

**CENTRE OF ADVANCED  
STUDIES**

**SIXTEENTH ANNUAL REPORT  
(2010-2011)**

*Dr. (Mrs.) P. Yasodha Devi*

**DIRECTOR**

**DEPARTMENT OF FOODS & NUTRITION  
POST GRADUATE & RESEARCH CENTRE  
ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY  
RAJENDRANAGAR: HYDERABAD – 500 030**

**SIXTEENTH ANNUAL REPORT OF  
CENTRE OF ADVANCED FACULTY TRAINING  
FOR THE YEAR 2010-2011 (April 2010 – March 2011)**

1. Project Title : Centre of Advanced Faculty Training.
2. Sanction No. : Proc. No. 37735/H.Sc/A1/94,  
dt. 22-9-95 of APAU
3. Report Period : April 2010 – March 2011.
- Report No. : XVI
4. Date of Start : 02-11-1995
5. A) Name of Institute/Station : Acharya N.G. Ranga Agricultural University  
Rajendranagar, Hyderabad.
- B) Division/Department/  
Section : Centre of Advanced Faculty Training  
Post Graduate & Research Centre,  
Department of Foods & Nutrition,  
Rajendranagar, Hyderabad – 500 030.
6. Technical Programme
- a) Technical Programme as approved for the scheme } Appendix – I  
enclosed
- b) Technical Programme for the next plan period : Submitted for Approval  
in the year 2010-11  
(Appendix II enclosed)
7. Technical Personnel employed (list of vacancies, if any)

Sanctioned Posts by ICAR: Post particulars	Posts filled	Posts to be filled
1. Steno-cum-Typist	<b>Senior Assistant against the post of U.D. Stenographer</b> transferred to Department of Foods & Nutrition, PG & Research Centre, Rajendranagar.	One
2. AVA Operator	<b>Projector Operator</b> transferred to AI & CC and ANGRAU Press, Rajendranagar .	One

## Technical staff employed:

Name with Designation	Date of Joining	Date of leaving
Smt. K. Shakuntala, Senior Assistant (against U.D. Steno)	Vacant	1-11-2008
Sri. N. Yedukondalu, Projector Operator	Vacant	19-9-2009

8. Total outlay : **Rs. (99,13,972-70)**

- Rs. 4,56,219=20 (1995-96)
- Rs. 9,61,192=20 (1996-97)
- Rs. 12,01,649=20 (1997-98)
- Rs. 9,10,103=40 (1998-99)
- Rs. 4,86,691=75 (1999-2000)
- Rs. 7,03,771=30 (2000-2001)
- Rs. 5,28,023=90 (2001-2002)
- Rs. 5,14,463=75 (2002-2003)
- Rs. 6,32,489=00 (2003-2004)
- Rs. 4,75,996=00 (2004-2005)
- Rs. 6,45,016=00 (2005-2006)
- Rs. 6,79,644=00 (2006-2007)
- Rs. 5,06,987=00 (2007-2008)
- Rs. 7,77,737=00 (2008-2009)
- Rs. 4,33,989=00 (2009-2010)

## Budget & Expenditure particulars for 2010-11:

Sl. No.	Sub head	Budget Sanctioned		Expenditure		Balance	
		Rs.	Ps.	Rs.	Ps.	Rs.	Ps.
1.	Training Programme	1,71,000-00		1,71,000-00			0
2.	TA / DA	30,000-00		0		30,000-00	
3.	Books	30,000-00		30,000-00			0
4.	Recurring Contingencies	1,50,000-00		1,50,000-00			0
5.	Staff salaries	4,00,000-00		82,989-00		3,17,011-00	
<b>Total Rs.</b>		<b>7,81,000-00</b>		<b>4,33,989-00</b>		<b>3,47,011-00</b>	

9. Total amount spent : Rs. 4,33,989-00  
in previous year (2009-10)

10. Total amount sanctioned/spent during the year under report

a) Sanctioned : Rs. 7,81,000-00

b) Spent : Rs. 4,33,989-00

11. Total No. of months : 12 months (From April 2010 – March 2011)  
during the year.

12. Summary : Enclosed.

Signature :

Name : Dr. P. YASODA DEVI

Designation : PROFESSOR-CUM-DIRECTOR.

