SPECIMEN FORMAT FOR THESIS OF MONTH

Faculty	:	School of BioSciences
Department	:	Biochemistry, Biotechnology and Bioinformatics
Branch/ Area:	:	Biochemistry
Sub Subject Heading:	:	Biochemistry
Candidate's Name	:	R.Renuka
Candidate's Address with email	:	Shree Sakthi Illam 12, Siva nagar Uppilipalayam (P.O) Coimbatore – 641015 senthilrenuka@gmail.com
Title of the thesis	:	A Comparative Study on the Antidiabetic Potential of Alpha amylase Inhibitors in *Momordica charantia* and *Trigonella foenum graecum*
(i) In Roman Script (ii) In roman Script		-
Nomenclature of Degree:	:	Ph.D
Month & Year of Enrolment:	:	June 2011
Month & Year of Registration:	:	June 2011
Month &Year of Submission:	:	June 2017
Month &Year of Award	:	June 2018
Name of Supervisor	:	Dr.G.P.Jeyanthi
Designation of Supervisor	:	Director, Research and Consultancy
Centre/department/school in which research was conducted	:	Department of Biochemistry, Biotechnology and Bioinformatics
University's Name & Address	:	Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641043

Abstract within 300 words:

The present investigation was carried out with an aim of studying the antidiabetic potential of the alpha amylase inhibitors in *Momordica charantia* and *Trigonella foenum graecum*. The study was conducted in four phases. In the first phase, the *in vitro* alpha amylase inhibitory and antioxidant free radical scavenging activities of *Momordica charantia* flesh, seeds and *Trigonella foenum graecum* leaves and seeds were analysed in various solvent extracts. The ethyl acetate extracts of seeds of both the plants showed more potent alpha amylase inhibitory and antioxidant activities than the other two plant parts. Type of inhibition was found to be non competitive in *Momordica charantia* flesh and seeds, competitive and mixed in *Trigonella foenum graecum* leaves and seeds respectively. In phase II in *vivo* antidiabetic potential of the selected plant extracts on streptozotocin induced diabetic rats showed significant reduction in fasting blood glucose, lipid profile, increase in HDL, improvement in the activities and the levels of enzymic and non enzymic antioxidants catalase, glutathione peroxidase, superoxide dismutase, vitamins C, E and reduced glutathione, reduction in lipid peroxidation, activities of glucose -6-phosphatase, fructose 1, 6-diphosphatase and increase in glucose -6-phosphate dehydrogenase activity. Histopathology results demonstrated the recovery of damaged islets and an improvement in the number of β cells after treatment with the plant extracts. In Phase III, the seed extracts showed the presence of various phytochemicals and was confirmed by HPTLC, TLC, FTIR and GCMS techniques. In Phase IV, *in silico* docking studies of compounds identified from the seeds of both the plants with human and porcine pancreatic alpha-amylase enzymes showed good binding affinity with low docking energies. Thus present study shows that inhibition of pancreatic alpha amylase inhibitor compounds identified from seeds of *Momordica charantia* and *Trigonella foenum graecum* might be a promising in the management and prevention of Diabetes.

i) Major objectives :

The present investigation was designed with the following objectives:

- *In vitro* alpha amylase inhibitory and antioxidant activities of *Momordica charantia* and *Trigonella foenum graecum*
- Antidiabetic potential of the selected plant extracts on streptozotocin induced diabetic rats

- Phytochemical analysis, isolation and characterization of active principles responsible for alpha amylase inhibition
- *In silico* molecular docking studies of compounds identified with pancreatic alpha amylase enzyme

ii) Hypothesis: -

iii) Methodology :

In vitro Antidiabetic studies by alpha amylase inhibition and antioxidant potentials by standard antioxidant and free radical scavenging assays. *In vivo* antidiabetic and antioxidant potential of *Momordica charantia* and *Trigonella foenum graecum* seed extracts on Streptozotocin– Nicotinamide administered Diabetes induced rats by analysing biochemical, haematological parameters and histopathology of pancreas. Phytochemical analysis by standard reference methods. Characterization and identification of compounds by HPTLC, TLC, FTIR and GCMS techniques. *In silico* Molecular docking studies of the selected compounds using Docking Server (https://www.dockingserver.com/web)

iv) Findings:

Momordica charantia and Trigonella foenum-graecum seed extracts might effectively contribute to the management of diabetes through alpha amylase inhibition and various antioxidant activities

Examiners

Internal Examiner :

Dr.Vasanthi Nachiappan
Professor and Head
Department of Biochemistry
Bharathidasan University
Tiruchirappalli- 620024

External Examiner:
Dr.Natarajan (raj) Muthusamy DVM.,Ph.D
Professor of Medicine
Division of Hematology, Dept of Internal Medicine
Mol.Virology, Immunology and Medical Genetics and Vet. Biosciences
The Ohio State University Comprehensive Cancer Center
The Ohio State University