982 68.868
Standard (Diclofenac)	200 400	0.57 0.49	73.114 76.887

Table no 2: Percentage protection for anti-inflammatory activity

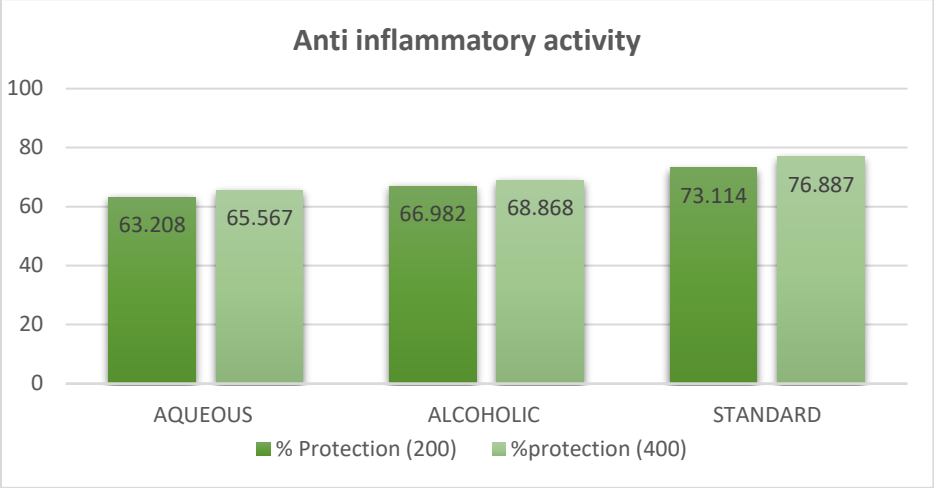


Fig 7: The effect of aqueous and ethanolic extract of *Bunchosia argentea* by HRBC method. The percentage protection was measured in the presence of various concentrations of *Bunchosia argentea* and Diclofenac sodium.

HYPOGLYCEMIC ACTIVITY

Sl no	Group	Extract	Dose (µg/ml)	Absorbance	% Glucose uptake
1	Control			2.31	
2	I a I b	AQUEOUS	200 400	0.63 0.52	72.72 77.48
3	II a II b	ETHANOLIC	200 400	0.71 0.65	69.26 71.86
4	III	STANDARD	200 400	0.39 0.32	83.11 86.14

Table no 3: Percentage glucose uptake for hypoglycemic activity

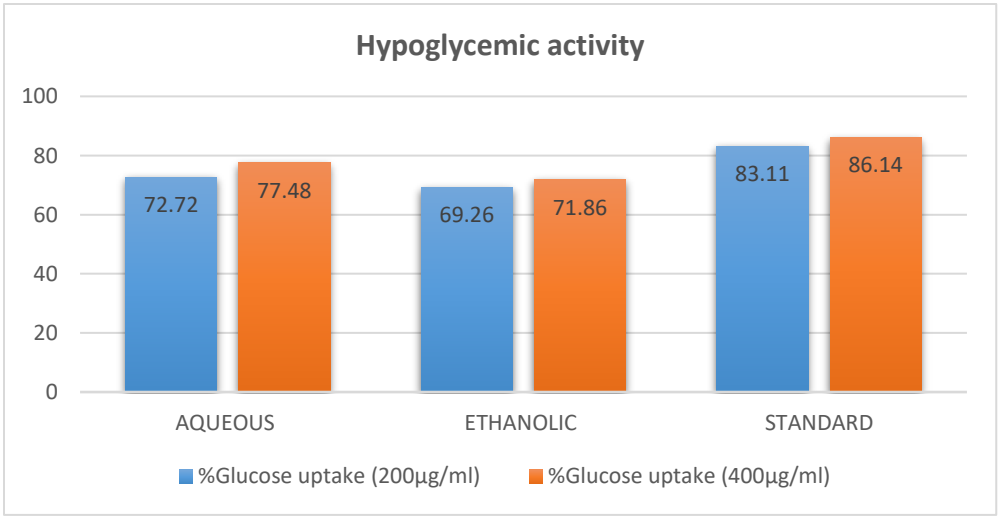


Fig 8: The effect of aqueous and ethanolic extract of *Bunchosia argentea* by HRBC method. The percentage protection was measured in the presence of various concentrations of *Bunchosia argentea.*

DISCUSSION

The leaves of *Bunchosia argentea* was shade dried, grinded and maccerated for 7 days to obtain crude extract.