## **REPORT ON ACTIVITIES CARRIED OUT UNDER CENTRE OF ADVANCED STUDIES 2010-11**

### **I. INFRASTRUCTURE FACILITIES**

#### **1. Staff Recruitment**

The posts of Steno-cum-typist and Projector Operator have been filled up and the two posts are being continued under the ICAR plan during the IX Five Year Plan and the X Five Year Plan vide F. No. 1(18)/95/CAS/HRD-II, dt. 17-09-1999 and 02-07-2001 of the ICAR.

#### **2. Civil Works**

The Centre of Advanced Studies in Foods & Nutrition presently has the following facilities.

**Seminar hall/Lecture hall  
Conference hall  
Computer room  
Library room  
Office room  
Class rooms  
Store room  
Equipment room/Laboratory  
Museum Hall  
Educational Technology Cell (ETC)**

**Books Purchased:**

- ♣ Introduction to Chemical Analysis of Foods
- ♣ Food Analysis : Theory and Practice
- ♣ HB of Analysis & Quality Control for fruit & Veg.,
- ♣ Undergraduate Instrumental Analysis
- ♣ Technology of Food preservation 4/ed
- ♣ Food processing Technology: Principles & Practice
- ♣ Introductory Practical Biochemistry
- ♣ Encyclopedia of Applied Nutrition & Health
- ♣ Food & Nutrition Education
- ♣ Nutrition Science
- ♣ Food & Health
- ♣ Nutrition Eating for Good Health
- ♣ Child Nutrition
- ♣ Laboratory Manual of Dairy Analysis
- ♣ Food Analysis
- ♣ Fundamentals of Food Processing Engineering
- ♣ Food Microbiology and Food Processing
- ♣ Food Science & Technology
- ♣ Mechanism and Theory in Food Chemistry
- ♣ The Vitamins Fundamentals aspects in Nut. 3/ed

## IV. ACADEMIC ACTIVITIES

### OBJECTIVE I

To serve as a National resource and training centre for faculty in the field of Foods and Nutrition by conducting summer institutes, short courses and training programmes.

The Centre of Advanced Studies, Department of Foods and Nutrition, Faculty of Home Science, Acharya N. G. Ranga Agricultural University, Hyderabad has been functioning as a resource and training centre for the faculty in the field of Foods and Nutrition for State Agricultural Universities since 1995. Organizing advanced training programmes (21 days duration) is one of the major functions of this centre. Till today 22 training programmes on different aspects of Food and Nutrition have been conducted. During the reporting year i.e. 2010 – 11, the 22<sup>nd</sup> training programme entitled **“Newer Technologies in food processing from production to consumption”** during the period of 19/11/10 to 9/12/10, with Course Director Dr. P. Yasoda Devi and Course Coordinators, Dr. V. Vijayalakshmi & Dr. K. Aparna was conducted at Centre of Advanced Faculty Training in Home Science, PGRC, Rajendranagar. Following is the training report.

**Report of the Training Program**  
**On**  
**NEWER TECHNOLOGIES IN FOOD**  
**PROCESSING FROM**  
**PRODUCTION TO CONSUMPTION**  
**19<sup>th</sup> November to 9<sup>th</sup> December 2010**



**CENTRE OF ADVANCED FACULTY TRAINING  
IN FOODS & NUTRITION  
POST GRADUATE & RESEARCH CENTRE  
ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY  
RAJENDRANAGAR : HYDERABAD – 500 030.**



## Report of the 22<sup>nd</sup> Training Programme

# Newer technologies in food processing from production to consumption

19<sup>th</sup> November to 9<sup>th</sup> December 2010



**Dr.P.Yasoda devi**  
Programme Director, CAFT & Course Director

**Dr. V. Vijayalakshmi**  
Course Coordinator

**Dr. K. Aparna**  
Course Coordinator



CENTRE OF ADVANCED FACULTY TRAINING  
IN FOODS & NUTRITION  
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RAJENDRANAGAR : HYDERABAD – 500 030.

## **Acknowledgement**

The course director and the course Coordinators wish to thank the ICAR for providing the financial support for conducting training programme.

Sincere thanks are due to the authorities of ANGRAU, Dean faculty of Home Science for providing administrative support & timely release of funds for conducting the programme.

Our special thanks to all the resource persons from the Agriculture, Horticulture, Veterinary and Home Science faculties from APHU, SVVU & Acharya N.G Ranga Agricultural University for their valuable contributions.

