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Alpha-amylase inhibition activity of Leaves of *Alstonia scholaris* R Br.

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Abstract

The present study was carried out to study the influence of alcoholic and aqueous extracts of leaves of *Alstonia scholaris* R Br. on α-amylase inhibition activity by *in-vitro* antidiabetic model. Among the aqueous and alcoholic extract, The alcoholic extract of leaves of *Alstonia scholaris* R Br. exhibited significant alpha amylase inhibition *in-vitro*. Present study has revealed the significant alpha amylase inhibitory potential of leaves of *Alstonia scholaris* R Br.

Keywords: *Alstonia scholaris* R Br., α-amylase.

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1. Introduction

Alstonia scholaris R Br. (Apocynaceae) is commonly known as Saptaparna in Sanskrit and Saptaparni in Marathi widely distributed in India.[1,2] The traditional claim reported that the leaves are Stimulant, carminative, stomachic, bitter tonic, astringent aphrodiasic, expectorant, and anthelmintic activity.[3]

The leaves contain biochemical constituents such as alshomine, isoalschomine, tubotaiwine, lagunamine, 19-epischolarimine, scholiracine, picraline, picrinine, picrarinal, nareline[4] non alkaloid compound along with lupeol acetate and β-sitosterol. The plant contain alkaloid iosabine 6,7-seco angustilobine B.[5] The earlier phytochemical investigation revealed leaves of *Alstonia scholaris* R Br. contain alkaloids, flavonoids, triterpenoides sterols, phenolic compounds In recent years, there is an increasing interest in research of natural anti-diabetic drugs. [6-10] Hence present study was planned to determine the claim of traditional use of leaves of *Alstonia scholaris* in diabetes.

2. Material and Methods

2.1 Collection of Plant Material

The leaves of plant were collected from Sakoli Bhandara District, Maharashtra, in the month of May 2009. The collected plant identified and authenticated by a botanist Dr. Arun Zingre, Department of Botany, M.B. Patel College of Science Sakoli, (Maharashtra).

2.2 Extraction of plant material

The collected leaves of plant were shade dried and coarsely powdered and extracted with ethanol by hot percolation and aqueous extraction by cold maceration. The solvent was removed at low temperature and both extracts were stored in refrigerator for further used.

2.3 *In vitro* antidiabetic activity

In vitro antidiabetic activity was carried out by previously reported method by Bauer *et al* [11]. From the stock extracts the various concentrations of alcoholic and aqueous extracts was prepared. A series of dilution of α-amylase solution (1:1) was prepared and mixed with alcoholic and aqueous extract at various concentrations

(0.25, 0.50, 1 and 2%) in 8 test tube and further added 0.5 ml of 1 % starch solution to each tube.

In the spot plate, two drops of iodine solution introduced in four rows, one row for each tube, Immediately one drop of solution taken out from test tube and placed in the first well. Procedure was continued every 1 min until all the starch digested and the colour in the well became light yellow brown (or until the enzyme activity decreases time required to digest the starch increases reached the eight well).

Table 1: Dilution of α- Amylase solution

Tube	Water	Amylase solution	Concentration
1	5 ml	5 ml stock	0.5
2	5 ml	5 ml tube 1	0.25
3	5 ml	5 ml tube 2	0.125
4	5 ml	5 ml tube 3	0.063

Table 2: Normal control

Tube	Amylase solution	Ph 6.8 Buffer solution	Time until starch disappears
5	1 ml tube 1+ 0.5 ml starch (1%)	20 drops	9 min
6	1 ml tube 2 + 0.5 ml starch (1%)	20 drops	11 min
7	1 ml tube 3 + 0.5 ml starch (1%)	20 drops	12 min
8	1 ml tube 4 + 0.5 ml starch (1%)	20 drops	13 min

Table 3: Standard (Riboflavin)

Tube	Amylase solution	Ph 6.8 buffer solution	Time until starch disappears
5	1 ml tube 1 + 0.5 ml starch + Std sol 2%	20 drops	24 min
6	1 ml tube 2 + 0.5 ml starch + Std sol 1%	20 drops	22 min
7	1 ml tube 3 + 0.5 ml starch + Std sol 0.5%	20 drops	19 min
8	1 ml tube 4 + 0.5 ml starch + Std sol 0.25%	20 drops	14 min

Table 4: Aqueous extract

5	1 ml tube 1 + 0.5 ml starch +aqueous ext 2%	20 drops	20 min
6	1 ml tube 2 + 0.5 ml starch + aqueous ext 1%	20 drops	16 min
7	1 ml tube 3 + 0.5 ml starch + aqueous ext 0.5%	20 drops	15 min
8	1 ml tube 4 + 0.5 ml starch + aqueous ext 0.25%	20 drops	13 min

Table 5: Alcoholic Extract

Tube	Amylase solution	Ph 6.8 buffer solution	Time until starch disappears
5	1 ml tube 1 + 0.5 ml starch + Alcoholic ext 2%	20 drops	21 min
6	1 ml tube 2 + 0.5 ml starch + Alcoholic ext 1%	20 drops	18 min
7	1 ml tube 3 + 0.5 ml starch + Alcoholic ext 0.5%	20 drops	16 min
8	1 ml tube 4 + 0.5 ml starch + Alcoholic ext 0.025%	20 drops	13 min

3. Result and discussion

In Present study, ethanol extract found to be more effective as compare to aqueous extract. Normal control shows that, as the concentration of α-amylase increases the rate of reaction is also increases but the time of reaction decreases because high conc. of α-amylase digest the starch rapidly. (Table 2) In observation of table of riboflavin, a α-amylase inhibitory agent indicate that as the concentration of riboflavin increases the time of reaction is also increases because the number of enzyme required for digestion of starch is not sufficient. [12-14] (Table 3)

From the observation of table 4 for aqueous extract, it was found that the aqueous extract having the α-amylase inhibition activity. But as compare to standard drug and alcoholic extract it has less activity. The table 5 for alcoholic extract demonstrate that the α-amylase inhibition activity. From observation, it was found that as the concentration of extract increases the time of reaction is also increases but as compare to standard drug they have little activity. The result of present study revealed that plant has anti-diabetic activity, may be due to active phytoconstituents like flavonoids, triterpenoides, sterols, alkaloids that has been reported in previous literature survey.

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