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Formulation and Evaluation of ANTI-DIABETIC churna

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ABSTRACT

The aim of this investigation was to assess the antidiabetic properties of Anti-Diabetic Churna using the streptozotocin-induced diabetes model, as well as its alpha amylase and alpha glucosidase inhibitory activities.[1] One of particularly prevalent metabolic diseases, diabetes mellitus affecting 2.8% of people worldwide and is projected to reach 5.4% by 2025. Herbal remedies have long been regarded as an extremely valuable form of medicine; as a result, they are increasingly featured in cutting-edge, contemporary care. Consequently, based on the review Medicinal plants' ability to lower blood glucose levels is mostly ascribed to the presence of polyphenols, flavonoids, terpenoids, coumarins, and other components. Antidiabetic churna – a compound ayurvedic preparation made up of Pterocarpus marsupium, Azardirachta indica, ocimum sanctum, syzygium cumini, trigonella foenum graceum, emblica officinalis, glycyrrhiza glabra, curcuma longa, black salt, piper nigrum, zingiber officinalis was screened for its antidiabetic activities.[2] Churna was subjected to in vitro antidiabetic screening using the starch iodine and dinitro salicylic acid (DNSA) methods, which involved α-amylase inhibition and IC 50 value was calculated.[3] The powder characteristics performed like Ash value, Angle of repose, Density, bulk density, tapped density, LOD, pH of churna. The standard limits have been surpassed for each parameter.

Keywords:

Churna, alpha amylase, alpha glucosidase, metabolic disease, diabetes mellitus, herbal remedies, lower blood glucose, IC50

INTRODUCTION

Plants have been utilised for thousands of years to treat illnesses throughout the world. It is now known that some of the chemical components found in plants may have therapeutic value or serve as building blocks for the creation of novel medications [4]. Natural products are the source of more than 50% of contemporary drugs, and as that, they are crucial to the pharmaceutical industry's drug discovery process [5].The use of herbal remedies for illness prevention and treatment dates back many years. In many cultures, using medicinal herbs for therapeutic purposes is a secular practice. Many local tribes cure a variety of illnesses with these traditional remedies. Pharmacopeial criteria have been followed in the evaluation of several of these compositions [6]. However, the scientific community is still unaware of the majority of the formulations. These herbal preparations, often known as herb-mineral preparations, also contain combinations of herbs and minerals. These blends of herbs and minerals offer treatment for a range of illnesses [7]. One particular kind of herb-mineral combination, called chandralekh antidiabetic churna, is the primary subject of this study. Diabetes mellitus is a metabolic disease characterised by elevated blood glucose levels, or chronic hyperglycemia, and abnormalities in the metabolism of proteins, fats, and carbohydrates brought on by a complete or partial lack of insulin secretion [8].A number of plants that are utilised as antidiabetic treatments have been shown to have a hypoglycemia impact; these plants' hypoglycemic activity mechanisms are now being Investigated. This review covers natural agents with the potential to prevent diabetes that work by secretagogues or insulinomimetic mechanisms. The importance of natural medications made from traditional medicinal plants and traditional therapeutic methods for diabetes is also the main topic of this review. There is a lot of promise for developing novel antidiabetic medications using traditional remedies made from widely available medicinal plants [9].The natural compounds or medicinal herbs work by blocking the enzymes that hydrolyze carbohydrates, like pancreatic amylase, to delay the absorption of glucose. By delaying and lengthening the duration of total carbohydrate digestion, the inhibition of this enzyme lowers the rate of glucose absorption and, as a result, attenuates the rise in postprandial plasma glucose. A number of native medicinal herbs possess significant potential in reducing the activity of the α-amylase enzyme [10]. The existence of low-molecular-weight chemical molecules known as secondary metabolites, such as flavonoids, phenols, alkaloids, saponins, and terpenoids, which have a specific physiological function in humans, is what gives plants their medicinal qualities[11] .

