ISSN 0974-3618 www.rjptonline.org

RESEARCH ARTICLE

Formulation and Development of Mouth Dissolving Tablets of Isolated Molecules and Evaluation for Anti-Hyperglycemic Activity

Nikhat F.[1,3]*, Satyanarayana D.[2], Sheikh A.S.[3] Prajakta H.[3], Ajaj A.[3]
[1]Department of Pharmaceutical chemistry, NGSMIPS, Deralakatte, Mangalore.
[2]Department of Pharmaceutical chemistry, VIP Sciences, Rajahmundry, AP.
[3]Department of Pharmacy, AIKTC School of Pharmacy, New Panvel, Mumbai.
*Corresponding Author E-mail: **nik.nida13ada25@gmail.com**

ABSTRACT:
Fast disintegrating drug delivery system offers a solution for those patients who are having difficulty in swallowing oral dosage forms. The present paper deals with formulation and evaluation of fast dissolving tablets from selected medicinal plants (*Syzygium cuminii* (L) skeel, *Momordica charantia* Linn *Cassia auriculata* Linn,) roots. A Pharmaceutical dosage form was made by using a novel constituent isolated from above mentioned plant constituents (ScReX-6b, McReX-1.CaReX-4) without and with excipients by direct compression. The tablets were evaluated for in-vivo and in-vitro anti-hyperglycemic activity and in-vitro hardness, friability, weight variation, disintegration time, water absorption ratio, wetting time and in vitro dissolution studies. All the formulations exhibited disintegration time in the range of 12.2 to 27.5 seconds along with rapid in vitro dissolution. It was concluded that the fast dissolving tablets of the poor soluble drug can be formulated by direct compression technique using selective super disintegrants with enhanced dissolution, taste masking and hence ensuring better patient compliance and effective therapy.

KEYWORDS: Fast dissolving, *Syzygium cuminii* (L) skeel, *Momordica charantia* Linn *Cassia auriculata* Linn, antihyperglycaemic.

INTRODUCTION:
The plants provide food, clothing, shelter and medicine. Much of the medicinal use of plants seems to have been developed through observations of wild animals and by trial and error. As time went on, each tribe added the medicinal power of herbs in their area to its knowledge base. They methodically collected information on herbs and developed well-defined herbal pharmacopoeias. Indeed, well into the 20th century much of the pharmacopoeia of scientific medicine was derived from the herbal lore of native people. Many drugs commonly used today are of herbal origin. About 25 percent of the prescription drugs dispensed in the United States contain at least one active ingredient derived from plant material. Some are made from plant extracts; others are synthesized to mimic a natural plant compound. Herbal medicinal products are defined as any medicinal product, exclusively containing one or more active substances.

WHO report 80% of the world population relies on the drug from natural origin. A large number of medicinal plants are used in the treatment of diabetes. A large number of medicinal plants are used in the treatment of diabetes. Diabetes is a metabolic disorder with major complication associated with hyperglycemia, inflammation, foot ulcer, Nerve disorders and sexual depression. If treatment means to cure the disease, there is no drug which can cure Diabetes completely and some evidence I found practically and theoretically treatment of diabetes in yoga and Ayurveda. Keeping in view of the importance of the disease and also considering the fact that green medicine are safe. So, I believed to select an herbal origin drug for this project[1].

A number of traditional herbal medical practices have been adopted for the diagnosis, prevention and treatment of various diseases. Many such practices were experimentally proved, depicting the scientific insight behind their traditional adoption. Less toxicity, better therapeutic effect, good patient compliance and cost effectiveness are some of the reasons for choosing drug from natural origin[2].

The attempts were made to investigate the active secondary metabolites from three different medicinal plants (***Syzygium cuminii* (L) skeel,** ***Momordica charantia* Linn.** *and* ***Cassia auriculata*** Linn)[3] roots, from the ancient which are

Received on 25.09.2013 Modified on 30.10.2013
Accepted on 12.01.2014

believed to be having anti-hyperglycemic activity, During the course of investigation we succeeded to isolate the molecules which are responsible for reducing the glucose level by stimulating the β-cells of the pancreatic islets of Langerhans, the core of the project study is to make a fast dissolving tablet of this active molecule on the basis of their phytochemical, spectroscopic and pharmacognostical data (s) and then formulation into a tablet dosage form, in vitro evaluation of the tablets and finally its pharmacological evaluation for the anti-diabetic activity with special reference to its curative and protective role in streptozotocin induced diabetic rats animal model were studied[4,5].

MATERIAL AND METHODS

Collection of plant material (S):

***Syzygium cuminii (L) skeel* roots:** Roots were collected during the month of April 2009 from village Nalwar of Gulbarga District (Karnataka) and was identified and authenticated by Department of Botany, Gulbarga University Gulbarga, a voucher (#72) of specimen was submitted to NGSMIPS, Derlakatte.

Momordica charantia Linn. roots were collected during the month of April 2009 from village Nalwar of Gulbarga District (Karnataka) and was identified and authenticated by Department of Botany, Gulbarga University Gulbarga, a voucher (#172) of specimen was submitted to NGSMIPS, Derlakatte.

