

**UNIVERSITY OF HORTICULTURAL SCIENCES,
BAGALKOT, KARNATAKA**



**SELF STUDY REPORT FOR THE
Ph.D. IN POSTHARVEST TECHNOLOGY
COH, BENGALURU, 2014-15 to 2018-19**

SUBMITTED TO
**Indian Council of Agricultural Research,
Krishi Bhavan, New Delhi.**

SUBMITTED BY
**University of Horticultural Sciences,
Udyanagiri, Bagalkot – 587 104
Karnataka**

PREFACE

Horticulture - a science of production and management of plants for food, comfort, feed, recreation, and beauty – is potentially vital in raising agricultural production, value addition, farm income and employment in the country. In the context of hazards like climate change, scarcity of water, labour problem etc., Horticulture is contributing incessantly in planning sustainable development goals. After UN General Assembly Summit held on January 1st of 2016, India has adopted 17 SDGs and 169 targets to strengthen health and economy of the nation. Modern era of digitalization has introduced new perspectives like digital horticulture, precision farming, climate smart farming, and nutritional security into the prospectus of horticulture.

Karnataka was the first state in the country to recognize the potential of horticulture sector to bring prosperity to the farmers. To increase the focus on the sector, the state took the lead and created the country's first Horticulture Department and other states followed the example of Karnataka. Presently Karnataka is placed second in horticulture performance in the entire country and the state received 'Best State in Horticulture' award in 2015. Karnataka is the highest exporter of cashew, roses, gherkins, rose onions, spices and condiments. The state has achieved remarkable progress in many fronts from production to storage, packaging and marketing of fruits, vegetables, flowers and plantation crops.

The horticulture sector, which includes a wide variety of crops such as fruits, vegetables, spices, plantation crops, floriculture, medicinal and aromatic plants etc., is recognized as an important sector for potential diversification and value addition for the sustainability of the farmers. It has been recognized that growing horticulture crops is now an ideal option to improve livelihood security; enhance employment generation; attain income and food security; and increase income through value addition.

After its establishment in 2008, University of Horticultural Sciences, Bagalkot established RHREC in a newly transferred land of 125 acres at its campus in Bengaluru in the year 2010 and in the year 2011 Post Graduation Centre was established. Initially the campus was called as Post Graduation Centre but with the commencement of Bachelor's degree programme and two year diploma course in the year 2014, it was re-christened as College of Horticulture.

The college is striving hard to impart quality education in terms of theory, research and extension. The college is gathering laurels through the performance of teachers as well as

the students. The college has an excellent track record in both academics and co-curricular activities.

ICAR, through an accreditation procedure of its own is assessing facilities available and to improve the quality of education rendered by the college. After accreditation, by the financial support of ICAR and State Government, the growth and developmental activities of the college will be improved further to a greater extent. Since the college is due for accreditation by ICAR the present report provides all the necessary information about the college activities performed during last five years.

The University level task force and steering committee is gratefully acknowledged for the help, guidance and suggestions given in preparing the report. The College level steering committee and task force have done a great job in compiling information and bringing out this report to be submitted to Accreditation Board of ICAR. I gratefully thank all those who have helped in preparing this report.



Dean

(Vishnuvardhana)

College of Horticulture, Bengaluru

CONTENTS

Sl. No.	Title	Page No.
6.4.1	Brief History of the Degree Programme	1
6.4.2	Faculty Strength	2
6.4.3	Technical and Supporting Staff	3
6.4.4	Classrooms and Laboratories	3
6.4.5	Conduct of Practical and Hands-on-Training	5
6.4.6	Supervision of students in PG / Ph.D. programmes	9
6.4.7	Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)	9
6.4.8	Student intake and attrition in the programme for last five years	10
6.4.9	ICT Application and Curricula Delivery	11
6.4.12	Certificate	12

6.4.1. BRIEF HISTORY OF THE DEGREE PROGRAMME

The Department of Postharvest Technology was started with the inception of the PG centre in the year 2009 to impart quality education, research and extension in postharvest handling, and processing of horticulture crops. The Masters in post harvest technology was started in the Department in 2010 offering specialization in the field of postharvest technology. With the increasing demand, Ph.D. programme specializing in postharvest technology was also started in the year 2016-17 with an intake of one student and increased to four in 2018-19.