The Biological active herbal extract use in the formulation are:-

Pterocarpus marsupium (Vijaysagar)

Vijaysar has been a very potent antidiabetic since ancient times. Through the preservation and regeneration of insulin-producing cells, it may reduce blood sugar levels. Numerous investigations on animals have demonstrated that it may repair damage to beta cells, which produce insulin, and return insulin levels to normal. According to clinical research, Vijaysar lowers blood sugar levels without having any negative side effects[12].In type 2 diabetic rats, Pterocarpus marsupium aqueous extract reduced fasting and postprandial blood glucose levels at both doses (i.e., 100 and 200 mg/kg). The medication also helped diabetic animals' body weight. Chronic systemic inflammation in untreated diabetic rats was discovered to be the cause of increased cytokine TNF-α. In rats with type 2 diabetes, the increased TNF-α level was significantly ($P < 0.001$) reduced by the aqueous extract at both doses[13,14].

2.Azardirachta Indica (Neem)

Lab studies have assessed the antidiabetic potential of neem extract. Neem extract may lower the activity of the glucosidase enzyme, which breaks down complex carbs into glucose, and may have beneficial effects on blood sugar. Additionally, neem leaf extract demonstrated anti-diabetic effects. These exercises could aid in the management of diabetes[15]. It exhibits potential for many health benefits, such as blood sugar regulation and advantages for your teeth, skin, hair, liver, and kidneys[16].

3.Ocimum sanctum (Tulsi)

It is also known that holy basil, or tulsi, enhances pancreatic beta-cell activity, which can boost muscle cells' absorption of glucose. In addition, taking tulsi on a regular basis lowers blood sugar. Additional research revealed that holy basil includes important components that inhibit blood sugar surges, including methyl eugenol, caryophyllene, and eugenol[17]. Apart from its health benefits, tulsi is advised to treat a variety of ailments, such as anxiety, ringworm, skin diseases, insect, snake, and scorpion bites, anxiety, cough, asthma, diarrhoea, fever, dysentery, arthritis, eye diseases, otalgia, indigestion, hiccups, vomiting, gastric, cardiac, and genitourinary disorders, back pain, and skin diseases[18,19,20,21].

4.Syzygium cumini (Jamun)

It is commonly recognised that jamun has advantages for diabetics. They have long been used to cure a variety of ailments, including weariness, blood pressure problems, and blood sugar imbalances. They hold a particular place in the traditional medical system of Ayurveda.The presence of jamboline and jambosine in jamun seed powder can help reduce sugar fluctuations[22].

5.Trigonella foenum graceum (Methi)

Fenugreek seeds are high in dietary fibre and offer several advantages to diabetic people[23]. Studies conducted over the last 20 years have demonstrated that fenugreek seeds can assist diabetic people lower their blood glucose levels. It has been claimed that it has an antidiabetic effect by improving glucose tolerance in human subjects and lowering fasting blood glucose levels[24]. Nutraceuticals containing fenugreek are currently on the market and promise to lower hyperglycemia[25].

6.Emblica officinalis (Amla)

Consuming amla has several advantages, one of which is its ability to reduce blood sugar spikes. The fruit's chromium content aids in controlling the body's sensitivity to insulin and regulates the metabolism of carbohydrates, both of which are important for managing diabetes.Amla is widely used to treat several health issues, including respiratory, skin, and hair damage[26].

7.Glycyrrhiza glabra (Mulethi)

Strong antidiabetic effects can be seen both in vivo and in vitro in licorice extracts, five flavonoids, and three triterpenoids that have been separated from licorice. The removal of free radicals and resistance to peroxidation, the correction of lipid and protein metabolic disorders, improved microcirculation throughout the body, and an increase in the appetiteness and sensitivity of the insulin receptor site to insulin were some of the mechanisms used to achieve this. There is significant therapeutic promise for the treatment of diabetes mellitus with licorice and its metabolites[27].

