

## BIODATA

Dr. Asha Martin  
Senior Principal Scientist,  
Department of Biochemistry,  
Professor, AcSIR, CSIR- CFTRI, Mysore-570020

- *Excellent academic record with core research expertise in the areas of Biochemistry, Biotechnology, Molecular Biology and Food safety.*
- *Head of Food Safety & Analytical Quality Control Laboratory, CFTRI Mysore from 2014-2017.*
- *Director of FSSAI notified Referral Food Laboratory, CFTRI Mysore from 2014-2017*
- *Chairman of FAD-28 “Test methods for food products” sectional committee of the Food and Agriculture Division of Bureau of Indian Standards (Aug 2014-Dec 2017).*
- *Expert Member of the project review & steering group for Ministry of Electronics and Information Technology.*
- *Expert Member of Technology and Innovation forecasting committee (TIFAC), DST.*
- *Principal Member of the Technical committee on “Food Biotechnology” sectional committee (FAD-23)” of the Food and Agriculture Division of Bureau of Indian Standards (BIS).*
- *Member of the Scientific panel on Sweets, Confectionery, Sugar and Honey, FSSAI (2017-2022)*
- *Member of Food Analyst Exam Board, FSSAI, 2016-2017.*
- *Extensively contributed in knowledge dissemination and capacity building in the areas of Biotechnology, food safety and quality. Coordinator for two international and nine national training programs on food safety.*
- *Coordinator for MSc Food Technology Subject - Food Quality, Safety and Analysis. Faculty for AcSIR doctoral students and for the subject Molecular Biology and Genetic engineering for MSc Food Technology.*
- *Member of the Board of studies for Food Sciences and Nutrition, University of Mysore.*
- *Member of the School board of Life Sciences, Pondicherry University*
- *Member of Human Ethical Committee of University of Mysore*
- *Member of the C.F.T.R.I Management council for 2007-2009; 2024-2025*
- *Recognised PhD guide in the faculty of Biological Science (AcSIR); Biochemistry, Biotechnology, Food Science and Nutrition (University of Mysore)*

1. **Academic Qualifications:** MSc (Biochemistry), PhD (Biochemistry) from Nagpur University, Nagpur.
2. **Category:** General
3. **Languages known:** English, Malayalam, Hindi and Marathi
4. **E-Mail :** [ashamartin@cftri.res.in](mailto:ashamartin@cftri.res.in),

**5. Contact No:** 9449029530

## **6. Ph.D. GUIDANCE**

No. of Ph.D. students awarded: 4      No of MSc/BTech students guided for their dissertation: 29

Currently Mentoring the following students for their doctoral study

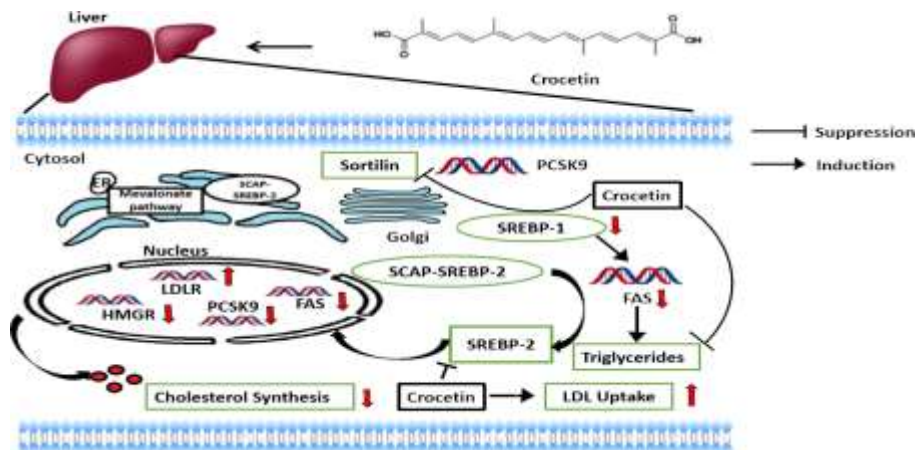
1. Ms. Divya Priya, UGC- SRF
2. Ms. Suhasini, UGC-SRF
3. Mr. Sanjay Gowda, ICMR-SRF (Co-Guide Dr. R. P Singh)
4. Mr. Vijay D, UGC-SRF
5. Ms. Radhika Gune, UGC-JRF
6. Mrs. Chaitanya I, Assistant Professor, UAS, Dharwad (FIP)
7. Ms. Arya S Kumar, CSIR-JRF

