

**STRUCTURAL STUDIES OF LIPOXYGENASES  
FROM LEGUMES**

***THESIS SUBMITTED TO THE UNIVERSITY OF MYSORE FOR THE  
DEGREE OF DOCTOR OF PHILOSOPHY IN BIOCHEMISTRY***

***BY***

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**MARCH 2006**

## DECLARATION

I hereby declare that the thesis entitled "**Structural studies of Lipoxygenases from legumes**" which is submitted herewith for the degree of **Doctor of Philosophy** in **Biochemistry** of the *University of Mysore, Mysore* is the result of the work done by me at the **Central Food Technological Research Institute, Mysore, India** in the **Department of Protein Chemistry and Technology** under the guidance of **Dr. A. G. Appu Rao** during the period July 2000 - March 2006.

I further declare the results of the work have not been previously submitted for any degree or fellowship.

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### CERTIFICATE

I hereby certify that this Ph.D. thesis entitled "*Structural studies of lipoxygenases from legumes*" submitted by Roopa Shree S. for the degree of *Doctor of Philosophy in Biochemistry* of the University of Mysore, Mysore, is the result of research work carried out by her in the *Department of Protein Chemistry and Technology, Central Food Technological Research Institute, Mysore, India*, under my guidance and supervision during the period 2000 – 2006. This has not been submitted either partially or fully to any degree or fellowship earlier.

  
A.G. APPU RAO  
Guide

## **ACKNOWLEDGEMENTS**

*I wish to express my sincere gratitude to my research supervisor Dr.A.G.Appu Rao, Head, Department of Protein Chemistry and Technology for suggesting the problem, able guidance, valuable insight, constant encouragement and support throughout the investigation.*

*My sincere thanks to Dr.V.Prakash, Director, CFTRI, Mysore, for providing the necessary facilities to work in the institute and permitting me to submit the results in the form of the thesis.*

*My grateful acknowledgements to Dr. Lalitha R.Gowda and Dr. Sridevi Annapurna Singh for their constant help and advice during the course of investigation*

*I am indebted to my fellow colleagues and staff members in the department, both past and present, for creating an inspiring working atmosphere to complete my research work.*

*My special thanks to Mr. P.S.Kulashekhar for suggestions towards making improvements to the presentation of the material in the thesis.*

*I would like to express my deepest gratitude to my parents and my brother for their constant support and understanding throughout the investigation.*

*It is my profound duty to thank CSIR, New Delhi, for the financial support in the form of fellowship.*

**ROOPA SHREE.S**

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## ABBREVIATIONS

Ea	Energy of activation
$\Delta G^*$	Activational free energy change
$\Delta H^*$	Activational enthalpy change
$\Delta S^*$	Activational entropy change
ADH	Alcohol dehydrogenase
ANS	8- Anilino 1-naphthalene sulphonic acid.
AOS	Allene oxide synthase
BCIP	5-bromo-4-chloro-3-indolyl-phosphate
BSTFA	bis(trimethylsilyl) trifluoroacetamide
CA	Carbonic anhydrase
CAPS	3-[cyclohexyl amine]-1-propane sulfonic acid
Da	Daltons
<i>D.biflorus</i>	<i>Dolichos biflorus</i> .
DBL	<i>Dolichos biflorus</i> lectin
DBSL	<i>Dolichos biflorus</i> seed lectin
DEA	Dihydroxyeicosatetraenoic acid
DES	Divinylether synthase
DOC	Deoxycholic acid.
EAS	Epoxy alcohol synthase
ETYA	5,8,11,14 Eicosatetraenoic acid
FA-OOH	Fatty acid hydroperoxide
GalNAc	N-acetyl galactosamine
GC MS	Gas chromatography mass spectrometry.
GST	Glutathione S transferase
H(P)ETE	Hydro(pero)xyeicosatetraenoic acid
H(P)OD	Hydro(per)oxide
HGLOX	Horsegram lipoxygenase
HPL	Hydroperoxide lyase.
HU	Haemagglutination unit.

IC <sub>50</sub>	Mid point inhibitor concentration
JA	Jasmonic acid
Kcal	Kilo calories
kDa	kilo daltons
Ki	Inhibition constant
K <sub>m</sub>	Michaelis Menton Constant
K <sub>r</sub>	Rate constant.
LA	Linoleic acid
LDL	Low density lipoprotein
LOX	Lipoxygenase
LT	Leukotriene
MALDI-TOF/ MS	Matrix Assisted Laser Desorption ionization- Time of Flight/Mass Spectroscopy
NDGA	Nor-dihydorguaiaretic acid
OPDA	Oxo-phytodienoic acid.
PA	Periodic acid
PAGE	Poly acrylamide gel electrophoresis.
PC	Phosphatidyl Choline
PDB	Protein data bank
PG	Prostaglandin
POX	Peroxygenase.
PTH	Phenyl thio hydantoin
PUFA	Poly unsaturated fatty acid
PVDF	Polyvinylidiflouride.
RP-HPLC	Reverse phase high performance liquid chromatography
S	Substrate
SDS	Sodium dodecyl sulphate
SP-HPLC	Straight phase high performance liquid chromatography.
T <sub>m</sub>	Mid point temperature
TNS	2,6,Toluidinylnaphthalenesulfonate
TPCK	L-1-Tosyl-amido-2-phenylethyl chloromethyl ketone

V	Velocity of the reaction
VOC	Volatile organic chemicals



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