We express our heartfelt thanks to Dr. A. Satyanarayana, Director CFTRI and Dr. T. S Jyothirmai, Scientist, CFTRI, Dr. K.V. V. Prasad Rao, Managing Director, V.H. Agro Foods Pvt Ltd, Mr. Karna, Indian Institute of Packaging, Dr. S. D. Mazumdar and Mr. A. Poshadri from ICRISAT, Mr. Sultan Masqati, Managing Director, Dr. Seshikaran, Director NIN and other scientists for all there cooperation & sharing their wide experience with participants and also keen interest in showing food processing in their respective institutions.

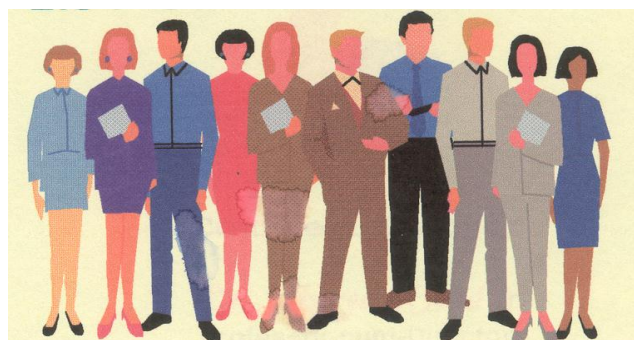
Our special thanks to the teaching & non-teaching staff of PG & Research Center and Department of Foods & Nutrition, College of Home Science, Saifabad for their cooperation in successful conduction of the training programme.

**Course Director**  
**Dr. Yasoda Devi,**  
**Course Coordinators**  
**Dr. V. Vijayalakshmi**  
**Dr. K. Aparna**

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## LIST OF PARTICIPANTS



Sl. No.	Name & Designation	Address & Telephone
1	<b>Dr. Manas Ranjan Sahoo</b>	<b>Dr. Manas Ranjan Sahoo,</b> SMS Horticulture, Farm Science Centre (Krishi Vignan Kendra), Orissa University of Agriculture & Technology, Balasore, Orissa,
2	<b>Mrs. Mamatha H.S</b>	<b>Mrs. Mamatha H.S,</b> Subject Matter Specialist (H.Sc), Krishi Vignan Kendra, Konehalli, Tiptur, Karnataka
3	<b>Mr. Shiva Shankar. M</b>	<b>Mr. SHIVA SHANKAR. M,</b> SMS Home Science, Krishi Vignan Kendra, University of Agricultural Sciences, <b>Kandali,</b> <b>HASSAN, Karnataka</b>
4	<b>Dr. Ramjee Gupta</b>	<b>Dr. Ramjee Gupta,</b> Assistant Professor, A.H. & Dairying, Department of A.H. & Dairying, C.S. Azad University of Agri.Tech , <b>Kanpur, Uttar</b> <b>Pradesh</b>
5	<b>Dr. Rajeev Kumar Pal</b>	<b>Dr. Rajeev Kumar Pal ,</b> Assistant Professor, Department of Entomology, Chandra Shekhar Azad University of Agriculture & Technology , <b>Kanpur</b>
6	<b>Dr. Ram Asrey Katiyar</b>	<b>Dr. Ram Asrey Katiyar,</b> Department of Seed Science & Technology, Chandra Shekhar Azad University of Agriculture & Technology <b>Kanpur, Uttar</b> <b>Pradesh</b>
7	<b>Dr. N. Karthikeyan</b>	<b>Dr. N. Karthikeyan,</b> Assistant Professor, Veterinary University training and Research centre, Veterinary Hospital