## **7. RESEARCH AREAS**

Presently involved in delineating the molecular mechanisms behind the health benefits associated with dietary molecules using animal /cell models with a focus on Pro protein convertase subtilisin/kexin type 9 (PCSK9), an important post- transcriptional regulator and SIRT 1 (Silent information regulator), a promising therapeutic target for the treatment of several metabolic disorders. The overall goal is to develop safe diet based strategy centered on nutraceuticals for prevention of chronic diseases. This research includes in vitro cell culture studies, animal model and in silico studies.

### **Exploring the role of dietary modulators of PCSK9**

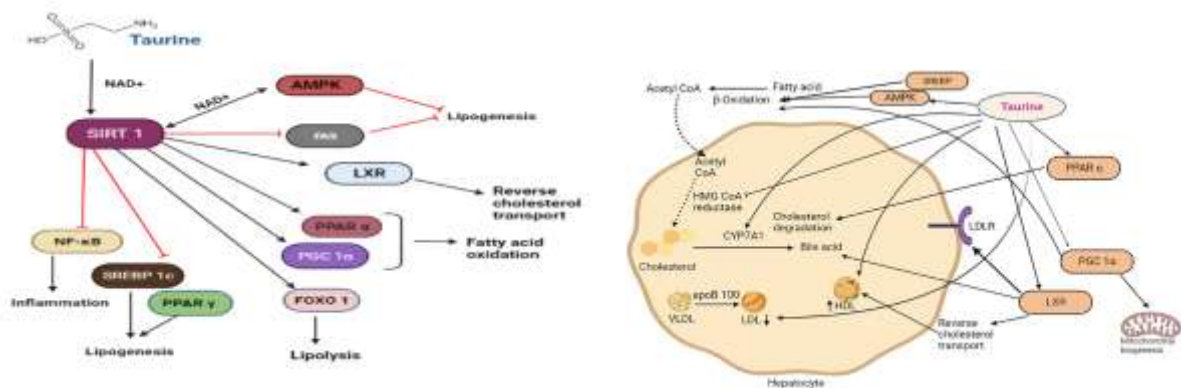
Proprotein convertase subtilisin/kexin type 9 (PCSK9) is a serine protease that plays an important role in the regulation of plasma levels of low density lipoprotein cholesterol (LDL-C). Food based molecules that can modulate PCSK9 have potential to be developed as safe and effective nutraceuticals for hypercholesterolemia and other related conditions. Our current interest is aimed at exploring the potential of dietary molecules to modulate the expression of PCSK9 and to understand the molecular mechanism in lipid metabolism disorders.



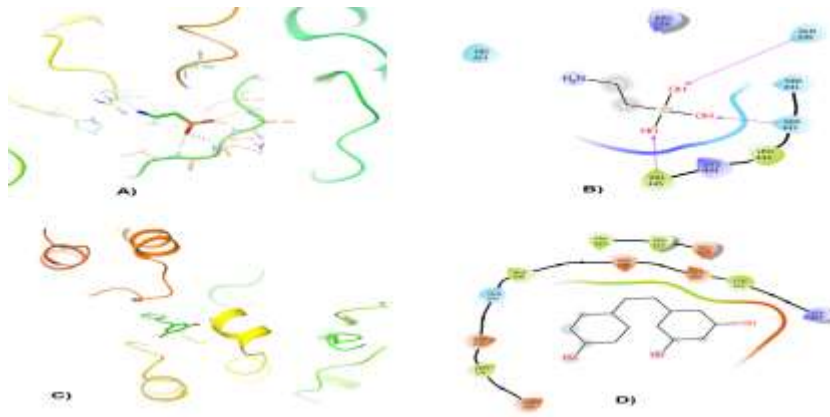
*Crocetin alleviates hypercholesterolemia and inflammation via PCSK9/Sortilin/LDLR/SREBP-2/TNF- $\alpha$  signaling pathway in Hep G2 cells and high fat diet induced C57BL/6 Mice (Nutrition Research 2021)*