***Cassia auriculata Linn* roots** were collected during the month of October 2009 from village Nalwar of Gulbarga District (Karnataka) and were identified and authenticated by Department of Botany, Gulbarga University Gulbarga, a voucher 222 of specimen was submitted to NGSMIPS, Derlakatte.

Isolation and Purification of molecule (S).

- The selected Methanolic extract were isolated by column chromatography by different graded solvents as per the standard method available in the litratures.REF
- The molecules for the formulation of the tablets were selected on the basis of pharmacological and spectral analysis
- The selected molecules were as follows[6,7]

1. From *Syzygium cuminii (L) skeel,* coded as ScReX-6b
2. From *Momordica charantia Linn* coded as McReX-1
3. From *Cassia auriculata Linn* coded as CaReX-4

Methods extraction adopted and phytochemical parameters of the plant materials is as in the following Table No 1

SNo	Plant Name	Plant part and extraction method	Quantity of powder	Solvents increasing polarity	Quantity of crude extract collected	Phytochemical test results of residue	UV-spectroscopy
1	*Syzygium cuminii (L) skeel,*	Root(s) Soxhlet extraction	2kg	Pet. Ether Ethyl acetate **METHANOL**	12g 48g **80G**	Lipids. Triterpenoids. **FLAVONOIDS,**	Florescent spot in dark back ground
2	*Momordica charantia Linn*	(Continues extraction)	$1^{1/2}$ kg	Pet. Ether Chloroform **METHANOL**	6g 12g **20G**	Lipids. Alkaloids, glycosides **FLAVONOIDS,**	Florescent spot in dark back ground
3	*Cassia auriculata Linn*		2kg	Pet. Ether	6g	Lipids. steroids	Florescent spot in dark back ground

Note:- The alphabetical notes indicates the selection of extract on the basis of phytochemical parameters.

Table 2:- Formulation of Tablets for 100 mg

Ingredients	BATCH NO.									
	QUANTITY PER TABLET (mg)									
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**	**F10**
Molécules. ScReX-6b, McReX-1.CaReX-4	03	03	03	03	03	03	03	03	03	03
Microcrystalline cellulose	30	30	30	30	30	30	30	30	30	30
Manetole	60	60	60	60	60	60	60	60	60	60
Magnesium stereate	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5	1.5
Talk	1.5	1.5	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5
Aspertine	1.5	1.5	1.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5
Pvp	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Croscarmellose sodium	-	-	-	-	-	1.5	1.5	1.5	1.5	1.5
Crospovidone	-	-	-	-	-	1.5	1.5	1.5	1.5	1.5
Weight /tablet	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Formulation, development and evaluation without excipients [8,9]

All the ingredients were mixed properly by homogenization with excipients in glass mortar and pestle, passed through # 60 sieves, compressed into the tablet using rotary compressor. The details of the composition were given in a table no 2.

Evaluation of in-vitro and in-vivo anti-hyperglycemic activity of isolated molecules of in streptozotocin induced diabetic rats.

In-vitro study.

α- Amylase Inhibition Activity

Alpha amylase enzyme is responsible for the metabolism of polysaccharides such as starch carbohydrate etc. the aim behind present experiment is to study the effect of α-amylase concentration on the rate of reaction and inhibition activity of isolated molecules of the plants roots of the

Syzygium cuminii (L) skeel*, *Momordica charantia Linn. *and* ***Cassia auriculata*** Linn.

Requirements

- 1% starch solution
- Buffer solution 6.8 Ph
- 8 well spot plate
- Iodine solution
- Amylase

Procedure:-

- Preparation of a 1:1 series of dilutions of the α-amylase solution of different concentration
- α-amylase solution was kept in four test tube and from them 1 ml withdrawn and kept in another test tube for test
- In spot plate put two drop of iodine solution in four row one row for each tube
- Added 0.5 ml of 1% starch solution to each tube, mixed it
- Immediately taken out one drop of solution and placed it in the first well.
- After 1 min. taken out another drop and put it in second well
- Continued the taking a sample every 1 minute until all the starch has been digested and the colour of the well is light brown or disappear

Table 3: Preparation of stock solution of α-amylase solution

Tube	Water	Amylase solution	Concentration in %
1.	5ml	5ml stock solution	0.50
2.	5ml	5ml stock solution	0.25
3.	5ml	5ml stock solution	0.125
4.	5ml	5ml stock solution	0.063

As the concentration of amylase increase the rate of reaction is also increases but the time of reaction decreases because high conc. of amylase will digest the starch rapidly and result were shown. Glibenclamide was taken as standard. Bothe standard and test was a amylase inhibitory agent as the concentration of drug increase, the time of reaction is also increases [10].

In-vivo anti-diabetic activity

Experimental Animals

Healthy albino Wistar rats (200–225 g) of either sex, in-house bred at the Animal House of nitte college of pharmacy deralakatte mangalore, India were used for the study. Rats were housed in polypropylene cages lined with husk in standard environmental conditions (temperature 25±2◦C, relative humidity 55±10% and 12:12 light:dark cycle). The rats were fed on a standard pellet diet ad libitum and had free access to water [3]. The experiments were performed after approval of the protocol by the Institutional Animal Ethics Committee (IAEC) and were carried out in accordance with the current guidelines for the care of laboratory animals[11,12].