8.Curcuma longa (Haldi)

Because curcumin, the active ingredient in turmeric, is safe, reasonably priced, and effective at lowering hyperlipidemia and glycemia in rodent models, it has attracted scientific interest as a possible therapeutic agent for treating the complications associated with diabetes and experimental diabetes[28,29,30,31].

9.Blacksalt

For diabetics, utilising black salt is beneficial. Patients with diabetes typically have higher, more variable blood sugar levels. When consumed in moderation, black salt lowers blood sugar levels and lessens the need for external insulin injections[32].

10.Zingiber officinalis (Suntha)

Suntha has been demonstrated over time to help lower blood sugar levels and control the insulin response in diabetics[33].

11.Piper nigrum (Kalimiri)

Black pepper has the ability to prevent blood sugar levels from rising. The primary enzymes associated with this condition are inhibited by black pepper, which also stabilises blood sugar variations. It is regarded as a powerful antioxidant that aids in lowering dangerously high levels in diabetic individuals[34].

OBJECTIVE

To find out whether any medicinal plants with the names Pterocarpus marsupium (Vijaysar), Azardirachta indica (neem), Ocimum sanctum (tulsi), and Syzygium cumini (jamun) have the ability to be hypoglycemic or antidiabetic.

To research the various biological functions that plants perform.

To investigate the plant extract's cytotoxic or safe properties.

To ascertain the plant's overall phytochemical profile

To identify and define these plant extract's active components

According to the World Health Organization's requirements for the quality control of herbal materials, the final product's quality was assessed.

The impact of the polyherbal formulation on blood glucose levels was investigated.

LITERATURE REVIEW

Yogesh Badkhane, A.S Yadav et al 2017

They proved that p. Marsupium (Bija), a popular Indian medicinal plant. Has long been used

Commonly in ayurvedic system of medicine. The plant has been found to possess diverse number of biological activities. The P. Marsupium tree has some medicinal property and is thus Commercially exploitable. During the last five decades, apart from the chemistry of the P.Marsupium compounds, considerable progress has been achieved regarding the biological activity and medicinal applications of P. Marsupium. It is now considered as a valuable source of unique Natural products for development of medicines against various diseases and also for the Development of industrial products. This review reveals that the biological activities and medicinal Properties of P. Marsupium compounds isolated, pharmacological actions of the P. Marsupium Extracts, clinical studies and plausible medicinal applications along with their safety evaluation

Deepti katiyar ,Vijender Singh,mohd Ali et al 2016

They shows that the Pterocarpus marsupium Roxb. (Fabaceae) is one such herbal drug which Finds its place in Ayurveda, Unani and Homeopathic system of medicine. Nature has bestowed This herb with a high versatility due to which it exhibits a wide range of Pharmacological action of Pterocarpus marsupium commonly known as Indian Kino tree or Asana or Vijayasar is a large Deciduous tree found in the subtropical regions of the world. It is highly enriched with an array of phytoconstituents including pterosupin, pterostilbene, liquirtigenin, isoliquiritigenin, Epicatechin , kinoin, kinotannic acid, kino-red beta-eudesmol, carsupin, marsupol, marsupinol and so on. Many of these constituents have been explored for numerous biological actions like Analgesic, anti-bacterial, anti-cancer, anti-cataract, anti-diabetic, anti-fungal, anti-Hyperlipidemic ,anti-inflammatory, anti-oxidant, aphrodisiac, cardiotonic, hepatoprotective etc. Thus, the current review aims to provide the complete phytochemical and pharmacological Profile of Pterocarpus marsupium.