### Sirtuins (SIRT1) in lipid metabolism disorders

Sirtuins are NAD<sup>+</sup> dependent class III histone deacetylases implicated in several age related degenerative diseases such as cancer, diabetes, cardiovascular disease (CVD) and neurodegenerative disorders. Molecules that activate sirtuin provide broad health benefits with potent anti-inflammatory, cardioprotective, neuroprotective, and anti-tumor activities. Our current research interest is focussed on evaluating the potential of SIRT1 (Silent information regulator T1) activators from dietary sources in ameliorating obesity, CVD and lipid metabolism disorders. Using a combination of *in vivo*, *in vitro* and computational approaches, we have shown for the first time that taurine exerts lipid lowering effects through activating SIRT1/ AMPK/FOXO1 signaling pathways and regulating their downstream targets. Our findings demonstrate that taurine functions as a natural SIRT1 activator with possible therapeutic benefits for metabolic disorders like obesity and age-related diseases.



*Taurine activates SIRT1/AMPK/FOXO1 signaling pathways to favorably regulate lipid metabolism in Hep G2 cells and C57BL6 obese mice (Journal of Nutritional Biochemistry 2023; Critical Reviews in Food Science and Nutrition 2022; Molecular Nutrition and Food research 2024)*

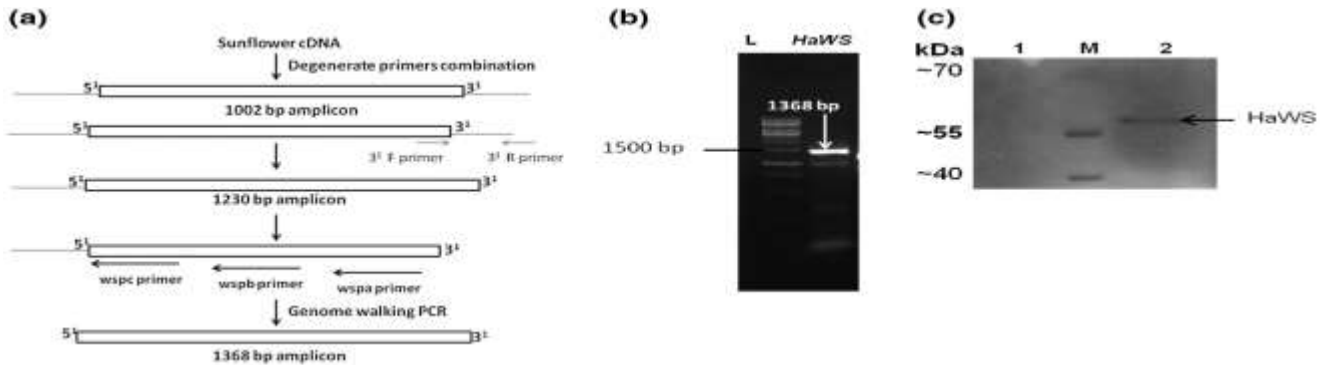


*Molecular interactions of Taurine (a) and resveratrol (b) binding at the allosteric site of SIRT1 and its two-dimensional representation (c and d) (Journal of Nutritional Biochemistry 2023)*

***Exploring the role of dietary interventions in the management of PCOS and understanding its underlying molecular mechanism***