Experimental design

Antidiabetic activity of combined molecule was assessed in normal, and alloxan induced diabetic rats [4]. In all studies, the animals were fasted overnight for 16hrs with free access to water.

Induction of Diabetes

Diabetes was induced by injecting 120 mg/kg of Alloxan monohydrate intra-peritoneal in 0.6% w/v CMC to overnight-fasted rats. After 72 h of injection, fasting blood glucose level was measured. The animals that did not develop more than 250 mg/dl glucose levels were rejected[13]. In all studies, the animals were fasted overnight for 16hrs with free access to water throughout the duration of experiment.

Evaluation of extract on Alloxan-induced diabetic rats

The selected diabetic animals were divided into five groups (n = 6) and one more group of normal non-alloxanised animals was also added to the study.

Group 1:- Normal control (non-alloxanised rats) received only distilled water;

Group 2:- Negative control, alloxan induced and received only distilled water;

Group 3:- Diabetic induced and treated with 250mg/kg, b.w. of ethanolic extract respectively;

Group 4:- Diabetic induced and treated with glibenclamide 10mg/kg as standard.

The treatment was continued for 10 consecutive days (p.o) at the end of 7th day, the rats were fasted for 16h and blood glucose level was determined. The determination of blood glucose levels is done by tail tipping method using Accu chek-sensor glucometer [6]. The results were compared with Group B which was treated with 10mg/kg b.w. of glibenclamide.

Table: - 4 Effects of combined isolated extract dose (CIED) in blood glucose levels in alloxan-induced diabetic rats (mg/dl)

Groups	Treatment	0h	1hr	3hr	5hr	7hr	9hr
a	Normal Control	91.48 ± 2.84 (100%)	93.73 ± 2.21 (102%)	95.64 ± 1.98 (104%)	96.42 ± 2.53 (105%)	98.44 ± 2.23 (107%)	94.75 ± 2.66 (103%)
b	Diabetic Control (Vehicle)	290.14 ± 3.65 (100%)	282.23 ± 3.67 (97%)	287.11 ±3.16 (98%)	284.43± 5.23 (97%)	279.52 ±3.33 (96%)	275.70 ± 3.45 (94%)
c	Alloxan + glibenclamide (5 mg/kg)	160.86 ± 6.92 (100%)	135.25 ± 7.06*** (84%)	115.18 ± 6.35*** (71%)	105.13 ± 6.20*** (65%)	95.86 ± 6.92*** (59%)	80.13± 5.98*** (50%)
d	Alloxan + CIED (150 mg/kg)	159.33 ± 2.89 (100%)	110.29 ± 4.57*** (69%)	94.69 ± 5.78*** (59%)	88.91 ± 6.78*** (55%)	79.95 ± 5.32*** (49%)	60.67± 4.39*** (37%)

Values are Mean ± S.E.M; n=6; **P <0.01 ,*** P <0.00 compared with 0hr

Table: - 5 Effects of formulated dosage form in blood glucose levels in alloxan-induced diabetic rats (mg/dl)

Groups	Treatment	0h	1hr	3hr	5hr	7hr	9hr
a	Normal Control	91.48 ± 2.84 (100%)	93.73 ± 2.21 (102%)	95.64 ± 1.98 (104%)	96.42 ± 2.53 (105%)	98.44 ± 2.23 (107%)	94.75 ± 2.66 (103%)
b	Diabetic Control (Vehicle)	290.14 ± 3.65 (100%)	282.23 ± 3.67 (97%)	287.11 ±3.16 (98%)	284.43± 5.23 (97%)	279.52 ±3.33 (96%)	275.70 ± 3.45 (94%)
c	Alloxan + glibenclamide (5 mg/kg)	160.86 ± 6.92 (100%)	135.25 ± 7.06*** (84%)	115.18 ± 6.35*** (71%)	105.13 ± 6.20*** (65%)	95.86 ± 6.92*** (59%)	80.13± 5.98*** (50%)
d	Alloxan + CIED (150 mg/kg)	159.33 ± 2.89 (100%)	110.29 ± 4.57*** (69%)	94.69 ± 5.78*** (59%)	88.91 ± 6.78*** (55%)	79.95 ± 5.32*** (49%)	60.67± 4.39*** (37%)

Values are Mean ± S.E.M; n=6; **P <0.01 ,*** P <0.00 compared with 0hr

Statistical Evaluation

The data were statically analyzed by one way ANNOVA followed by dunnet's t-test and values were considered significant. And value were expressed + SEM. And p<0.01

Uniformity of Weight[14]:

The weights were determined to within ±1mg by using Sartorious balance (Model CP- 224 S). Weight control is based on a sample of 20 tablets. Determinations were made in triplicate.

Tablet Hardness [15]:

The crushing tolerance of tablets was measured using an Electrolab hardness tester model EL 500. Determinations were made in triplicate.

Tablet Friability[15]:

The friability of the tablets was measured in a Roche friabilator. Tablets of a known weight or a sample of 20 tablets are deducted in a drum for a fixed time (100 revolutions) and weighed again. Percentage friability was calculated from the loss in weight as given in equation as below. The weight loss should not be more than 1%. Determination was made in triplicate.

