

# STUDY ON THE ALPHA AMYLASE INHIBITION OF ALOE VERA AND MIMOSA PUDICA AND FORMULATION OF ANTI DIABETIC POWDER

Afsal T<sup>1</sup> Rishad K S<sup>2</sup> Swarnalatha A<sup>3</sup>

<sup>1</sup> Post Graduate, Department of Food Science and Nutrition, Nehru arts and science college, Coimbatore

<sup>2</sup> Principal Scientist, Unibiosys Biotech Research Lab, Kochi

<sup>3</sup> Assoc.Prof and Head, Department of Food Science and Nutrition, Nehru arts and science college, Coimbatore

\*\*\*

**Abstract** - Diabetes mellitus or type 2 diabetes is a persistent medical issue which results in the buildup of sugar or glucose in your circulatory system. Insulin is the hormone which causes the body to move glucose from your blood in to your cells for energy synthesis.. Ignored or uncontrolled type 2 diabetes can cause chronic high blood glucose levels and potentially leads to serious complications. In the digestive system of humans and many other mammals there is an enzyme called alpha amylase which helps in the digestion and break down of carbohydrates. Several studies have found that the inhibition of the enzyme alpha amylase which is involved in the digestion of carbohydrates can reduce the post-prandial increase of blood glucose and therefore can be an important strategy in the management of type 2 diabetes and in treating borderline diabetic patients. In this study the samples from aloe vera and mimosa pudica is taken through standard technique of extraction and they are evaluated for their phytochemical properties and the quantitative analysis of the phytochemicals will be carried out. The alpha amylase inhibition of these plant extracts are through assays and will be compared with the alpha amylase inhibition of a standard medication utilized for type 2 diabetes (acarbose 50 mg).

**Key Words:** Diabetes mellitus, Alpha amylase, Mimosa pudica, Aloe vera, Glycemic control, Anti inflammatory.

## 1. INTRODUCTION

Aloe (*Aloe barbadensis miller*), a famous houseplant, has a long history as a multipurpose folk remedy. The plant can be isolated into two fundamental items: gel and latex. Aloe Vera gel is the leaf pulp or mucilage, aloe latex, usually alluded to as "aloe juice," is a bitter yellow exudate from the pericyclic tubules just underneath the external skin of the leaves. Concentrates of aloe gum successfully builds glucose resilience in both typical and diabetic rats. Therapy of ongoing however not single portion of exudates of Aloe barbadensis leaves showed hypoglycemic impact in alloxanized diabetic rats. Single just as constant dosages of standard of a similar plant additionally showed hypoglycemic impact in diabetic rats.

Mimosa pudica is used as a traditional medicine for the treatment of numerous diseases including diabetes. In recent time, diabetes has become much common disease perhaps due to changed life style. In a study conducted by Rita Maneju *et al* antidiabetic effect of Mimosa pudica seeds ethanolic extract was investigated in vivo in Wistar rats. Antioxidant study was carried out using in vitro and in vivo

models. The free radical nitric oxide scavenging activity and total antioxidant (flavonoid and phenol) contents of the extracts were determined in vitro by spectrophotometric method. In the in vivo studies, 100, 200 and 400 mg Mimosa pudica seeds ethanolic extract and 200 mg of each extract fractions were administered to streptozotocin (60 mg) induced diabetic Wistar rats. The study concluded that Mimosa pudica seed extracts possess moderate amount of antioxidants and scavenged nitric oxide free radicals. Mimosa pudica seed extracts also decreased fasting blood glucose level in 21 days treated diabetic rats.

No single diabetes treatment is best for everybody, and what works for one individual may not work for another. Your primary care physician can decide how a particular medicine or various meds may find a way into your general diabetes treatment plan and assist you with understanding the benefits and disadvantages of specific diabetes drugs.

## 2. MATERIALS AND METHODS

### 2.1 Collection of plant materials and extraction

For the antidiabetic powder making, the plants aloe vera and *mimosa pudica* are collected from various parts of the city. Aloe Vera is taken as pieces to take the fleshy part from it for further use. *Mimosa pudica* is taken as the whole plant and stems and thorns are avoided. Except that the whole plant is taken for further experiments. Here the extraction for both aloe vera and mimosa pudica was done with ethanol and distilled water using mortar and pestle

### 2.2 Phytochemical analysis

The medicinal plants are useful for healing as well as for curing human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plant. In this study the presence of some phytochemicals in Aloe vera and *mimosa pudica* are analyzed the following phytochemicals are analyzed in the given samples: alkaloid, flavanoid, phenol, tannins, and saponins.

### 2.3 Quantitative analysis of phytochemicals

Quantitative analysis of phytochemicals in aloe vera and mimosa pudica were conducted. Quantitative analysis will help us in the determination of the amount of phytochemicals present in the given samples. Phenols and flavanoids were tested for their quantity

## 2.4 Antioxidant activity

Anti oxidant activity is determined through the nitric oxide scavenging properties of the given sample. There are several assays to determine the antioxidant properties, Assays developed to evaluate the antioxidant activity of plants and food constituents vary. Therefore, to investigate the antioxidant activity of chemical, choosing an adequate assay based on the chemical of interest is critical. Here we used sodium nitroprusside for the assay.