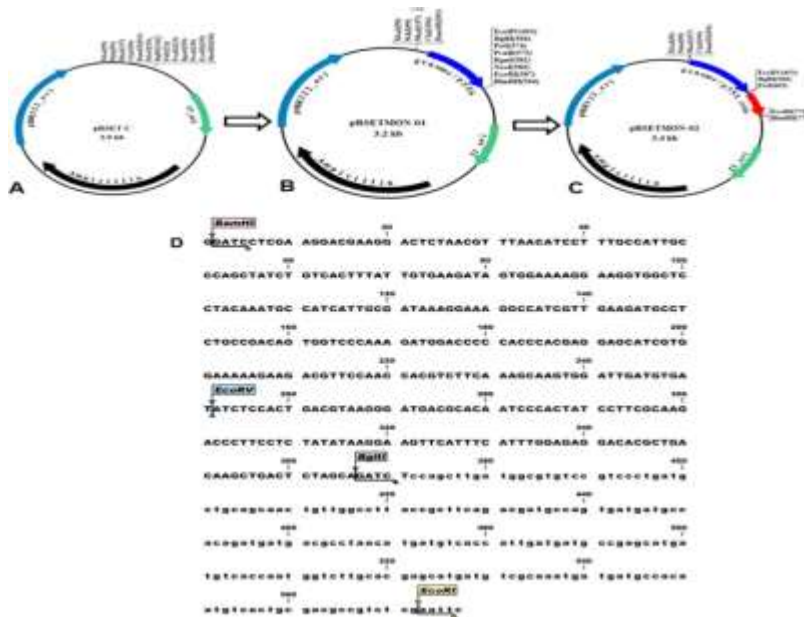
Recently, our lab has embarked on identifying dietary molecules for management of Polycystic Ovary Syndrome (PCOS) and has got promising leads. PCOS is a complex endocrine and hormonal disorder that affects reproductive health of many women and causes health disorders. Research has shown that nutraceuticals play a critical role in the health maintenance of women with PCOS. However, little is known about the molecular mechanism involved. In this context, our focus is on investigating the effect of selected bioactive extracts and their mechanism at the molecular level in an attempt to find natural alternatives for management of PCOS. Investigation in this area can lead us to improve the treatment strategy and better understand the mechanisms by which dietary molecules/ natural plant extracts exert their effects and give a solid basis for their development and utilization as dietary supplements or nutraceuticals for the treatment of PCOS.

***Cloning, functional expression of wax synthases for production of tailored wax esters for potential use in food/pharma/ cosmetic industries***

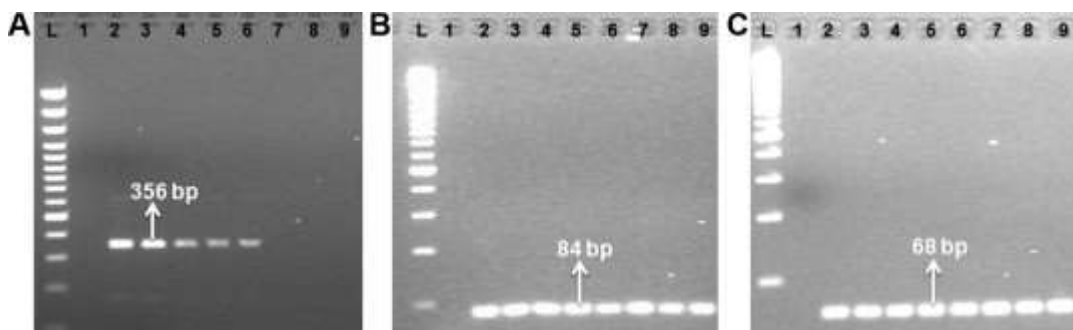


(a) Schematic representation summarizing the isolation of putative *HaWS*, (b) 1,368 bp amplicon *HaWS* isolated using Sunflower cDNA and (c) Western blot analysis of expressed *HaWS*. (*Journal of Food Biochemistry*, 2020)