		Campus (opp to old bus stand), Kamarajar road, <b>Tirupur</b> , <b>District – 641604</b> ,Tamilnadu.
<b>8</b>	<b>Dr.V. Chandrasekaran</b>	Veterinary University Training and Research Centre, Tamilnadu Veterinary and Animal Sciences University, Panduthakaranpudur, <b>KARUR-639 006,TAMILNADU</b>
<b>9</b>	<b>Dr. R. Yasothai, M.V.Sc.</b>	Assistant Professor, Veterinary University Training and Research Centre (TANUVAS), Veerappanchatram, <b>Erode-638 004 , Tamilnadu</b>
<b>10</b>	<b>M. Satti Raju</b>	<b>M. Satti Raju,</b> Horticultural Research Station, <b>Pandirimamidi,</b> <b>Rampachodavaram East</b> <b>Godavari (dist)</b>
<b>11</b>	<b>Dr. V. Sudha Vani</b>	Assistant Professor (Hort), College of Horticulture, <b>Venkataramannagudem,</b> <b>Andhra Pradesh Horticultural</b> <b>University (APHU)</b>
<b>12</b>	<b>V. Rajendra Prasad</b>	<b>V. Rajendra Prasad,</b> Scientist (Ag.Econ), E.C.F. Scheme, Regional Agricultural Research Station, <b>Warangal-506007, Andhra Pradesh</b>
<b>13</b>	<b>Dr.O. Sharada</b>	<b>Dr. O. Sarada</b> Subject Matter Specialist (Agril. Extension) Krishi Vignan Kendra, ANGRAU Opp. Civil Supply godowns UNDI – 534 199 West Godavari Dist
<b>14</b>	<b>Ms. T. Supraja</b>	<b>Ms. T. Supraja</b> Assitant Professor Dept of Foods & Nutrition College of Home Science ANGRAU, Hyderabad
<b>15</b>	<b>V. Muralidhar Reddy</b>	<b>V. Muralidhar Reddy,</b> Matha Socio Educational Society, Kurnool

## HOST FACULTY



<b>Department of Foods &amp; Nutrition, ANGRAU</b>	
Dr. P. Yasoda Devi	Professor & Head & Course Director
Dr.V. Vijayalakshmi	Professor & Course coordinator
Dr. K. Aparna	Assistant Professor & Course Coordinator
Dr. Anurag Chaturvedi	Professor & Associate Dean
Dr.K.Uma Maheswari	Professor
Dr. N. Lakshmi Devi	Professor
Dr. S. Shobha	Professor
Dr. K. Uma Devi	Professor
Dr. T.V. Hymavathi	Associate professor
Ms.T. Supraja	Assistant Professor
Dr. S. Sucharitha Devi	Assistant Professor

## GUEST FACULTY



<b>S.V. Veterinary University (SVVU)</b>	
Dr.N. Krishniah	Professor , Dept of Public health
Dr.K.Kondal Reddy	Professor, Dept of Live stock production
Dr. Dhana Lakshmi	Professor, Dept of Microbiology
Dr.Naga Malleswari	Assistant Professor, RUSKA Labs
<b>Agricultural Faculty,ANGRAU</b>	
Dr.S. Sumathi	Professor and Head , Dept of Biochemistry
Dr.K. Manorama	Professor, Department of Biotechnology
Dr. Durga Rani	Associate Professor
Dr. Radhika	Assistant Professor
<b>Andhra Pradesh Horticultural University (APHU)</b>	
Dr.Dilip Babu. J	Sr. Scientist & Head, Vegetables Section, APHU
<b>Retired staff from ANGRAU / DOR/ CFTRI</b>	
Dr. Kamini Devi	Professor (Retd), ANGRAU
Dr.Gopala Rao	Professor (Retd), Agri'l Engg, ANGRAU
Dr. Nagaraj	Professor (DOR - Retd)
Mr. Srinivasan	CFTRI (Retd), Hyderabad

<b>National Institute of Nutrition (NIN)</b>	
Dr.B.Sasi Karen	Director
Dr.V.Sudershan Rao	Scientist `C`, Food and Drug Toxicology
<b>Central Food Technological Research Institute (CFTRI),Hyderabad</b>	
Dr. T. Jyothirmayi	Sr. Scientist, Regional Centre of CFTRI Habsiguda, Hyderabad
<b>ICRISAT</b>	
A. Poshadri	Scientist, Nutriplus Knowledge Centre
Dr Saikat Datta Mazumdar	Technical Director, NutriPlus Knowledge Centre
<b>Indian Institute of Packaging, Hyderabad</b>	
Dr.Karna	Deputy Director, Indian Institute of Packaging
<b>Canara Bank</b>	
Mr. Srikant Mahapatra	Canara Bank, Hyderabad
Mr. Kiran Kumar	Manager, Canara Bank
<b>Industries in Hyderabad</b>	
K.V.V.Prasada Rao	Managing Director, V H Agro Foods Pvt. Ltd
Sultan Bin Masqati	Masqati Dairy, Hyderabad



## **Report on the Course content & execution of the Programme**

As the economies of many countries are increasing, the consumers have started using processed foods. As a matter of fact global food processing and packaging business has reached to multi trillion dollars. Updating recent advances in food processing technologies from production to consumption is not just to meet the food demands but to adopt sophisticated automation, control and monitoring methods and techniques.

