University of Massachusetts Medical School

Barur R. Rajeshkumar PhD
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Cardiovascular Medicine ASC7-1046
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November 22, 2014

Dr. S. Thirumagan, PhD
Controller of Examinations
University of Madras
Chennai-600 005

Dear Dr. S. Thirumagan:

Sub: "PhD Eval./449/ 2014 /9412/ Dated 09-October-2014/Ms. S. Pradeepa -Reg."

Thank you for your invitation to be a member of Board of examiner to adjudicate the PhD thesis entitled "Studies on the hypoglycemic, hypolipidemic and antioxidant properties of *Pithecellobium dulce* Benth. fruit extract studied in Streptozotocin induced diabetic rats" submitted by Ms. S. Bhuvaneswari (Center for Advanced studies in Botany, University of Madras Chennai) University of Madras, Chennai 600 005. I request you to accept my expert report and comments. I congratulate both the doctoral student Ms. S. Pradeepa and Dr. V. Kaviyarasan for their scientific contribution. If you have any question or concern please feel free to contact me.

Thank you

Sincerely,

Barur R. Rajeshkumar, PhD

22-NOV-2014

Ph-D /

சென்னைப் பல்கலைக்கழகம்

UNIVERSITY OF MADRAS

APPENDIX F: Proforma for Adjudication of the Ph.D. Thesis

1. Name of the Candidate : **S. PRADEEPA**
2. Title of the Thesis : Studies on the hypoglycemic, hypolipidemic and antioxidant properties of .....
3. Discipline and Subject : Botany
4. Name and Address of the Examiner with E-mail ID : Dr.Barur R. Rajeshkumar, PhD

   Laboratory Manager\ Senior Research Scientist,Cardiovascular Med ASC7-1007

   U of Massachusetts Medical School, 368 Plantation Street, Worcester, MA 01605, barur.rajeshkumar@umassmed.edu

5. **Recommendation of the Examiner : (Please Tick whichever is appropriate box)**

   a) Thesis is highly commended, the public viva-voce be conducted and Degree may be awarded ☑

   OR

   b) Thesis is commended, the public viva-voce be conducted and Degree may be awarded. ☐

   OR

   c) Thesis is commended and the Degree may be awarded subject to the candidate's furnishing satisfactory clarifications to my queries during the public viva-voce examination. ☐

   OR

   d) Thesis is commended and the Degree may be awarded subject to the condition that the corrections/modifications, suggested by me are carried out in the thesis and duly certified by the Supervisor-Convener before the public viva-voce examination. ☐

   OR

   e) Thesis needs to be resubmitted after revision for revaluation. ☐

   OR

   f) Thesis is not commended and the Degree may not be awarded. ☐

Note:
Please enclose your detailed report on the thesis. Please also enclose a list of questions, if any, to be asked at the public viva-voce examination.

6. Any other remarks.

11-22-14.

Place: Worcester, MA 01605
Date: November 22, 2014

(Signature of Examiner with designation)
Address:

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EXAMINER'S REPORT ON MISS. S. PRADEEPA'S PHD THESIS:

"STUDIES ON THE HYPOGLYCEMIC, HYPOLIPIDEMIC AND ANTIOXIDANT PROPERTIES OF *Pithecellobium dulce* Benth. FRUIT EXTRACT STUDIED IN STREPTOZOTOCIN INDUCED DIABETIC RATS".

I RECOMMEND THAT THE CANDIDATE BE AWARDED THE DEGREE OF DOCTOR OF PHILOSOPHY IN BOTANY WITHOUT FURTHER EXAMINATION.

The candidate, Miss S. Pradeepa, has chosen a socially relevant topic for her research study. Diabetes mellitus is a metabolic disorder characterized by hyperglycemia, and its occurrence is increasing worldwide at an alarming rate. Although plenty of drugs are available to treat diabetes, none are considered ideal because of their undesirable side effects after prolonged use; this is why the search for novel drugs, especially from the medicinal plants, continues in order to find a successful treatment of diabetes. In India, Herbal medicine derived from plant extracts have been utilized increasingly for the treatment of various disorders including diabetes mellitus.

In this present study, anti-hyperglycemic, hypolipidemic and anti-oxidative potential of ethanolic extracts of Pithocellobium *dulce* Benth (P.*dulce* pod extract) were assessed in Streptozotocin induced diabetic rats. The succulent fruits (P.*dulce* pod) are rich in phytochemicals and used in the treatment of diabetes. The candidate has scientifically validated the beneficial as well as therapeutic effects of P. *dulce* pod extract for the treatment of both primary and secondary complications of experimentally induced diabetic rats.

The introduction chapter of this thesis is well written and articulately composed with adequate background information on the need and benefit of traditional medicine and P *dulce* pod. In the second chapter the candidate clearly outline the scope of the present investigation. Third chapter evaluates the anti-hyperglycemic, hypolipidemic and anti-oxidative potential of ethanolic extracts of P.*dulce* pod. Antimicrobial properties were discussed in chapter 4, followed by the summary and conclusion in the last chapter.

The qualitative phytochemical screening and HPLC analysis of the P *dulce* pod extract revealed the presence of the important biological secondary metabolites such as Quercetin, Rutin, Myricetin, Luteolin, Apigenin and Kaemferol which readily account for its pharmacological activities. The candidate has systematically evaluated the antidiabetic properties of the P *dulce* pod extract by determining the fasting blood glucose, glycosylated hemoglobin, plasma insulin and C-peptide levels. Likewise, the hypolipidemic efficacy of the P *dulce* pod extract was assessed by its ability to alter the individual components of lipid profile such as TC, HDL, LDL, VLDL and TG levels.