### Genomic and proteomic approaches for detection of GMOs and food allergens



Schematic diagram of (A) *pRSET C* vector, (B) single target plasmid *pRSETMON-01* containing the *MON 810* maize event specific sequence, (C) dual target plasmid *pRSETMON-02* containing both the transgenic and endogenous zein gene targets and (D) nucleotide sequences of the inserted transgenic and endogenous targets. Uppercase letters indicate the junction sequence between *MON 810* maize genome and *P-35S*; lowercase letter indicates partial sequence of zein gene. (*Food Chemistry* 2013)



Agarose gel electrophoresis of PCR products amplified from pRSETMON-02 DNA subjected to different processing treatments using (A) T7 promoter/VWO3 (B) zein F/R primers and (C) P-35SF/R. The arrows indicate the expected PCR amplification products. Lane L, 100 bp ladder size marker; lane 1, NTC; lane 2, unprocessed pRSETMON-02; lane 3, microwaving at 900 W; lane 4, heating at 100 °C for 30 min; lane 5, heating at 100 °C for 60 min; lane 6, baking at 180 °C for 20 min; lane 7, autoclaving at 121 °C for 20 min and Lane 8, UV irradiation (120 mJ/cm<sup>2</sup>) for 5 min. (Food Chemistry 2013)

Other research areas include

- Functional and nutritional characterization of under-utilized edible fruits.
- Elucidation of the health benefits of under exploited medicinal plants
- Structural characterization of proteins

### 8. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received

S.No	Name of Award	Awarding Agency	Year
1	<b>CFTRI Foundation day</b> individual award for <b>Maximum ECF</b> generated in the institute for the period 16-17, 17-18 and 18-19.	CSIR-CFTRI	2019
2	<b>Col. O.P Kapoor award</b> (Citation and Rs. 15,000 cash award) for contribution in the field of food Safety	All India Food Processors Association (AIFPA), New Delhi.	2016
3	<b>CFTRI Foundation Day Award</b> –for the <b>Best Research paper</b> published in <b>Basic Science Category by staff.</b>	CSIR-CFTRI	2014
4	Ranganna Setty Memorial Award for Best MSc Food Tech Investigation thesis carried out at CFTRI under my supervision and guidance.	CSIR-CFTRI	2014
4	Junior Research Fellowship and Senior Research Fellowship	UGC, India	1995-1999

5	Awarded the M.R.F. Student Scholarship for excellence in academic studies for every academic session	MRF	1985 to 1992.
6	National Merit certificate in recognition of the high position secured in the Senior Secondary School Certificate (SSC) examination.	Government of India	1985

### 9. Selected Publications

S.No.	Author(s)	Title	Name of Journal	Volume	Page	Year	Impact Factor
1	Arya Devi KP Muthukumar SP and Martin, A.	Taurine Activates SIRT1/AMPK/FOXO1 Signaling Pathways to Favorably Regulate Lipid Metabolism in C57BL6 Obese Mice	Molecular Nutrition & Food Research	68 (8)	2200660	2024	6.75
2	Arya Devi KP Shimoga Janakirama, A.R., Martin, A.	SIRT1 activation by Taurine: in vitro evaluation, molecular docking and molecular dynamics simulation studies	Journal of Nutritional Biochemistry	102	108948	2023	6.117
3	Arya Devi KP and Martin, A.	Recent insights into the molecular regulators and mechanisms of taurine to modulate lipid metabolism: a review	Critical Reviews in Food Science and Nutrition	2022-01-18	DOI: 10.1080/10408398.2022.2026873	2022	11.208
4	Siddiq A and Martin A.	Crocetin exerts hypocholesterolemic effect by inducing LDLR and inhibiting PCSK9 and Sortilin in HepG2 cells, Nutrition Research .	Nutrition Research	98	41-49	2022	3.876
5	Appaiah, P., Sunil, L., Martin, A., Vasu, P.	Physicochemical Characterization and In Vitro Digestibility Study of an In Silico Designed Recombinant Protein Enriched with Large Neutral Amino Acids and Lacking Phenylalanine for Phenylketonuria	Protein Journal	2022-01-22	DOI: 10.1007/s10930-021-10039-0	2022	4.000