Aruna L Hugar,Ramesh L Londonkar et al 2017

They demonstrate how plants can have significant medicinal benefits for easing human illnesses. Pterocarpus marsupium, a member of the Fabaceae family, is well-known in the Indian system for its customary applications. The goal of the current study was to use GCMS analysis to identify any potential bioactive components in the aqueous bark extract of Pterocarpus marsupium. The mass spectra of the compounds found in the extract were compared to the NIST library.Different peaks from the GC-MS analysis's results indicate the presence of 27 phytochemical substances. Two pentanone, 4-hydroxy-4methyl, furan-2-one, 3,4-dihydroxy-5-[1-hydroxy-2-fluoroethyl], benzoic acid, and 2,6bis[(trimethylsilyl)oxy] are the main phytocomponents in the extract.- a-d-Mannofuranoside, methyl, trimethylsilyl ether, 1-Monolinoleoylglyceroltrimethylsilyl ether, phthalic acid, ethyl iso-allocholate, and Milbemycin b,Different therapeutic activity are exhibited by 13-chloro-5-demethoxy-28-deoxy-6, 28-epoxy-5-(hydroxyimino)-25-(1-methyl ethyl). These bioactive substances' existence justifies Pterocarpus marsupium is a great source of phytocomponents that aid in the treatment of a wide range of illnesses and medical issues in people. Nonetheless, isolating specific phytochemical components could be helpful in creating a novel medication.

Sharma Pankaj, Tomar Lokeshwar, Bachwani Mukesh, Bansal Vishnu 2011

Neem has gained significance in the current global setting due to its ability to address many of the main issues that humanity faces. Azadirachta indica is a widely distributed, rapidly growing, evergreen tree that is native to America, Africa, and India. In addition to explaining how "neem is the one solution of thousand problems," this review provides an overview of the biological activity and its preventive-motive medicinal uses and applications. These biological activities include those that are antiallergenic, antidermatic, antifeedent, antifungal, anti-inflammatory, antipyorrheic, antidiabetic, antiscabic, cardiac, diuretic, insecticidal, larvicidal, nematicidal, spermicidal, and others.

Biswas et al. 2002

The sacred tree A. Indica is extremely valuable in modern Unani, Ayurvedic, and homoeopathic therapy. The Sanskrit word for neem tree is "Arishtha," which translates as "reliever of sickness." The

Academy of Sciences of the United States released a paper titled “Neem—a tree for solving global problems” in 1942.In the mid-1900s, a great deal of work was done on the characterisation and chemical studies of neem compounds.

MATERIAL AND METHOD

Ingredients	Quantity
Pterocarpus marsupium (Vijaysagar)	20 g
Azardirachta indica(Neem)	20 g
Ocimum sanctum (Tulsi)	7.95 g
Syzygium cumini (Jamun)	7.95 g
Trigonella foenum graceum (Methi)	7.95 g
Emblica officinalis (Amla)	7.95 g
Glycyrrhiza glabra (Mulethi)	7.95 g
Curcuma longa (Haldi)	7.95 g
Blacksalt	7.95 g
Piper nigrum (Kalimiri)	2.15 g
Zingiber officinalis (Suntha)	2.15 g

Table no.1 Material and Method

Take vijaysagar bark, the leaves of neem, tulsi, jamun, amla, seeds of methi, mulethi bark, and haldi.

Wash the ingredients and dried under sunlight.

The dried material are finely powdered in mixer and each passed through the # 85 no.

All the powders are mixed together in the proportion i.e. given in above table.[35]

Mechanism of Action of Herbal Anti-diabetic Chruna:

A number of mechanisms explain the antidiabetic effects of herbs. Herbal anti-diabetic medications work through the following mechanisms:

cAMP (2^{nd} messenger) stimulation, pancreatic beta cell potassium channel blocking, and adrenomimeticis suppression of the kidneys’ ability to absorb glucose

Islet beta cells’ ability to secrete insulin can be stimulated, or its degradation pathways can be blocked.

