



Publishers homepage: <http://globalsciencepg.org/>

Physagulin F – as an Anti-diabetic Agent

Poojari Satheesh Kumar & Estari Mamidala

To cite this book:

Poojari Satheesh Kumar & Estari Mamidala (2018) Physagulin F-as an Anti-diabetic Agent, AIRA, DOI: 10.5281/zenodo.7842613

To link to this book: <https://doi.org/10.5281/zenodo.7842613>



© 2018 The Author(s). Published
by AIRA association with Global
Science Publishing Group



Available online



Submit your book/chapter to this
publishers ([upload](#))



View Crossmark data

Full Terms & Conditions of access and use can be found at:
<http://globalsciencepg.org> and <http://airaacademy.com>

Book title:
Physagulin F – as an antidiabetic agent

Name & Address of the Authors:

Lt. Dr. Poojari Satheesh Kumar, M.Sc., B.Ed., Ph.D
Lecturer & Head,
Department of Zoology,
C.K.M Arts & Science College,
Desaipet, Warangal – 506 006,
Telangana State, India

Dr. Estari Mamidala, M.Sc., Ph.D., PDF (USA)
Assistant Professor,
Department of Zoology,
Kakatiya University,
Warangal-506009, Telangana State, India



Copyright © 2018, AIRA

All rights reserved. No part of this publications may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, recording or otherwise, without the prior written permission of AIRA.



ISBN: 978-93-5300-533-7

To link to this book;

DOI: <https://doi.org/10.5281/zenodo.7842613>

Published in India by arrangement with
AIRA, India

Printers:
Global Science Publishing Group,
709, South Street,
Carrollton, GA 30118, USA

Book Description

Type 2 diabetes mellitus is a disorder that disrupts the way your body uses glucose (sugar). All the cells in your body need sugar to work normally. Sugar gets into the cells with the help of a hormone called insulin. If there is not enough insulin, or if the body stops responding to insulin, sugar builds up in the blood. This is what happens to people with diabetes mellitus. The book lists the research done by the author and outlines selection criteria to provide readers with the knowledge they need to develop research awareness on diabetes regarding to in vitro, in vivo works. Divided into six parts, chapters cover Introduction, literature review on diabetes mellitus, anti-diabetic medicinal plants, pathophysiology of DM, *Physalis angulata*, prevention and Management of DM, In vitro anti-diabetic activity of *P. angulata* plant extracts, preliminary phyto-chemical analysis of *P. angulata* and In vivo anti-diabetic activity of *P. angulata*. Finally, this book presents an approach to explore biological properties of *Physalis angulata* which has been documented. Reports of the present investigation also provide a scientific validation for the use of this plant extract in folklore medicine. sustainable perspectives and developments, theory and mechanisms of various separation processes, advances in sample preparation techniques, advances in chromatography, advances in membrane technology, advances in microfluidics, green and sustainable separation sciences, and challenges and commercialization. In-depth and step-by-step descriptions of the various processes and technologies, explanations of their inclusion in modern industry and scales for both experimental and theoretical models are also included.

TABLE OF CONTENTS

<i>Table of Contents</i>	<i>iii</i>
<i>List of Figures</i>	<i>vi</i>
<i>List of Tables</i>	<i>vii</i>
CHAPTER-I: INTRODUCTION	1-10
1.1 General Introduction	2
1.2 Aims and Objectives of the study	5
1.2.1 Aim of the Study	6
1.2.2 Objectives	6
1.3 Scope of the thesis	6
1.4 References	7
CHAPTER-II: REVIEW OF LITERATURE	22-85
2.1 General Introduction	23
2.2 Epidemiology of Diabetic Mellitus (DM)	27
2.2.1 General Introduction	27
2.2.2 Global DM epidemic	28
2.2.3 India DM epidemic	31
2.3 Types of DM	36
2.3.1 Type-1 DM	36
2.3.2 Type-2 DM	37
2.3.3 Gestational Diabetes	38
2.3.4 Other Types of DM	40
2.4 Diagnosis of DM	41
2.5 Pathophysiology of DM	42
2.6 Prevention & Management of DM	47
2.7 Introduction to Medicinal Plants	51
2.8 Anti-diabetic Medicinal Plants	60
2.9 <i>Physalis angulata</i>	69
2.9.1 Description	69
2.9.2 Chemical Constituents	71
2.9.3 Medicinal Uses of <i>P. angulata</i>	73
2.10 References	77