6	Chinmayee, C.V., Martin, A., Gnanesh Kumar, B.S., Singh, S.A.	A new thermostable rhizopuspepsin: Purification and biochemical characterisation	Process Biochemistry	112	18–26	2022	4.885
7	M.P.Thanushree, M.L.Sudha, Asha Martin, T.Vanitha, Crassina Kasar	Enhancing the nutritional and quality profiles of buckwheat noodles: Studies on the effects of methods of milling and improvers	LWT-Food Science and Technology	160	113286	2022	6.056
8	J.Prakash,S. Sallaram, A.Martin, R P. Veeranna, M Serva Peddha	Phytochemical and Functional Characterization of Different Parts of the Garcinia xanthochymus Fruit	ACS Omega	7, 24	21172–21182	2022	4.132
9	Haritha Duppeti , Sachindra Nakkarike Manjabhatta , Asha Martin , Bettadaiah Bheemanakere Kempaiah ,	Effects of different processing methods on the biochemical Y composition, color and non -volatile taste active compounds of whiteleg shrimp (Litopenaeus vannamei)	Food Chemistry Advances <a href="https://doi.org/10.1016/j.focha.2022.100118">https://doi.org/10.1016/j.focha.2022.100118</a>	1	100118	2022	
10	Sunil, L., Appaiah, P., Martin, A., Vasu, P.	Characterization of in silico modeled synthetic protein enriched with branched-chain amino acids expressed in Pichia pastoris	International Journal of Biological Macromolecules	168	518-525	2021	8.025
11	Shalini, T., Martin, A.	Identification, isolation, and heterologous expression of Sunflower wax synthase for the synthesis of tailored wax esters	Journal of Food Biochemistry	44(10)	e13433	2020	3.654
12	Kamani, M.H., Martin, A., Meera, M.S.	Valorization of By-products Derived from Milled Moth Bean: Evaluation of Chemical Composition, Nutritional Profile and Functional	Waste and Biomass Valorization	11(9),	4895-4906	2020	3.449



		Characteristics					
13	Bethi, C.M.S., Narayan, B., Martin, A., Kudre, T.G.	Recovery, physicochemical and functional characteristics of proteins from different meat processing wastewater streams	Environmental Science and Pollution Research	27(20),	25119-25131	2020	5.190
14	Rajashekhar V Ballari and Asha Martin	Assessment of DNA degradation induced by thermal and UV radiation processing: Implications for quantification of genetically modified organisms.	Food Chemistry	141: 2136	382-389.	2013	9.231
15	Rajashekhar V Ballari, Asha Martin and L R Gowda	A calibrator plasmid for quantitative analysis of insect resistant maize(Yieldgard MON 810).	Food Chemistry:	140	382-389.	2013	9.231
16	Rajashekhar V Ballari, Asha Martin and LR Gowda	Detection and Identification of Genetically Modified EE-1 Brinjal ( <i>Solanum melongena</i> ) by single, multiplex PCR and Real Time PCR.	J Sci Food Agriculture	93	340-347	2013	4.125
17	K.R. Vijayakumar, Asha Martin, LR Gowda and V. Prakash	Detection of genetically modified soya and maize: Impact of heat processing.	Food Chemistry	117	514-521	2009	9.231
18	Jaba Debnath, Asha Martin and LR Gowda	A Polymerase Chain Reaction directed to detect wheat glutenin: Implications for gluten free labeling.	Food Research International	42,.	782-787	2009	7.425
19	Rohini M., Asha Martin and LR. Gowda	Effect of traditional Indian household thermal processing operations on the 3-N-oxalyl L-2-3-Diaminopropanoic acid ( $\beta$ -ODAP) in grass pea ( <i>Lathyrus sativus</i> ) as determined by reverse	Journal of Food Composition and Analysis	22	704-708	2009	4.52