Both Aqueous and Ethanolic extract of *Bunchosia argentea* leaves was prepared.

Phytochemical analysis of both extracts was performed

ANTI-INFLAMMATORY ACTIVITY

Hemolysis occurs when there is accumulation of excessive fluid into the cells resulting in rupture of the RBC membrane. When the red cell membrane gets damaged, it will make cell more prone to secondary damage. This damage is occurred by free radical-induced lipid peroxidation. The leakage of serum protein and fluids into tissue can be prevented by membrane stabilization. This process goes on by inflammatory intermediators where there is an increase in permeability of membrane hrbc membrane is analogous to the lysosomal membrane and stabilization of red blood cell membrane implies that the extract may as well stabilize the lysosomal membrane.

The aqueous extract of *bunchosia argentea* at concentration of 200g/ml and 400g/ml showed 63.208% and 65.567% of protection respectively, while at a conc. of 200g/ml and 400g/ml the ethanolic extract of *bunchosia argentea* showed 66.982% and 68.868% protection against lysis. On comparing with the standard of same concentration, the standard showed 73.114 & 76.887% at 200g/ml and 400g/ml respectively and it was clear that standard show more protection than the extract. From the above result it was concluded that the anti-inflammatory activity increased in dose dependent manner, as dose increases the activity increases.

HYPOGLYCEMIC ACTIVITY

The mechanism of glucose transport across the yeast cell membrane is one of the main invitro screening method for the hypoglycemic effect of various medicinal plants. The amount of glucose remaining in the medium after a specific time serves as an indicator of glucose uptake by the yeast cells. Generally, glucose is transported in yeast cells by facilitated diffusion process. Facilitated carriers are specific carriers that transport solutes down the concentration gradient highlighting that the effective transport is only attained if there is removal of intracellular glucose. Hence glucose transport occurs only if the intracellular glucose is effectively reduced.

The aqueous extract of *bunchosia argentea* at concentration of 200µg/ml and 400µg/ml showed 72.72% and 77.48% of glucose uptake, while the ethanolic extract of *bunchosia argentea* leaves at concentration 200µg/ml and 400µg/ml showed 69.26% and 71.86% glucose uptake activity. On comparing with the standard at same concentration, the standard showed 83.11% and 86.14% glucose uptake activity at 200µg/ml and 400µg/ml respectively. So, from the present study it is clear that hypoglycemic activity if *bunchosia argentea* leaves extracts was found to be less compared to that of standard metformin. The percentage glucose uptake for standard (200,400µg/ml) was greater than both alcoholic and aqueous extracts. As the concentration increases the percentage of glucose uptake increases for both extracts. From the results, aqueous extract of Bunchosia argentea has greater percentage of glucose uptake as compare to its ethanolic extracts.