The department has a sophisticated separate two story building housing modern and advanced instruments and seating capacity for four faculty members. The Department is being developed with Rs. 93.29 Lakh funding from RKVY on 'Establishment of Sub -Centre for Postharvest Technology of Horticulture Crops at PG Centre. Infrastructure is being created with the project on 'Infrastructure Creation for M.Sc. Postharvest Technology. (Under the Scheme for Human Resource Development)' of Rs. 75 Lakh from National Mission on Food Processing (NMFP), Department of Agriculture, GOK.

Mandates:

- Teaching graduate, post graduate and doctoral students
- Development of technologies for post harvest loss reduction of various horticultural produce
- Processing of underutilized crops for novel products development viz., jamun, jackfruit, aonla, kokum, custard apple etc
- Physicochemical profiling of underutilized fruit for food value
- Development of nutraceuticals, functional food and health drinks
- Extension to cater the farmers and entrepreneurs in the field of postharvest technology
-

Statistics of Ph. D. degree programme from 2013-14 to 2017-18

Year of Admission	No. of Students Admitted			No. of Students dropped/Cancelled/Discontinued			No. of Students left over			Year of passing		
	B	G	T	B	G	T	B	G	T	B	G	T
2013-14	-	-	-	-	-	-	-	-	-			
2014-15	2	1	3*	0	0	0	0	0	0			Completed
2015-16	1	-	1	0	0	0	0	0	0			Completed

2016-17	0	1	1	-	-	-	-	-	-	-	-	Yet to be
2017-18	2	1	3	-	-	-	-	-	-	-	-	Yet to be
Cumulative Total	5	3	4*+5	-	-	-	-	-	-	-	-	

Note: * Gen. Horticulture, B-Boys, G-Girls, T-Total

Award of UHS, Bagalkot, GOI & BCM authorities' Scholarships

Scholarship Type	M.Sc.(Hort.)				
	2013-14	2014-15	2015-16	2016-17	2017-18
Merit Scholarship	-	1	2	1	2
Students Aid fund	-	-	-	-	-
Category I EBL Scholarship	-	-	-	-	-
SC/ST Fellow Ship	-	-	-	-	-
GOI Scholarship (SC+ST)	-	-	-	-	-
Vidyasiri	-	-	-	-	-
TOTAL	-	01	02	01	02

6.4.2. FACULTY STRENGTH

Faculty Strength (Cadre-wise)

Designation / Cadre	2014			2015			2016			2017			2018		
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
Professor	1	1	0	1	1	0	1	0	1	1	0	1	1	0	1
Associate Professor	1	0	1	1	0	1	1	1	0	1	1	0	1	1	0
Assistant Professor	2	2	0	2	2	0	2	3	+1	2	3	+1	2	3	+1
Total	4	3	1	4	3	1	4	4	0	4	4	0	4	4	0
Contractual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

S-Sanctioned, F-Filled, V-Vacant

Faculty Strength

Department	Sanctioned Faculty			Faculty in place			Vacant position			Recommended by ICAR			Deviation from ICAR recommendation		
	Pro f.	Aso c. Prof	Ass t. Prof	Pro f.	Aso c. Prof	Ass t. Prof	Pro f.	Aso c. Prof	Ass t. Prof	Pro f.	Aso c. Prof	Ass t. Prof	Pro f.	Aso c. Prof	Ass t. Prof
Postharvest Techn.	1	1	2	0	1	3	1	0	0	1	1	2	1	0	+1
Total	1	1	2	0	1	3	1	0	0	1	1	2	1	0	+1
			4			4			0			4	-1		+1

6.4.3. TECHNICAL AND SUPPORTING STAFF

Sl No	Post	2018				
		Sanctioned	Filled	Vacant	Recommended by UHS	Diversion from recommendation (Sanctioned)
1	Lab. Assistant	1	1	-	1	-
2	Messenger	1	1	-	1	-
3	Lab Labour	-	-	-	-	-
	Total	2	2	1	3	-

*Are allotted to department on Contractual basis.