Decrease in the levels of insulin resistance

Providing specific essential elements for the beta-cells, such as calcium, zinc, magnesium, manganese, and copper

Pancreatic beta cells that are renewed and/or repaired The islets of Langerhans' cell size and quantity are increasing. Increasing the release of insulin

Enhancement of hepatic glycolysis and glycogenesis benefit against the beta cells' degeneration Reduced blood pressure and improved digestion.[36]

Qualitative chemical test

Alkaloids, carbohydrates, cardiac glycosides, polyphenols, saponins, tannins, and terpenoids were all identified using qualitative chemical assays.

Test for alkaloids

- Dragandroff test :- To 1 ml of extract, add 1 ml of dragandroff reagent. An orange-red ppt indicate presence of alkaloids.
- Mayer's test :- To 1 ml of extract, add 1 ml of Mayer's reagent. Whitish yellow or cream colored ppt indicate presence of alkaloids.
- Hager's test :- To 1 ml of extract, add 3 ml of Hager's reagent. Yellow colored ppt indicate presence of alkaloids.
- Wagner's test :- To 1 ml of extract, add 2 ml of Wagner's reagent. Formation of reddish brown ppt indicate presence of alkaloids.

Test for saponin

Take small quantity of alcoholic and aqueous extract separately and add 20 ml of distilled water and shake in a graduated cylinder for 15 minutes lengthwise. A 1cm layer of foam indicates the presence of saponins

Test for glycosides

- Legal test: Dissolve the extract in pyridine and add sodium nitroprusside solution to make it alkaline. The formation of pink red to red colour shows the presence of glycosides.
- Baljet test: To 1ml of the test extract, add 1ml of sodium picrate solution and the yellow to orange colour reveals the presence of glycosides.
- Keller-Killiani test: 1gm of powdered drug is extracted with 10ml of 70% alcohol for 2 minutes, filtered, add to the filtrate, 10ml of water and 0.5ml of strong solution of lead acetate and filtered and the filtrate is shaken with 5ml of chloroform. The chloroform layer is separated in a porcelein dish and removes the solvent by gentle evaporation. Dissolve the cooled residue in 3ml of glacial acetic acid containing 2 drops of 5% ferric chloride solution. Carefully transfer this solution to the surface of 2ml of concentrated sulphuric acid. A reddish brown layers forms at the junction of the two liquids and the upper layer slowly becomes bluish green, darkening with standing.

- Borntrager's test: Add a few ml of dilute Sulphuric acid to 1ml of the extract solution. Boil, filter and extract the filtrate with chloroform. The chloroform layer was treated with 1ml of ammonia. The formation of red colour of the ammonical layer shows the presence of anthraquinone glycosides

Test for carbohydrates and sugars

- Molisch's test: To 2ml of the extract, add 1ml of o-napthol solution, add concentrated sulphuric acid through the side of the test tube. Purple or reddish violet colour at the junction of the two liquids reveals the presence of Carbohydrates.
- Fehling's test: To 1ml of the extract, add equal quantities of Fehling solution A and B, upon heating formation of a brick red precipitate indicates the presence of sugars.
- Benedict's test: To 5ml of Benedict's reagent, add 1ml of extract solution and boil for 2 minutes and cool. Formation of red precipitate shows the presence of sugars.

Test for tannins and phenolic compounds:

- Take the little quantity of test solution and mixed with basic lead acetate solution. Formation of white precipitates indicates the presence of tannins.
- To 1ml of the extract, add ferric chloride solution, formation of a dark blue or greenish black colour product shows the presence of tannins.[36]

Tests for terpenoids :-

About 5ml of the extract was treated with 2ml of chloroform and about 3ml concentrated H_2SO_4 was carefully added to form A layer. A reddish-brown coloration of the interface indicates the Presence of terpenoids.[36,37,38]

Standardization :-

Conformity is the process of making something meet a standard.

True density :-

Take a clean and dry density bottle. Accurately measure volume of density bottle using solvent upto the mark. Transfer accurately 10 grams of powder to density bottle.Fill density bottle that contain powder with known amount of any solvent in which powder is insoluble. Note the volume of the solvent. Repeat the procedure thrice and take average of all to obtain correct data. Calculate true density of powder sample.