## 2.5 Alpha amylase inhibiting activity

Antidiabetic assays are methods used to identify the potential of the given plant extracts to inhibit the effect of diabetes mellitus. Many medicinal plants have anti-diabetic properties to treat DM. Two assays that can be used to measure the biological activity are the  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibition assays. Here the aloe Vera and *mimosa pudica* are tested for their alpha amylase inhibiting properties and compared with a standard drug "acarbose 50" mg used in the treatment of type 2 diabetes. through this method we can identify the alpha amylase inhibiting properties of these plant extracts.

## 2.6 Antidiabetic powder formulation

Powder is a dosage form, here the antidiabetic powder is a solid dosage form which contains mixture of aloe vera, *mimosa pudica* and fortified with vitamin c. the antidiabetic potential of mimosa pudica and aloe vera are studied and considered as a potential medicine for the treatment of diabetes mellitus. Vitamin c is one of the safest and most effective nutrients; the benefits of vitamin c may include protection against immune system deficiencies, cardiovascular disease, prenatal health problems, eye disease and even skin wrinkling. The tolerable upper intake level is 2000mg a day for adults. So the immunity related benefits of vitamin c can be very useful for the treatment of patients having type 2 diabetes.

## 3. RESULTS

### 3.1 Phytochemical analysis

Table -1: presence of phytochemicals

phytochemicals	Aloe vera	Mimosa pudica
ALKALOID	PRESENCE CONFIRMED	PRESENCE CONFIRMED
FLAVANOID	PRESENCE CONFIRMED	PRESENCE CONFIRMED

PHENOL	PRESENCE CONFIRMED	PRESENCE CONFIRMED
TANNINS AND SAPONINS	PRESENCE CONFIRMED	PRESENCE CONFIRMED

### 3.2 Quantitative analysis of phytochemicals

Table -2: Amount of phytochemicals

Test sample	Concentration ( $\mu$ l)	O.D	Amount of phytochemical (mg/ml)
Aloe vera	1000	0.125	Phenol:0.235
Mimosa pudica	1000	0.102	Phenol:0.288
Aloe vera	1000	0.322	Flavanoid:0.091
Mimosa pudica	1000	0.579	Flavanoid:0.050

### 3.3 Anti-oxidant activity

Table -3: percentage of Anti oxidant activity

Test sample	concentration( $\mu$ l)	O.D	% of activity
Aloe vera	1000	0.17	71.1%
Mimosa pudica	1000	0.221	70.2%

### 3.4 Alpha amylase inhibiting activity

Table -4: percentage of inhibition

Test sample	concentration( $\mu$ l)	O.D	% of inhibition
Aloe vera	1000	0.24	71.8%
Mimosa pudica	1000	0.14	83%
Acarbose 50mg	1000	0.136	83.1%

### 3.5 Anti diabetic powder formulation

The anti diabetic powder must be powdered well enough and should be ready to be mixed with water for use

#### 4. CONCLUSION

The study can be concluded that the aloe vera and mimosa pudica are undoubtedly a successful therapeutic plant in the treatment of type 2 diabetes. The alpha amylase inhibitory properties of these plants can adequately reduce the blood glucose level in diabetic and border line patients. The results from the tests prove that these extracts of aloe vera and mimosa pudica are effective in reducing the activity of alpha amylase in the body. They are also proved to be rich in phytochemicals which makes the effective in treating many health conditions.

#### REFERENCES

- a) Role of medicinal plants in the management of diabetes mellitus: a review Bindu Jacob 1, Narendhirakannan R T 2.2000
- b) Rajaei E, Jalali MT, Shahrabi S, Asnafi AA, Pezeshki SMS. HLA's in Autoimmune Diseases: Dependable Diagnostic Biomarkers? *Curr Rheumatol Rev.* 2019;15(4):269-276. [PubMed]
- c) Prevalence of Type 2 Diabetes and Prediabetes in the Gwalior-Chambal Region of Central India. Senthil Kumar Subramani,1,2,† Dhananjay Yadav,3,† Meerambika Mishra,4 Umamaheswari Pakkirisamy,5 Prakesh Mathiyalagen,6 and GBKS Prasad1,\*2017
- d) Klein BE, Klein R, Moss SE, Cruickshanks KJ. Parental history of diabetes in a population-based study. *Diabetes Care.* 1996 (8):827-30. [PubMed] 1996
- e) Barnett AH, Eff C, Leslie RD, Pyke DA. Diabetes in identical twins. A study of 200 pairs. *Diabetologia.* 1981 87-93. [PubMed]
- f) Diabetes Genetics Initiative of Broad Institute of Harvard and MIT, Lund University, and Novartis Institutes of Biomedical Research. Saxena R, Parikh H, Richardson D, Ricke D, Purcell S. Genome-wide association analysis identifies loci for type 2 diabetes and triglyceride levels. *Science.* 2007 (5829):1331-6. [PubMed]
- g) Köhl C. Etiology and pathogenesis of gestational diabetes. *Diabetes Care.* 1998 Suppl 2:B19-26. [PubMed]
- h) Felner EI, Klitz W, Ham M, Lazaro AM, Stastny P, Dupont B, White PC. Genetic interaction among three genomic regions creates distinct contributions to early- and late-onset type 1 diabetes mellitus. *Pediatr Diabetes.* 2005):213-20.
- i) American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care.* 2010 1:S62-9.
- j) Karagiannis T, Bekiari E, Manolopoulos K, Paletas K, Tsapas A. Gestational diabetes mellitus: why screen and how to diagnose. *Hippokratia.* 2010. [PMC free article] [PubMed]
- k) Rita Maneju Sunday, Efere Martins Obuotor and Anil Kumar.2007