6.4.4. CLASSROOMS AND LABORATORIES:**Classrooms**

Sl. No.	Class room No.	Area (sq.ft)	Seating capacity	Other facilities (LCD, Projectors, Computers, Smart board etc.)
1.	PHT	150	25	LCD, Projector, Computers

Laboratory: The Post Harvest technology department has 2 laboratories to carry out UG/ PG practical as well as PG research. All the laboratories are well equipped with all facilities to carry out research

Sl. No.	Name of the laboratory	Area (sq.ft)	Seating capacity
1	Quality control Lab	180	30
2	Processing and analytical lab	250	20
3.	Wet processing laboratory	300	NA

Major equipments

Sl. No.	Name of the equipment	Quantity
1.	Vacuum frying machine	1
2.	Twin screw extruder	1
3.	Mechanical press	1
4.	Food texture analyzer	1
5.	Modified atmosphere package unit	1
6.	Calorimeter for colour measurement	1
7.	Fiber Analysis system	1
8.	Non-cooling table top microprocessor controlled Centrifuge	1
9.	Digital Stereoscopic Zoom microscope	1
10.	Vacuum oven	1

Sl. No.	Name of the equipment	Quantity
11.	Floor model tray drier	1
12.	Quartz double distillation Unit - RO system with 5 stage filter for boiler feed	1
13.	L type lab table-Size:13'x3' & 5'x 3' height 2.6'	1
14.	Vertical Deep freezer	1
15.	Remission photometer	1
16.	Vertical Autoclave	1
17.	Electronic balance (Sartorius)	1
18.	Bottle Cooler	1
19.	Air purifier	1
20.	Auto Titration unit	1
21.	Micro fine grinder	1
22.	HPLC	1
23.	Lab Freeze Dryer	1
24.	Walk in cold room unit (8 x 8 x8 feet)	1
25.	Power generator	1
26.	Laboratory scale Spray dryer	1
27.	Cooling Incubator	1
28.	Computer (2) and Laptop(1)	1
29.	E-reader (3 no- 42728)+ Laptop Dell (55915)	1
30.	Amla grater	1
31.	Laminar air flow – Vertical(4x2x2)	1
32.	Carbonation Unit	1
33.	Multimedia projector with mounting kit & screen	1
34.	Colloidal mill grinder	1
35.	Electronic weighing machine (2 no)	1
36.	Sonicator-3liter	1
37.	Fruit pulper	1
38.	Vacuum packing (portable) unit	1
39.	Universal Vegetable cutting machine	1
40.	Dehydrator	1
41.	Shaker water bath	1
42.	Nikon DSLR Camara	1
43.	Lab filtration Unit	1
44.	Horizontal freezer 280 Liter-240C	1
45.	Box type juicer	1
46.	High speed homogenizer	1
47.	Carrot juicer	1
48.	Hot air Oven	1
49.	Portable Ethylene gas analyzer (Model-601)	1
50.	Desiccators – 250 mm	1

Sl. No.	Name of the equipment	Quantity
51.	Digital wine Refractometer	1
52.	pH Meter.	1
53.	Digit Sodium Chloride Refractometer -PAL-03S	1
54.	Digital magnetic stirrer hot plate	1
55.	Ultrasonic Humidifier	1

Average Number of Students in Theory and Practical Classes

Postgraduate students are less in number and are grouped into one theory batch and one practical batch.

Sl. No.	Name of the department	Theory Batch	Practical Batch
1.	Post Harvest Technology	Full strength	Full strength

6.4.5 CONDUCT OF PRACTICAL AND HANDS-ON-TRAINING

Course curriculum for master degree programme has been designed with special emphasis on specialized/ novel horticultural techniques. Further as a part of their course curriculum, the PG students are taken to exposure visits to different research institutes, progressive farmers' field and private processing industries. A study tour of seven days to different research institutes and commercial hubs specifically engaged in particular research field is organized by department which is contributing for better understanding of the subject and to enrich their practical knowledge.

Practical Credit details

Sl.No.	Discipline	Number of credits for practical	Per cent of time spent	
			In laboratory	In field*
1	Post-harvest management	3	40	60
2.	Processing and value addition	3	70	30
3	Quality control and biochemistry	3	80	20

Glimpses of Practicals and exposure visits

Sl.No.	Department	Hands on Training and Methodology
1.	Post-Harvest Technology	<ul style="list-style-type: none"> Processing of fruit and vegetables: Hands-on-trainings were imported in the preparation/production of jam, jelly, ketchup, fermented beverages, unfermented beverages, carbonation, drying and dehydration, candies, toffees, fruit bars, pickles etc. Hands-on-trainings were conducted for Masters degree students

Sl.No.	Department	Hands on Training and Methodology
		<p>from the traditional universities.</p> <ul style="list-style-type: none"> • The Department has conducted 6 hands-on-trainings where students involve completely from preparation, processing and package of the processed products. • For Fresh produce handling, students are involved in procurements and handling of large quantities of fresh produce. • Hands on trainings were conducted for self-help group women on preparation of fruit jam, squash, RTS, tomato ketchup, lime and mango pickle, etc



Freeze dryer Texture Analyser



HPLC Facilities being utilised by students & staff



Mechanical press



Twin-screw extruder



Vacuum frying machine



Vacuum retort



Facilities created being utilised by students and staff of the college.