True density = mass / true volume

Bulk density :-

Take clean and dry measuring cylinder. Weight accurately 5 gm of powder. Place it in dried graduated Measuring cylinder and note the volume as ml.

Bulk density = weight of powder / Volume of powder

Tapped density :-

Take clean and dry measuring cylinder. Weight accurately 2 gm of powder. Place it in dried graduated measuring cylinder and note the volume as V 1 ml. Place the measuring cylinder in the tap density tester. Adjust apparatus and operate it for 100 tapping. Record the volume occupied by the powder as V2 ml.

Tapped density = weight of powder / minimum volume occupied bypowder

Angle of repose :-

The static angle of repose was measured according to the fixed funnel and free Standing cone method. A funnel was clamped with its tip 2cm above a graph paper placed on a flat Horizontal surface. The powders were carefully poured through the funnel. Block the orifice of the Funnel by thumb. Fill the powder in the funnel and remove the thumb immediately. After emptying the powder from the funnel, measure the height of the pile and diameter.

$\Theta = \tan^{-1}(h/r)$

Where, Θ= angle of repose

H- height of the powder in cm,

R -is the radius of heap of powder.[39]

LOD :-

Loss on drying is the loss in weight in% w/w determined by means of the procedure given below. It determines the amounts of volatile matter of any kind (including water) that can be driven off under the condition specified (Dessicator or hot air oven).If the sample in the form of large crystals, and then reduce the size by quickly crushing to a powder. About 1.5 gm. Of powdered drug was weighed accurately in a tared porcelein dish which was previously dried at 105 °C in hot air oven to constant weight and then weighed. From the difference in weight, the percentage loss of drying with reference to the air dried substance was calculated.

$$\text{Loss of Drying} = \frac{\text{\% Loss in weight in sample}}{\text{Weight of the Sample}} \times 100$$

Determination of total Ash value:

Ash values are helpful in determining the quality and purity of crude drug, accurately weighed about 3 gm of air dried powdered drug was taken in a tared silica crucible and incinerated by gradually increasing the temperature to make it dull red hot until free from carbon. Cooled and weighed, repeated for constant value. Then the percentage of total ash was calculated with reference to the air dried drug.

Total Ash value = Weight of total ash _____ × 100

Weight of crude drug taken

Determination of acid insoluble ash value:

The ash obtained as directed under total ash was boiled with 25 ml of 2N HCl for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water, ignited and weighed, then calculated the percentage of acid insoluble ash with reference to the air dried drug. Determination of water soluble ash value: The total ash obtained was boiled with 25 ml. Of water for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited for 15 minutes at a temperature not exceeding 450□C. The weight of insoluble matter was subtracted from the weight of total ash. The difference in weight represents the water soluble ash. The percentage of water soluble ash was calculated with reference to the air dried drug.

Acid insoluble ash value = Weight of acid insoluble ash × 100 Weight of crude drug taken

Determination of Ph

20 g or the powder will be siloved in 100 ml of distilled or deionized water and be sure that all the powder is dissolved in the water, then measure the pH using any pH meter.[40]

IN VITRO α-AMYLASE INHIBITION ASSAY

3, 5-Dinitrosalicylic acid method (DNSA) The inhibition assay was performed according to Miller (1959) using DNS method. Aqueous extract of Nisamalki churna of varied concentrations in 500 µL were added to 500 µL of 0.02 M sodium phosphate buffer (pH6.9 containing 6 mM sodium chloride) containing 0.04 units of α-amylase solution and were incubated at 37°C for 10 min, followed by addition of 500 µL of a 1% starch solution in 0.02 M sodium phosphate buffer (pH6.9) all the test tubes. The reaction was stopped with 1.0 mL of 3, 5 DNSA reagent. The test tubes were then incubated in a boiling bath water for 5 min and cooled to room temperature. The reaction mixture was then diluted after adding 10 mL distilled water and absorbance was measured at 540 nm. The control samples were also prepared accordingly without any plant extracts and were compared with the test samples containing various concentrations of the plant extracts prepared with different solvents. The results were expressed as % inhibition calculated using the formula:[35]

$$\text{Inhibition activity} = \frac{\text{Abs (Control)} - \text{Abs (Extract)}}{\text{Abs (Control)}} \times 100$$