India is the world's second largest producer of foods and has the potential of becoming the largest and is the fastest growing national market worldwide. Paradoxically the food security situation is not very bright because of huge post harvest losses, inadequate food distribution systems in the domestic markets, improper food safety management systems and expensive processing technologies from production level to consumption. The challenge to catch up with the growing population of one billion consumers and the participation in globalisation will lead to major investments in the food processing industry. Up gradation of technology, therefore, becomes essential.

Though there is tremendous potential in the food processing industry, it needs strong and dependable chain facilities to support the increasing production of various perishable products like fruits, vegetables, milk, meat products etc. Any attempts to project emerging trends during the new millennium must be viewed in the backdrop of anticipated changes in the global trade of food commodities under the WTO regime. Further, a number of major food processing technologies will influence and govern the future trends in new products development so far as global food is concerned.

Reflecting on current trends, the present training focused on some of the most recent applications in food processing technologies like high-pressure technologies, modern thermal and non-thermal operations, microencapsulation, nanotechnology etc to prevent the occurrence of food-borne pathogens, extend shelf-life of foods, and improve the safety, quality, and nutritional value of various processed food products.

The objectives of the Training:

1. To create awareness and a vision for participants towards food processing technologies for developing a strong and vibrant food processing sector.
2. To create awareness on scientific food supply of processed foods and distribution system both in wholesale and retail markets.
3. To get a holistic picture of the emerging trends in food processing technologies from production to consumption.

### **Profile of the participants**

There were total 15 participants from different state Agricultural universities and ICAR institutes. Three were from Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, one from Orissa University of Agriculture & Technology, two from University of Agricultural Sciences, Bangalore, three from Tamilnadu Veterinary and Animal Sciences University, three from AP Horticulture University, two from Acharya N G Ranga Agricultural University and one from non ICAR institute, Matha Socio Economic Educational Society.

### **Resource persons**

34 subject experts from reputed institutes like APHU, SVVU, ICRISAT, NIN, CFTRI, Indian Institute of Packaging, Canara Bank, DOR were invited, apart from the host faculty. The participants were taken for visits to places like VH Agro foods, CFTRI regional centre, Ruska labs (SVVU), QC labs (ANGRAU), Indian Institute of packaging, Nutri plus knowledge centre and Agri Science Park at ICRISAT, National Institute of Nutrition and Masqati Dairy, for getting first hand experience on various processing technologies.

### **Execution of the Programme**

The training programme commenced on 19<sup>th</sup> of November, 2010 with registration of participants which was followed by introduction and interactive session .Informal and ice breaking sessions of this sort helps in building up of rapport and enables fruitful involvement throughout the training period. The course Director & coordinators oriented the participants about the CAFT, training

programme schedule, objectives, topics included and about the resource persons. The participants initial knowledge was assessed using a structured questionnaire. (Appendix I).

### **Lecture delivered by guest faculty from Sri Venkateswara Veterinary University, Hyderabad**



### **Lecture delivered by guest faculty at RUSKA labs, Hyderabad**



**Lecture delivered by guest faculty from Andhra Pradesh Horticulture University, Hyderabad**



**Participants keenly involved in the guest lectures during the training**



The regular class room sessions were scheduled from 9.30 am to 3.30 pm, while field visits were scheduled from 8 am to 6 pm. The methodologies for technical sessions were mainly lecture cum discussions. Care was taken to ensure active the participation of every trainee, during sessions.

The training was initiated with introductory topics like overview of newer techniques in food processing, elements of food processing, consumer attitudes towards different food processing techniques – their influence and benefits, Present status & future of food processing in India.

The preliminary sessions included topics like various processing technologies – Nanotechnology, Biotechnology, Irradiation, Extrusion technology, Thermal food processing technology, High intensity and high pressure electric field pulse technology, Membrane technology, Micro encapsulation, Hurdle technology, super critical fluid extraction, enzyme technology, pre and pro biotics, intermediate moisture and high moisture foods technology.