Friability = [(Initial weight- Final weight) / (Initial weight)] x 100%

Drug Content:

Ten tablets were powered and the blend equivalent to 5 mg of formulated tablet was weight and dissolved in suitable quantity of pH 1.2 solutions. Solution was filtered and diluted and drug content analyzed spectrophotometrically at 239 nm using Shimadzu Corporation, UV-1601, Japan.

***In-vitro* Disintegration Test [16]:**

The test was carried out on 6 tablets using Tablet disintegration tester ED-20 (Electrolab, Mumbai, India) distilled water at 37°C±2°C was used as a disintegration media and the time in second taken for complete disintegration of the tablet with no palable mass remaining in the apparatus was measured in seconds.

Wetting Time[16]:

The wetting time of the tablets can be measured using a simple procedure. Five circular tissue papers of 10 cm diameter are placed in a petridish with a 10 cm diameter. 10 mL of water-containing amaranth a water soluble dye is added to petridish. A tablet is carefully placed on the surface of the tissue paper. The time required for water to reach upper surface of the tablet is noted as a wetting time.

Tablet Thickness[16]:

Tablet thickness can be measured using a simple procedure. 5 tablets were taken and their thickness was measured using Varnier callipers. The thickness was measured by placing tablet between two arms of the Varnier Callipers (Mitutoyo).

Water Absorption Ratio [17]:

A piece of tissue paper folded twice was placed in a small Petri dish containing 6ml of water. A tablet was put on the tissue paper and allowed to completely wet. The wetted tablet was then weighted. Water absorption ratio, R was determined using following equation.

$R = 100 \times Wa - Wb/Wa$

Where, Wa = Weight of tablet after water absorption
Wb = Weight of tablet before water absorption.

***In-vitro* Dissolution Study:**
The release rate of formulation a fast dissolving tablets was determined using United State Pharmacopoeia (USP) XXIV dissolution testing apparatus II (paddle method). The dissolution test was performed using 900 ml of 0.1 N HCl (PH=1.2), at 37± 0.50C and 50 rpm. A sample (5 ml) of the solution was withdrawn from the dissolution apparatus at regular intervals for 10 min. The samples were replaced with fresh dissolution medium of same quantity. The samples were filtered through a 0.45ì membrane filter. Absorbance of these solutions was measured at 239 nm using a Shimadzu UV/Vis double beam spectrophotometer. Cumulative percentage of drug release was calculated using an equation obtained from a standard curve.

Accelerated Stability Study of Best Batch: [18 19]
In order to determine the change in *in-vitro* release profile on storage, stability study of batch F5 was carried out at 40 C in a 0 humidity chamber having 75% RH. Samples were withdrawn at regular intervals during the study of 60 days. Formulation is evaluated for change in in-vitro drug release pattern, hardness and disintegration time.

RESULTS AND DISCUSSION:

Anti diabetic plants an important role in inhibiting the glucose level and inflammation thus providing protection to human against hyperglycemia. Realizing the fact this research was carried out to evaluate for the anti diabetic activity of the isolated molecules by preparing them in the form fast dissolving tablets of plants (***Syzygium cuminii (L) skeel*, *Momordica charantia Linn.*** *and* ***Cassia auriculata*** *Linn*) roots in alloxan induced diabetic rats model.
The Phytoconstituents were extracted by using different solvent of increasing polarity like petroleum ether, Chloroform and Methanol were presented. (Table 3)

Pharmacological Investigation
Oral Acute Toxicity Studies
The aim to perform acute toxicity studies was for establishing the therapeutic index of a particular drug and to ensure the safety in-vivo. Acute toxicity study is generally carried out for the determination of LD50 value in experimental animals. The LD50 determination was done in mice by OECD guideline 423 and LD50 of formulation was determined (infinity). Therefore, any dose can be selected up to 5000 mg/kg, so 300 mg/kg was selected as ED50.The selection of dose was made based upon the minimum concentration of drug required for therapeutic action which will be economically fruitful for further research and formulation (Table 5).

Table 6: LD50 value of combined formulation

No of Swiss albino mice	Dose (mg/kg)	Observation
3	5	No Death
3	50	No Death
3	300	No Death
3	2000	No Death
3	5000	No Death

Anti-diabetic Activity
i) In-Vitro Anti-diabetic Studies
α- Amylase inhibition activity of aqueous extracts of tuberous roots of combined formulation was studied. There are many enzymes in the human digestive system that help in the digestion of food. α- Amylase catalyses the breakdown of polysaccharide in to monosaccharide and only monosaccharide form of food only can absorbed in the stomach. It is known that the degradation of starch to glucose in the alimentary canal proceeds rapidly. A few minutes after the ingestion of starch a marked hyperglycemia leading to hyper-insulin aemia is observed. Molecule required for digestion of starch in not in sufficient, is given table no.9 and fig no.2. The present study deals with the inhibition of α- Amylase by both extracts of combined formulation. Extracts of leaves having α- Amylase inhibition activity which is shown by increase in reaction time i.e. the time taken by α- Amylase to digest the starch. From the 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, have been presented.