REFERENCES

1. Hao DC. Genomics and Evolution of Medicinal Plants. Ranunculales Medicinal Plants. 2019;1–33.

2. Ram Vishal. Protective role of Indian medicinal plants against liver damage. The Journal of Phytopharmacology. 2013 Jun 25;2(1-3):1–3.
3. Myu Mu Aye, Hnin Thanda Aung, and Chabaco Armijos. Medicinal properties of 15 Selected Myanmar Medicinal plants. The Journal of Phytopharmacology. 2019:1-3.
4. Mohammed MJ, Tarek Elbashiti, Atef Masad et al. The Antibacterial Effect of Some Medicinal plant extract Plant Extract and Their Synergistic Effect with Antibiotic and Non-Antibiotic Drugs: World Journal of Pharmacy and Pharmaceutical Science. 2016; 5(2):22-23.
5. Peanut Butter Fruit facts and health benefits [Internet]. 2018. Available from: https://www.healthbenefitstimes.com/peanut-butter-fruit/
6. Azab A, Nassar A, Azab A. Anti-Inflammatory Activity of Natural Products. Molecules [Internet]. 2016 Oct 1;21(10):1321. Available from: https://www.mdpi.com/1420-3049/21/10/1321
7. Singh M, Kumar V, Singh I, Gauttam V, Kalia A. Anti-inflammatory activity of aqueous extract of Mirabilis jalapa Linn. leaves. Pharmacognosy Research. 2010;2(6):364.
8. Singh Bora K. Evaluation of Anti-inflammatory Activity of Clerodendrum wallichii (Merr.) Leaves. Open Access Journal of Pharmaceutical Research. 2021;5(2).
9. Odongo E, Mungai N, Peggoty Mutai, Karumi E, Mwangi J, Okalebo F, et al. Antioxidant and anti-inflammatory activities of selected medicinal plants from western Kenya. The African Journal of Pharmacology and Therapeutics. 2017 Dec 21;6(4).
10. Siverio-Mota D, Andujar I, Marrero-Ponce Y, Giner R, Vicet-Muro L, Cordero-Maldonado M, et al. Pharmacological Evaluation of the Anti-Inflammatory Activity and Chemoinformatic Analysis of New Potent 2-Substituted 1-Methyl-5-Nitroindazolinones. Current Topics in Medicinal Chemistry. 2014 Sep 23;14(999):1–1.
11. Patel, Dk, Prasad, Sk, Kumar, Hemalatha. An overview on antidiabetic medicinal plants having insulin mimetic property. 2012 Jan 1;(4):320–30.
12. Salehi, Ata, V. Anil Kumar, Sharopov, Ramírez-Alarcón, Ruiz-Ortega, et al. Antidiabetic Potential of Medicinal Plants and Their Active Components. Biomolecules. 2019 Sep 30;9(10):551.
13. Anlin Sheebha Y, J. S. (2014). A Review of Antidiabetic Potential of Ethnomedicinal Plants. Medicinal & Aromatic Plants, 03(04).
14. Srivastava, N., Singh, A., Kumari, P., Nishad, J. H., Gautam, V. S., Yadav, M., Bharti, R., Kumar, D., & Kharwar, R. N. (2021). Advances in extraction technologies: isolation and purification of bioactive compounds from biological materials. Natural Bioactive Compounds, 409–433. https://doi.org/10.1016/b978-0-12-820655-3.00021-5.
15. Azwanida, N. (2015). A Review on the Extraction Methods Use in Medicinal Plants, Principle, Strength and Limitation. Medicinal & Aromatic Plants, 04(03). https://doi.org/10.4172/2167-0412.1000196.
16. Yadav, R. N. S., & Agarwala, M. (2011). Phytochemical analysis of some medicinal plants. Journal of Phytology. https://updatepublishing.com/journal/index.php/jp/article/view/2737.
17. Ghumre, S. V. (2017). Assessment of In-vitro Anti-Inflammatory Activity of Cynodon Dactylon and Acyclovir Showing Synergistic Effect by Albumin Denaturation and Membrane Stabilization Assay. Modern Approaches in Drug Designing, 1(2). https://doi.org/10.31031/madd.2017.01.000506.

18. Karthika K. INVITRO ANTI-DIABETIC ACTIVITY OF ETHANOLIC EXTRACT IN ANDROGRAPHIS PANICULATA LEAVES. World Journal of Pharmaceutical Research. 2017 Aug 1;1232–44.

HOW TO CITE: Aiswarya S., Sarankumar M. S.*, Preetha Peter, Karishma, Adina Aslam, Exploring The In Vitro Anti-Inflammatory and Hypoglycemic Effects of Bunchosia Argentia Leaf Extracts, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 6, 4010-4025. https://doi.org/10.5281/zenodo.15731353