CHAPTER-III: IN VITRO ANTI-DIABETIC ACTIVITY OF *P. ANGULATA*

3.1 Introduction	87
3.2 Materials and Methods	91
3.2.1 Collection of Plant Material	91
3.2.2 Preparation of Crude Extracts	91
3.2.3 In vitro Anti-diabetic Activity	93
3.3 Results	96
3.3.1 Percentage of Yield	96
3.3.2 Evaluation of In vitro Anti-diabetic Activity	97
3.4 Discussion	99
3.5 Conclusion	100
3.6 References	101

CHAPTER- IV: PRELIMINARY PHYTOCHEMICAL ANALYSIS OF *P. ANGULATA* **103-118**

4.1 Introduction	104
4.2 Materials and Methods	109
4.2.1 Plant collection	109
4.2.2 Preparation of plant extracts	109
4.2.3 Phytochemical Screening	109
4.3 Results and Discussion	112
4.3.1 Percentage of Yield Extract	112
4.3.2 Evaluation of Phytochemical Study	112
4.5 Conclusion	115
4.6 References	116

CHAPTER- V: IN VIVO ANTI-DIABETIC ACTIVITY OF *P. ANGULATA* **119-149**

5.1 Introduction	120
5.2 Materials and Methods	128
5.2.1 Collection of Plant	128
5.2.2 Preparation of Plant Crude Extract	128
5.2.3 Isolation of Active Compound	128
5.2.4 Experimental Animals	130
5.2.5 Induction of DM	132
5.2.6 Acute Toxicity Studies	132
5.2.7 Experimental Design	132
5.2.8 Body Weight & Glucose Measurements	133

5.3 Results and Discussion	134
5.3.1 Isolation & Identification of Active Compound	134
5.3.2 Assessment of <i>In vivo</i> Anti-Diabetic activity of isolated active compound	139
5.4 Conclusion	146
5.5 References	147
CHAPTER-VI: SUMMARY & CONCLUSION	150-157

LIST OF FIGURES

Figure No.	Title	Page Nos.
1	The prevalence of type 2 diabetes reported in different regions of India.	33
2	Mechanism of insulin release in normal pancreatic beta cells.	46
3	A, B- Collection of plant and separation of Fruits, C, D- Removal of Fruit petals and Separation of fruit capsules, E-Isolated fruit capsules, F- Maceration of Fruit, G- Filtration of crude extract, H- Rota-evaporization, I-Fractionation process	70
4	Inhibitory effects of α - amylase by <i>Physalis angulata</i> fruit extracts at various concentrations.	98
5	Inhibitory effects of α - glucosidase by <i>Physalis angulata</i> fruit extracts at various concentrations.	98
6	A- Procurement and Transportation of rats without noise pollution, B- Grouping the rats before induction of Diabetes, C- Making the rats to adjust to suitable environment before experiment commence, D- Induction of Diabetes via intra peritoneal injection with Streptozotocin, E- Treatment of rats with <i>Physalis angulata</i> fruit extract, F- Monitoring the behavior of rats during the experiment, G- Screening of Body weight during all the days of Experiment, H- Determination of Glucose Levels with the help of Glucometer, I- Recordings of the investigation.	131
7	Separation of plant constituents using column chromatography	135
8	Fig-6.1 Molecular structure Physagulin-F isolated form <i>Physalis angulata</i>	139

LIST OF TABLES

Table No.	Title	Page No.
1	Top 10 countries for numbers of people aged 20–79 years with diabetes in 2010 and 2030.	30
2	Percentage yield of crude extract of four plants	96
3	Preliminary phytochemical analysis from various <i>P. angulata</i> fruit extracts	113
4	Chromatography resolution	136
5	¹ HNMR and ¹³ C-NMR data of the Physagulin-F isolated from Fruit of <i>Physalis</i>	138
6	Percentage of Body Weight of Streptozotocin induced diabetic rats during the treatment with <i>Physalis angulata</i> Fruit Methanol extract	141