Table 7: Control tube of amylase solution

Tube	Amylase solution	Buffer solution pH 6.8	Time until starch disappear
1	1 ml tube 1 + 0.5 ml starch solution+2% amylase solution	25 drops	18
2	1 ml tube 2 + 0.5 ml starch solution+1% amylase solution	25 drops	15
3	1 ml tube 3 + 0.5 ml starch solution+0.5% amylase solution	25 drops	10
4	1 ml tube 4+ 0.5 ml starch solution+0.25 amylase solution	25 drops	6

Table 8: Observation of standard drug (Glibenclamide) on α-amylase inhibition

Tube	Amylase solution	Buffer solution pH 6.8	Time until starch Disappear (min)
1	1 ml tube 1 + 0.5 ml starch solution+2% amylase solution +2% standard drug solution	25 drops	15
2	1 ml tube 2 + 0.5 ml starch solution+1% amylase solution +1% standard drug solution	25 drops	16
3	1 ml tube 3 + 0.5 ml starch solution+0.5% amylase solution +0.5% standard drug solution	25 drops	20
4	1 ml tube 4+ 0.5 ml starch solution+0.25 amylase solution +0.25% standard drug solution	25 drops	23

Table 9: Observation of Combined formulated Molecules (CFM) on α-amylase inhibition activity

Tube	Amylase solution	Buffer solution pH 6.8	Time until starch Disappear (min)
1	1 ml tube 1 + 0.5 ml starch solution+2% amylase solution + 0.25 % CFM solution	25 drops	**12**
2	1 ml tube 2 + 0.5 ml starch solution+1% amylase solution + 0.5 % CFM solution	25 drops	**15**
3	1 ml tube 3 + 0.5 ml starch solution+0.5% amylase solution + 1 % CFM solution	25 drops	**18**
4	1 ml tube 4+ 0.5 ml starch solution+0.25 amylase solution + 2% CFM solution	25 drops	**20**

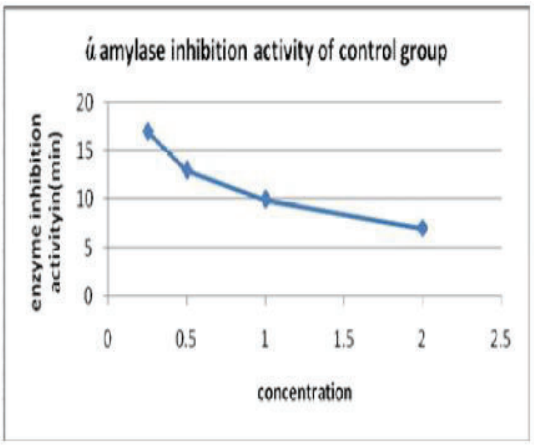

Figure 1: α- Amylase Inhibition Activity of Control Group

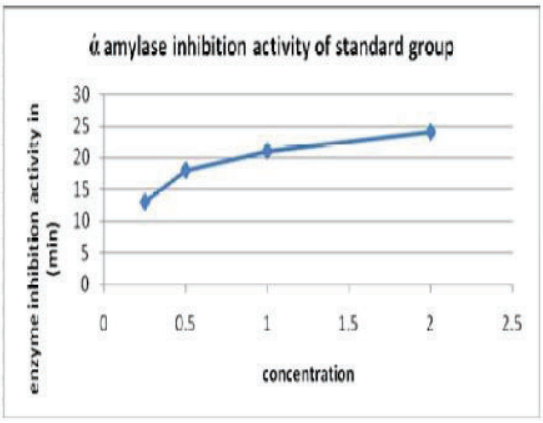

Figure 2: α- Amylase Inhibition Activity of Standard Group

As the concentration of α-amylase increase the rate of reaction is also increase but the time of reaction decrease because of high concentration of α-amylase will digest the starch rapidly. Glibenclamide is a α-amylase inhibitor agent. As the concentration of Glibenclamide increase the time of reaction is also increase because the number of enzyme required for digest for starch is not sufficient. From the observation it was found that the aqueous extract of dried tuberous roots of Ipomoea digitata Linn having the α-amylase inhibition activity. But as compare to standard drug is less activity but compare to ethanolic extract is having more activity

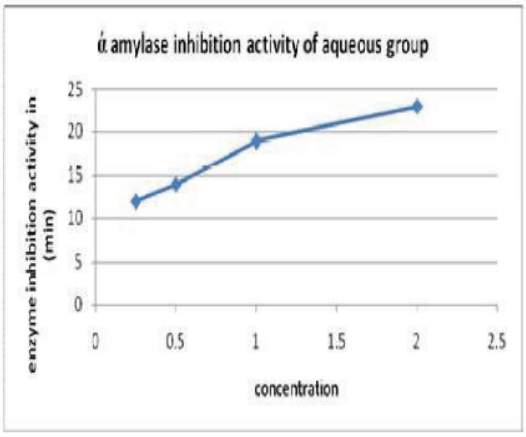

Figure 3: α- Amylase Inhibition Activity of Aqueous Group

Drug excipients Compatibility Study:

Compatibility of the drug with excipients was determined by FT-IR spectral analysis, this study was carried out to detect any changes on chemical constitution of the drug after combining it with the excipients. The samples were taken for FT-IR study. IR spectra of drug in KBr pellets at moderate scanning speed between 4000-400 cm-1 was carried out using FTIR (Jasco FTIR 6100 type A). The peak values (wave number) and the possibility of functional group are shown in spectra which compare with standard value. The comparison of these results with chemical structure shows that the samples were pure. The FTIR spectra of plant extract and excipients were shown in figure no 4.

