

Preface

The entire thesis work has been divided into nine chapters as follows: Chapter 1- deals with the general introduction about faba beans, phytochemical composition, polyphenols, diabetes mellitus and their relation with oxidative stress and antidiabetic activity. It also covers the general strategy adopted for antidiabetic activity and highlights the motivations and significance of research work. Objectives of thesis work are also the part of chapter 1. Chapter 2- presents the literature survey covering strategies for extraction purification and characterization. It also covers the polyphenols classification and therapeutic applications. The first objective comes under Chapter 3. Chapter 3- describes the seed materials, methods of various techniques(thin layer chromatography, HPLC, HR-LCMS) involved in extraction, purification, characterization and their results and discussion. *In vitro* and *in silico* evaluation of dietary polyphenols from faba beans as a diabetic agent is my second objectives. Chapter 4, chapter 5 and chapter 6 cover the second objective. Chapter 4- presents materials and methods adopted to enzyme kinetics studies of alpha-amylase with polyphenols and their results and discussion. Chapter 5 deals with *in vitro* and *in silico* studies of polyphenols with alpha-glucosidase, their materials, methods results, and discussion. Chapter 6- presents the material and methods, result and discussion of xanthine oxidase with polyphenols and evaluation of antioxidant activity. The third objective comes under chapter 7. Chapter 7 describes the materials, method results, and discussion for hypoglycemic and oxidative stress studies of polyphenols from faba bean in yeast cells. Different strategies for glucose uptake and ROS determination such as flow cytometry, AFM, SEM, confocal microscopy has been addressed in chapter 7. Chapter 8 deals with materials, methods, results, and discussion for hypoglycemic and

oxidative stress studies of polyphenols from faba bean on 3T3-L1 cell line. The conclusion has been already discussed in all chapter 3, chapter 4, chapter 5, chapter 6, chapter 7, chapter 8 and chapter 9. Chapter 9- presents a brief summary and conclusions of the experimental work.