The role of hyperglycemia induced oxidative stress in diabetes is well studied, and the candidate has presented the effect of oral administration of P *dulce* pod extract to STZ induced diabetic rats by estimating the levels of oxidative stress markers as well as the levels of both enzymatic and non-enzymatic antioxidants. The determination of antibacterial and antifungal activities using common pathogenic bacteria and fungi in terms of MIC and MBC revealed the antimicrobial activity of the P *dulce* pod extract. Assay of pathophysiological enzymes such as AST, ALT and ALP and the histological observations made on the vital organs indicate the non-toxic as well as tissue protective nature of the P *dulce* pod extract.

This research investigation represents an exceptional piece of work. This research study was well thought-out and executed with great extent. The literature reviews encompasses a wide range of key issues in diabetes research and were presented in an authoritative, critical and well-informed

manner. The rationale for the study is explained clearly, and the investigation is carried out with a high degree of rigor in accordance with current standards of good practice. The methodology applied is clear and organized in a sequence to address the goal of the planned research study to evaluate the potential medicinal benefit of the P.*dulce* pod fruit in controlling or treating diabetes. Results and discussion were presented well to establish the anti-hyperglycemic, hypolipidemic anti-oxidative and antimicrobial potentials of P.*dulce* pod. The results obtained are adequate and the data obtained are discussed in the light of relevant available literature. The results are clearly presented in the form of tables, figures and graphs. The statistical analysis has been carried out to present the significance of the study. This research lays a strong basic foundation for the researchers, physicians and industrialists who may have to further understand, analyze, and take necessary steps to make use, develop and find a newer and more effective treatment for this devastating disease.

The candidate has already made some publications and presentations from the thesis. However, it is a fertile source for many further publications both within and outside India. I would urge the student to move toward publication in a leading peer reviewed journal.

In summary, this study is well planned, efficiently organized, well-written and the style and layout are excellent. The candidate clearly demonstrates creative abilities in evaluating the potential benefit of P.*dulce* pod extract. This study is original and significant contribution to knowledge and understanding of evaluating the medicinal property of P.*dulce* pod extract and this thesis meets the required standard of a doctoral thesis to justify the award of a PhD.

It is without hesitation that I **RECOMMEND** the thesis to be accepted and **MISS. S. PRADEEPA** may be awarded the degree of Doctor of Philosophy in Botany, University of Madras. I congratulate both the doctoral fellow Miss S. Pradeepa and Dr. V. Kaviyarasan for their hard work and valuable contribution.

A few specific comments may, however, be directed at the candidate during viva interface

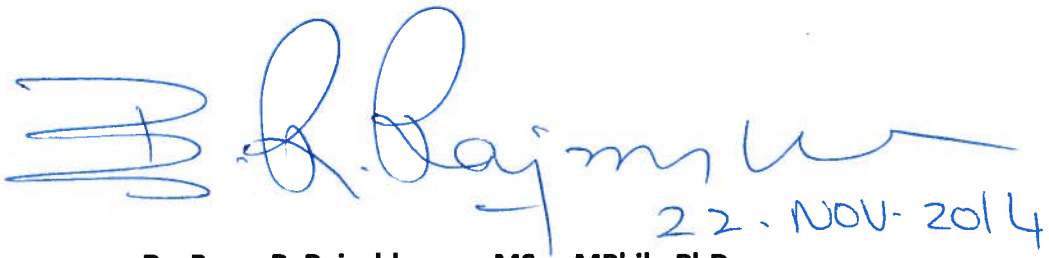
Questions may be asked during viva voce:

1. Have you prepared and tested only one batch of P.*dulce* pod extract? Have you collected fruit from only one region of the Tamil Nadu or different parts of India? Also only one particular season (like summer, winter etc) or it is from collection of different seasons?
   It would be interesting to determine the variation between batches, locations and seasons of the fruit extracts to study the difference in phytochemical composition and medicinal effect.

2. Page 60: Diabetes rats were treated with 300mg/kg body weight of P.*dulce* pod extract? How to arrive this dose? What is the LD 50 Value? Also, have you done toxicity study to justify P.dulce pod extract at a 300mg/kg body weight does not affect vital organs?

3. Page 60: Under materials and method section, "The rats were divided in to 4 groups and each group comprising of six animals"- Have you repeated these experiments more than once?

4. What could be the active compounds that could present in this P.*dulce* pod extract that helps to treat Diabetes? Does your laboratory equipped to analyze the active compounds in P.*dulce* pod extract.



External Examiner:

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22nd November 2014

Claim on the University of Madras by

Thiru / Tmt. / Selvi. / Dr. Dr. Barur R Rajeshkumar, PhD

(IN BLOCK LETTERS)

DATE	PARTICULARS	Amount Rs.	Amount P.
11-22-2014	Adjudication PhD Thesis submitted by S. Pradeepa "Studies on the hypoglycemic, hypolipidemic... ...diabetic rats"	$150	00
	Total $150/-	$150	00
	Rupees One hundred and fifty dollars only		

O.E. Contents received

Station Worcester, MA 01605

Date 22 November 2014

Countersigned

Re.1/- Revenue Stamp

Signature

11-22-14

Address .....

.....

(In Block Letters)

(P.T.O.)

Signature and Designation

NOV-22-14

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