Table 10: Evaluation of Fast Dissolving Tablets

Formulation	weight variation	Hardness (kg/cm)	Friability	Drug content	Wetting time (sec.)	Water absorption ratio	Thickness (mm)	Disintegration time (sec.)
F1	3.3±0.29	2.5±0.11	0.43±0.29	97.28	20±0.9	28.91±2.1	3.1±0.1	27±2.1
F2	3.1±0.10	2.4±0.16	0.59±0.33	96.4	21±1.1	39.30±1.9	3.4±0.4	25±2.9
F3	2.3±0.20	2.3±0.17	0.52±0.13	96.86	16±1.7	59.00±1.7	3.0±0.6	17±2.0
F4	2.1±0.35	2.1±0.10	0.74±0.32	97.84	31±1.9	41.23±1.4	3.0±0.3	22±2.9
F5	3.5±0.40	2.3±0.22	0.33±0.16	98.15	23±1.2	58.11±1.2	3.4±0.1	26±1.5
F6	2.6±0.33	2.5±0.33	0.47±0.25	97.73	30±1.7	69.89±1.4	2.98±0.2	33±3.0
F7	3.7±0.13	2.2±0.51	0.69±0.27	96.57	15±0.9	42.92±1.9	3.1±0.5	31±2.0
F8	2.9±0.11	2.5±0.91	0.37±0.16	98.19	13±1.0	81.73±2.4	3.3±0.4	15±1.0
F9	3.2±0.60	2.7±0.44	0.52±0.32	98.23	10±0.8	69.89±1.4	3.0±0.4	14±2.5
F10	2.3±0.10	2.3±0.78	0.75±0.33	98.15	30±1.7	81.73±2.4	3.2±0.6	11±2.1