The subsequent sessions were focused on various topics like Newer technologies in processing of fruits and vegetables, oil seeds, dairy foods, Millets, cereals and pulses for food uses.

After making the participants understand the newer food processing technologies topics like Safety and sanitation in food processing, role of food processing technologies for nutrition security, determination of micro organisms and their products in foods, evaluation of wholesomeness in newer methods of food processing were dealt.

In the last session, focus was given to topics like importance of IPR in food processing, importance of Supply chain management in food processing- Govt. initiatives and regulations, Newer technologies in food packaging from production to consumption & financing food industry, which was very useful to put the above aspects into practice.



## **VISIT TO CFTRI, Regional centre, Hyderabad**



**Dr.Jyothirmai showing various food processing equipment to the participants**

## Visit to VH AGRO FOODS Pvt. Ltd



**Mr. K.V.V.Prasada Rao, Managing Director (VH Agro Foods) showing the processing of baby corn and processing of instant snack foods from baby corn  
Participants seeing the individual quick freezing equipment**





**Participants are explained about the packaging technology for instant snack foods**





### **Trainees at RUSKA Labs**



### **Trainees at ICRISAT, Patancheru**





**Mr.Poshadri, Scientist explaining about sweet sorghum processing at Nutriplus Knowledge centre, ICRISAT**



**Trainees at Masqati Dairy**



**Demonstration on processing of flavoured milk at Masqati Dairy**



**Trainees attending guest lecture at National Institute of Nutrition**





## **Practicals & Visits**

1. The participants were taken to the campus visit i.e University Central Library, Computer centre, Agricultural college, Department of Foods and Nutrition and All India Coordinated project on Home Science, ANGRAU Museum etc.on 20<sup>th</sup> November 2010.
2. A Tour to Quality Control (QC) lab was arranged for the participants where they saw various labs like Microbiology lab, Nutrient analytical lab, HPLC and GC lab etc. Various equipments required for food analysis was also shown to them in QC lab. They were taken to food irradiation unit and a demo on irradiation of potatoes was given on 24<sup>th</sup> November 2010.
3. A tour of pilot plant in CFTRI regional centre was arranged for the participants to have an exposure on canning units, colour extractions, boiler units, cereal and pulse milling technologies etc. on 25<sup>th</sup> November 2010.
4. A visit was arranged to VH Agro foods Pvt Ltd at Uppal Industrial area. Participants were given a demonstration on individual quick freezing (IQF) technology. They were shown the processing of instant snack foods like vegetable nuggets, instant samosa, instant kababs etc. and various processing equipment to manufacture the same, on 25<sup>th</sup> November 2010.
5. A visit to Hitex- Food processing exhibition was arranged on 26<sup>th</sup> November 2010 the participants had an opportunity to see various food processing equipments related to fruit and vegetable processing, cereal and pulse processing, poultry and meat processing equipments. They also collected information about the companies manufacturing them, cost and instrumentation details, which could be of great help to them to establish lab scale processing units in their respective institutions.
- 6. RUSKA Labs:** Practical demonstrations were arranged for the participants to have exposure on electron microscopy, high sensitive microscopy for study of food matrices at RUSKA Labs, SVVU, Rajendranagar. A live demonstration on study of cross section of extruded snack was shown, on 29<sup>th</sup> November 2010.
7. A visit to Indian institute of packaging (IIP) was arranged to have an overview of various packaging technologies for packing raw materials to processed food materials on 30<sup>th</sup> November, 2010. The participants saw different types of packaging materials, different packaging machinery suitable for various food products displayed at the institute. A lecture was also arranged on the topic “Newer technologies in food packaging from production to consumption” for the benefit of participants.
8. A visit to ICRISAT was arranged on 1<sup>st</sup> December, 2010, where the participants had an exposure to AGRI Science Park, Food Industry Incubation Centre, Nutri Plus Knowledge Centre and various crop field.

9. A visit to Masqati dairy was arranged on 2<sup>nd</sup> December 2010. The participants have seen, milk pasteurization, sterilization, packaging storage and transportation. They also saw processing technology, equipments of various milk products and by products like Ice cream, flavoured milk, Butter milk, Lassi, Ghee and Paneer.