RESULT AND DISCUSSION

Phytochemical investigation

Sr no	Phytochemical Test	Test	Polyherbal churna	Herbal Extract
1	Alkaloids	Dragandroff test	+	+
		Mayer's test	+	+
		Hager's test	+	+
		Wagner's test	+	+
2	Saponin	Foam test	+	+
3	Glycosides	Legal test	+	+
		Baijet test	+	+
		Keller-Killiani test	+	+
		Borntrager tesr	+	+
4	Carbohydrates and sugar	Molisch test	+	+
		Fehling's test	+	+
		Benedict's test	+	+
5	Tannins and phenolic	Lead acetate test	+	+
		Ferric chloride test	+	+
6	Terpenoids	Salkowski test	+	+

Table no.2 Phytochemical investigation

Physiochemical parameters – 1 : (Table no.3)

properties	observation
Colour	Light Brown
Odour	Characteristics
Taste	Slightly bitter
Texture	Smooth

parameters	observation
Density	1.99 g/ ml
Bulk density	0.31 g/ ml
Tapped density	0.46 g/ ml
Porosity	84%
Carr's index	21.39%
Ph	6.32
Ash value	17.5%
Acid insoluble ash	13.1%
Angle of repose	43.13°
Loss on drying	0.8%

Table no.4 Physiochemical parameter – 2

A-amylase inhibition assays

Sr No	Concentration µl/ml	% Inhibition by marketed Churna	IC50 value of marketed Churna	% Inhibition by Antidiabetic churna	IC50 value of Antidiabetic Churna
1	100µl/ml	29.04	351.33µl	20.55	449.21µl
2	200µl/ml	35.55		25.34	
3	300µl/ml	44.56		37.47	
4	400µl/ml	57.34		45.68	
5	500µl/ml	69.03		58.45	

Table no. 5 α-amylase inhibition assays

Discussion

A range of physical, chemical, and microbiological procedures were used to standardise the churna, which was composed of precisely measured amounts of finely crushed herbs. Measuring physical attributes such as pH helped reduce stomach pain, while measuring moisture content helped spot any weight increase caused by absorbing moisture. It was concluded that the obtained value fell within the permissible range. Because the ashing process involves the oxidation of product components, an increase in the ash value indicates adulteration, substitution, and contamination. The acid insoluble ash value indicates the existence of silicate impurities that may have evolved as a result of incorrectly cleaning crude medicines, and the total ash value reflects the total amount of inorganic material that remains after incineration is completed[41].

This study assessed the chandralekh churna's in vitro antidiabetic efficacy. The natural chruna formulation and the commercial medication, Acarbose, were contrasted. The antidiabetic effect of Chandralekh churna may have resulted from its ability to block enzymes like alpha amylase. We contrasted the IC50 values of commercially available and Chandralekh churna's α-amylase inhibitory actions. Provided with 69.03% inhibitory effects at 500 µl concentration demonstrated an IC50 value of 351.33 µl, while Chandralekh churna demonstrated 58.45% α-amylase inhibitory activity at 500 µl concentration with an IC50 value of 449.21 µl.

CONCLUSION

The standard of the formulated churna is confirmed by the analysed physical parameters. The enzymatic activity investigation conducted in vitro using the aforementioned techniques reveals that the churna formulation has the ability to lower blood glucose levels in the body.

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