		phase high performance liquid chromatography					
20	Thippeswamy R., Asha Martin and L R. Gowda	A reverse phase high performance liquid chromatography method for analyzing of neurotoxin $\beta$ -N-oxalyl-L- $\alpha$ , $\beta$ -diaminopropanoic acid in legume seeds.	Food Chemistry	101	1290-1295	2007	9.231
21	Thippeswamy R, M. Gouda, D.H. Rao, A Martin and L R. Gowda	Determination of theanine in commercial tea by liquid chromatography with fluorescence and diode array ultraviolet detection.	J. Agric. Food Chemistry	54(19)	7014-7019	2006	5.895
22	Asha Martin and E.R Martin	Toxicity evaluation of insecticides to stored grain pest, <i>Sitophilus oryzae</i> (Coleoptera; Curculionidae).	Pollution Research	22 (4):	465-467	2002	
23	Asha John & P.N. Shastri	Study on Food Macromolecules by differential scanning calorimetry: A Critical Appraisal.	J. Food Science & Technology	35	1-14	1998	3.111

#### 10. Books/Reports/Chapters/General articles etc.

S.No	Title	Author's Name	Publisher	Year of Publication
1	Evaluation and validation of commercial lateral flow strip test kits for detection of genetically modified herbicide tolerant soybean and insect resistant maize.	Rajsheshkar V. Ballari, Asha Martin and Lalitha R.Gowda	In Biosafety: Issues and Challenges pp. Editors: Desh Deepak Verma and Manoranjan Hota, Ministry of Environment and Forests, Government of India.	2006
2	Regulation of Genetically Modified and Gene-Edited Foods: An Overview	Asha Martin	In Recent Advances in Food Biotechnology. Editors: Ajay Kumar, Kiran Patruni, Vijai Singh, Springer, Singapore	2022
3	Chemical Adulterants in Food: Recent Challenges	P Vasu, A Martin	In: Hebbar, H.U., Sharma, R., Chaurasiya, R.S., Ranjan, S., Raghavarao, K. (eds)	2023

			Engineering Aspects of Food Quality and Safety. Food Engineering Series. Springer, Cham.	
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### **11. Deputations abroad:**

Presented a paper in the global symposium on GMO detection methods and reference materials, organised by AACC International and Crop life international at Minneapolis, Minnesota, U.S.A., 15-Oct- 16-Oct-2015.

### **12.Reviewer for Journals/ project proposals**

1. Reviewer for research proposal submitted for funding to DSIR under the Technology development and utilization programme for women; SERB, DST; Kerala State Council for Science Technology; CSIR-HRF under the Extra mural research scheme.

3. Reviewer for Food Chemistry (Elsevier), Journal of Photobiology (Elsevier), International Journal of Biological Macromolecules (Elsevier), Food Research International (Elsevier), Analytical Bioanalytical Biochemistry (Springer), Journal of Food Science and Technology(Springer), Journal of Food Composition and analysis (Elsevier), Journal of Nutritional Biochemistry (Elsevier), Molecular Nutrition and Food research (Wiley) and Indian Journal for Experimental Biology (CSIR).

4. Question Paper setter for Kerala Public Service Commission, MSc Food Science and Nutrition, PG diploma in Food Safety and Quality Assurance course conducted by University of Mysore, B Tech Food Technology, Dr. Rajendra Prasad Central Agricultural University,

**Opportunity for Students & Postdocs to work on various streams of biological and multidisciplinary sciences: Molecular biology, biotechnology, cell biology, genomics, proteomics, Food Science & Nutrition and food safety.**

### **Recognised guide in the faculty of**

- 1) Biological Science, AcSIR
- 2) Biochemistry, University of Mysore
- 3) Biotechnology, University of Mysore
- 4) Food Science and Nutrition, University of Mysore

Students excited to explore diverse aspects of modern biology may contact me at ashamartin@cftri.res.in