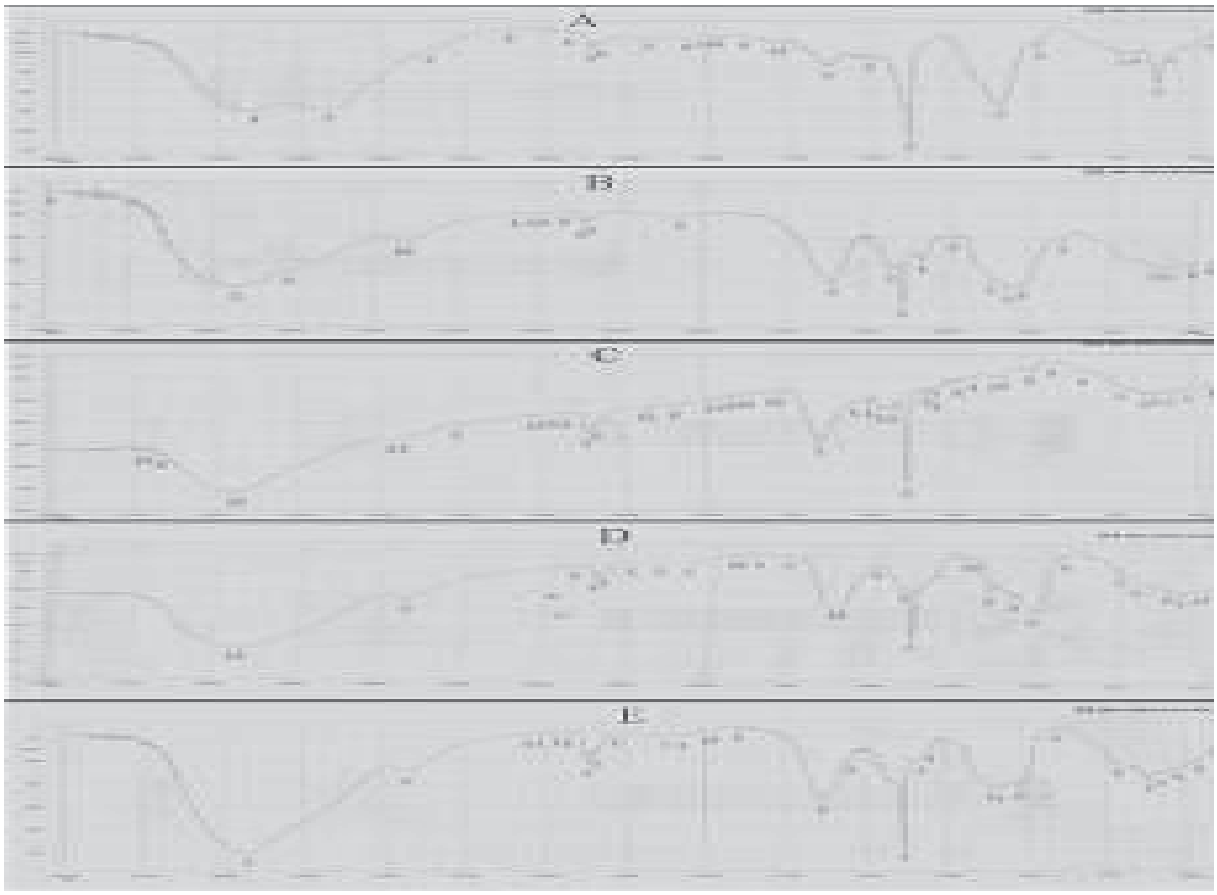

Fig. 4: **A:** IR spectrum of ***Syzygium cuminii (L) skeel (***ScReX-6b) molecule
B: IR spectrum of ***Momordica charantia Linn*** (McReX-1) molecule
C: IR spectrum of ***Cassia auriculata*** *Linn* (CaReX-4) molecule
D: IR spectrum of ***Combined formulated molecules*** molecule
E: IR spectrum of ***Combined formulated molecules+ excipients*** molecule

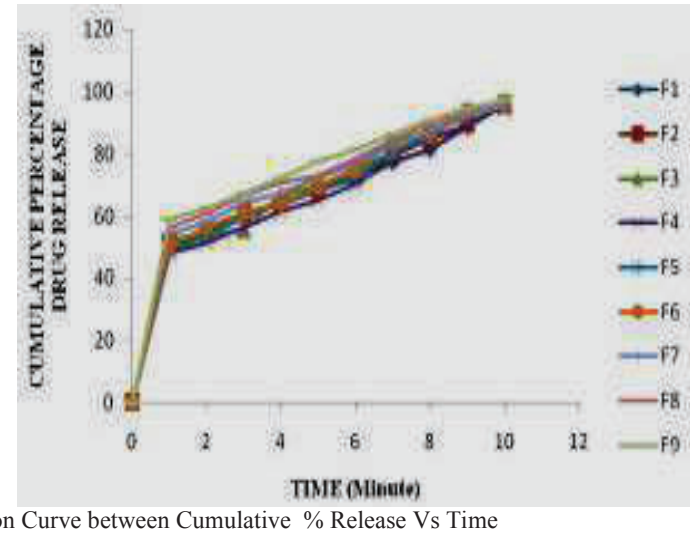

Fig. 5: *In-vitro* Dissolution Curve between Cumulative % Release Vs Time

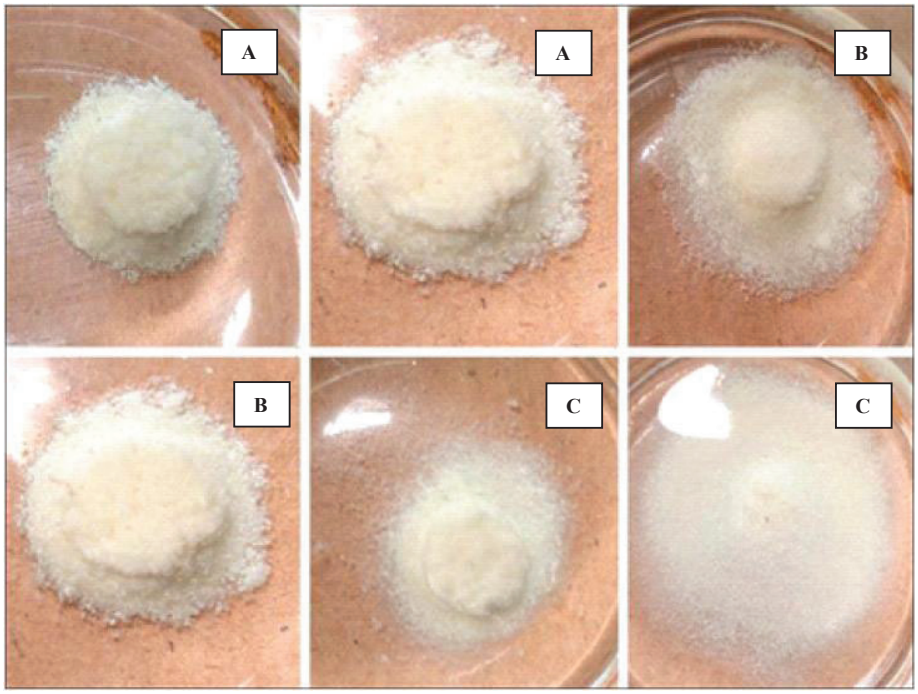

Fig. 6: State of Tablet while measuring Wetting Time (A) Initial stage, (B) Intermediate, (C) Completely Wetted Tablet

Table 11: Physical Characteristics of Formulated fast disintegrating tablet of optimised Batch F10 at Temperature (40°C±2°C / 75% RH±5%)

BATCH F10				
Physical Parameter	**0 days**	**15 Days**	**30 Days**	**60 Days**
Weight gain (mg)	100	100	103	103
Percent drug content (%)	99.8	98.2	97.65	97.23
Hardness (Kg/cm2)	3.7	3.7	3.6	3.6
Disintegration time (Sec)	11	11	14	15
Wetting time (Sec)	10	11	11	12

Table 12: Drug release% at 40°C±2°C/75% RH±5%

S.No	Time (Days)	40°C / 75% RH
1	0	99.7
2	30	98.9
3	60	99.9

CONCLUSION:

Herbal products may contain a single herb or combinations of several different herbs believed to have complementary and / or synergistic effects. Some herbal products, including many traditional medicine formulations, also include animal products and minerals. Herbal products are sold as either raw plants or extracts of portions of the plant. The selected medicinal plants ***Syzygium cuminii (L) skeel*** is belonging to the family Myrtaceae, ***Momordica charantia Linn*** belonging to the family Cucurbitaceae and ***Cassia auriculata*** *Linn* belonging to the family *Caesalpiniaceae* is commonly known as Tanner's Cassia, are having highly anti-hyperglycemic activity. From the ancient these plants were using to control and treatment of different disease and elements, we have selected these plants to isolate the constituent responsible for anti-hyperglycemic activity; we have published more than six papers on the isolation and pharmacological activity of these plants. Moreover on the basis of spectral and phytochemical investigations of these plants, we have isolated more than six constituents from each plant in and investigated for anti-diabetic activity. The entitled topic is the part of our research project to investigate whether or not this molecule were having anti-hyperglycemic activity.

We succeeded to our goal by carrying-on, the formulation of mouth dissolving tablets of single constituent without excipients shows the remarkable results when compare with standard, but the duration of action is less to increase the duration of action and efficiency of drug to regenerate the β-cells of the pancreatic islets of Langerhans. The furthere study on the mechanism of action of this formulation is under progress in AIKTC School of Pharmacy laboratory.

ACKNOWLEDGEMENT:

The corresponding authors takes an opportunity to express their sincere thanks to **Prof. Abdul Razza Q Honnutagi,** Director of AIKTC School of Pharmacy, and also management of AIKTC, for their constant support and encouragement and inspiration without which it would have been impossible to complete the work. I consider myself lucky to have been a part of the AIKTC campus New Panvel, Mumbai.

REFERENCES:

1. Joy KL, Kuttan R. Anti-diabetic activity of *Picrorrhiza kurroa* extract. J Ethnopharmcol 1999; 167: 143-148.
2. Sridevi S, Chary MG, Krishna DR, Prakash Diwan V. Pharmacodynamic evaluation of transdermal drug delivery System of glibenclamide in rats. Indian Journal of Pharmacology 2000; 32: 309-312.
3. Tietz NW. Clinical guide to laboratory tests, Philadelphia, W.B. Saunders Co. 1976.
4. Trinder P. Ann. Clin. Biochem 1969; 6: 24.
5. Lenzen S,The mechanisms of alloxan and streptozotocin induced diabetes, Diabetologica 51, 2008, 216-226.
6. Lenzen S, Panten U,Alloxan:History and mechanisms of action, Deabetologica, 31, 1998, 337-342.
7. Turner A, Screening Methods In Pharmacology, Academic Press, New York, London, 2009. pp. 227,228
8. Thirupathi Reddy et al. Asian J Pharmacodyn Pharmacokin 2006; 6(4): 327-329.
9. Kulkarni S.K., Hand Book of Experimental Pharmacology, 3rd Edition,vallabh publisher, New Delhi, 2007, pp.128-130
10. Jarald et al. Indian J Pharmacol 2008; 40 (6): 256-260.
11. Triender, P., Determination of glucose using glucose oxidase with an alternative oxygen acceptor, *Annual Clinical Biochemistry,* Vol 6, pg 24–27, 1969.
12. Lachman, L., A. Lieberman and J.L. Kinig, 1991. The Theory and Practice of Industrial Pharmacy, Varghese Publishing House, pp: 67-68.
13. Battue, S.K., M.A. Repay, S. Maunder and M.Y. Rio, 2007. Formulation and evaluation of rapidly disintegrating tablet Fenoverine tablets: Effect of superdisintegrants. Drug. Dev. Ind. Pharm., 33: 1225-1232.
14. Bi, Y., H. Sunada, Y. Yonezawa, K. Danjo, A. Otsuka and K. Iida, 1996. Preparation and evaluation of a compressed tablet rapidly disintegrating in the oral cavity. Chem Pharm Bull (Tokyo), 44: 2121-2127.
15. Swamy, P.A., S.H. Areefulla, S.B. Shrisand, S. Gandra and B. Prashanth, 2007. Orodispersible tablets of meloxicam using superdisintegrant blends for improvedefficiency. Ind. J. Pharm. Sci., 69(6):836-840.
16. Malke, S., S. Shidhaye and V.J. Kadam, 2007. Formulation and evaluation of oxcarbazepine fast dissolving tablets, Ind. J. Pharm. Sci, 69(2): 211-214.
17. Patel, M.M. and D.M. Patel, 2006. Fast dissolving valdecoxib tablets containing solid dispersion of valdecoxib, Ind. J. Pharm. Sci, 68 (2): 222-226.
18. Vineet Bhardwaj, Mayank Bansal and P.K. Sharma. Formulation and Evaluation of Fast Dissolving Tablets of Amlodipine Besylate Using Different Super Disintegrants and Camphor as Sublimating Agent
19. Margret Chandira, B. Jayakar, Formulation and evaluation of herbal tablets containing *Ipomoea digitata linn.* extract , volume 3, issue 1, July – August 2010; article 022.