Various industrial visits for students



National and International Visitor for the Facilities

6.4.6. SUPERVISION OF STUDENTS IN PHD PROGRAMME

Every student shall have Advisory Committee with a Major Advisor and at least four members among whom two members shall be from outside the major field of specialization. Programme of Research proposed by the Advisory Committee and approved by the Dean (Post Graduate Studies) will be carried out by the student under the supervision of Advisory Committee. Research work was carried out by students on the major crops which are grown in this area

Sl. No.	Year	No. of PG recognized teachers		Student to teacher ratio	
		COH-Bengaluru	Ph.D	Total (PG students)	
1	2013-14	03	00	00	-
2	2014-15	03	03	03	1:1
3	2015-16	04	01	01	4:1
4	2016-17	04	01	01	4:1
5	2017-18	04	03	03	1.33:1

Though there is a shortage of the faculty, the department is been managed well with the collaboration of scientists of Division of Postharvest technology, Indian Institute of Horticulture Research, Hesarghatta, Bengaluru and other faculty from Department of Microbiology, Biochemistry, Pathology for offering related courses and guiding PG students.

6.4.7. FEEDBACK OF STAKEHOLDERS (STUDENTS, PARENTS, INDUSTRIES, EMPLOYERS, FARMERS ETC.)

Sl. No.	Feed back	Action taken
2013-14		
Students		
1.	Teaching is good, All the faculties supports the students in conducting research. Though the number of faculties are less it is well managed with PG recognised teachers from IIHR. Facilities should improve in terms of	Efforts are made to improve facilities time-to-time. Many new and advance equipments are being procured

Sl. No.	Feed back	Action taken
	more equipments	
Entrepreneur/Farmers		
1.	Faculties gave knowledge on processing aspect of tomato based products, FSSA Licensing, etc was useful	Many entrepreneurs visit the department to know new technologies
2014-15		
Students		
2.	<ul style="list-style-type: none"> Teaching is good. Research guides are allotted based on the interest of the students and merit. Good exposure visits we had to have more understanding 	Research guides are allotted based on the interest of the students
Entrepreneur	<ul style="list-style-type: none"> Got good knowledge on ripening of mango and preparation of mango processed products. 	Many small scale entrepreneurs visit the department seeking information on various aspects
2015-16		
Students		
3	Faculties are well know ledged for teaching and research formulation. I received a good knowledge about the postharvest technology and equipped to take-up jobs in private and to become a entrepreneur	Students are given freedom to choose the research topics which are relevant to the present situations faced by the farmers. Students are made to visit industries and institutions
2016-17		
Students		
	Exposure visits were good. Teaching is also good. Good research facilities in terms of new equipments	Many exposure visits were conducted. Good facilities to carry out the research were also created.
Entrepreneurs		
	Got hands-on experience on preparation of pickles from lemons which is helpful in starting home scale industry. I also got knowledge about FSSA and food safety	Efforts were made to import hands-on training to the interested people who wants to become entrepreneurs.
2017-18		
Entrepreneurs		
	I received knowledge on jackfruit processing and value addition which will help to market and earn income	Many interested people visit the department asking for specific knowledge.

6.4.8. STUDENT INTAKE AND ATTRITION

Year	Sanctioned seats	Actual intake	Attrition	% Attrition
	Ph.D.	Ph.D.		
2014-15	General Hort.	03	0	0
2015-16	1	01	0	0
2016-17	1	1	0	0
2017-18	3	3	0	0
2018-19	5	5	0	0

6.4.9. ICT APPLICATION AND CURRICULA DELIVERY:


The department uses various ICT methods for teaching PG and Ph.D. students. The department has wi-fi and LAN connection. The classroom is fitted with LCD projector and television where videos, pictures related to the syllabus, recent developments will be played to enrich the student's knowledge.

6.4.12.

CERTIFICATE

I the Dean, College of Horticulture, Bengaluru hereby certify that the information contained in the Section 6.4.1 to 6.4.9 are furnished as per the records available in the college and degree awarding university.

Date: March, 2019



DEAN
College of Horticulture
UHS Campus, GKVK Post
Bengaluru-560065