10. A visit to National Institute of Nutrition (NIN) was arranged and the participants were taken around the laboratories of NIN on 6<sup>th</sup> December, 2010. Two lectures were also arranged at NIN. They were taken to NIN library, where the participant collected various reference materials related to their specializations.

### **Assessment of participant's knowledge on program content**

In order to assess the impact of the training program, pre and post evaluation of the participant's knowledge was conducted using a structured questionnaire.(Annexure I) The evaluation indicated that there was an increase in their knowledge by 80%( Table I). During the program, all the participants actively interacted with speakers and participated in discussions.

**Table 1. Scores of the participants before and after training (n=10)**

<b>Scores</b>	<b>&lt; 20</b>	<b>20-40</b>	<b>40-80</b>	<b>.&gt;80</b>
Before	50%	50%	-	-
After	-	-	25%	75%

### **Course evaluation by the participants**

The training input was evaluated by the participants through the structured proforma ( Appendix III). Each topic was assessed in terms of its

- Relevancy for application
- Adequacy of the information
- Appropriateness of Audio visual aids used
- Deliverance of content

In addition to this, participants were asked to give overall rating of each lecture as fair, good or excellent, Majority (95%) of the sessions were ranked to be relevant for application, content coverage and delivery of content. 5% rated it fair 54% good and 41% excellent. Group discussions and interactions at each session were repeated to be satisfactory and fruitful.

## **VALEDEICTORY FUNCTION**

The valedictory function of the course was held on 9<sup>th</sup> December, 2010. Sri. KVS Narsimha Rao, Business Head (Fruit & Vegetable) Reliance Retail Ltd., Hyderabad and Dr. P. Yasoda Devi, Professor & Head , director of CAFT were the guests of honour

Dr. Anurag Chaturvedi , Associate Dean, College of Home Science presided over the program. After the formal invocation, Dr. P. Yasoda Devi, Course Director and Director, CAFT presented a report on the activities of CAFT. This was followed by the training program presentation by Dr. V. Vijayalakshmi, Professor & course coordinator.

Participants gave feed back on the training programme. This was followed by the distribution of certificates and course manuals by Sri . KVS Narsimha Rao , Chief Guest of the programme.

Dr. (Mrs) K. Aparna, Assistant Professor course coordinator proposed vote of thanks, which was followed by lunch.

## Valedictory function



**Dr. V.Vijaya Lakshmi, Course coordinator presenting the training report in the valedictory session**



**Chief guest Mr.Narasimha Rao, Reiance Retail Ltd. sharing his experiences with the participants**



## Appendix I

### Training Programme of CAFT in Home Science on “NEWER TECHNOLOGIES IN FOOD PROCESSING FROM PRODUCTION TO CONSUMPTION”

19<sup>th</sup> November to 9<sup>th</sup> December 2010

### Pre and Post Evaluation Schedule

Marks : 20

1. Compressing food into a semi-solid mass, and then forcing it through a small aperture to increase the variety of texture, shape, and colour obtainable from a basic food ingredient is called \_\_\_\_\_.
2. Electron Beam (EB) Technology may be described as product treatment using a beam of accelerated electrons or X-rays to gain a beneficial effect.
3. Food processing is the set of methods and techniques used to transform raw ingredients into food or to transform food into other forms for consumption by humans or animals either in the home or by the \_\_\_\_\_.
4. Microencapsulation is defined as a process in which tiny particles or droplets are surrounded by a coating or embedded in a homogeneous or heterogeneous matrix, to give small capsules with many useful properties.
5. Benefits of food processing include toxin removal, preservation, easing marketing and distribution tasks, and increasing food consistency.
6. Functional foods are designed to allow consumers to eat enriched foods close to their natural state, rather than by taking dietary supplements manufactured in liquid or capsule form.
7. A prebiotic is a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or the activity of one or a limited number of bacteria in the colon.
8. A supply chain is a network of manufacturers, suppliers, distributors, transporters, storage facilities and retailers that perform functions like procurement and acquisition of material, processing and transformation of the material into intermediate and finished tangible goods, and finally, the physical distribution of the finished goods to intermediate or final customers.
9. Physical distribution is concerned with efficient movement of finished products from the end of the production line to consumer.
10. Electron microscopes are scientific instruments that use a beam of highly energetic electrons to examine objects on a very fine scale.
11. The process in which tiny particles or droplets are surrounded by a coating or embedded in a homogeneous or heterogeneous matrix, to give small capsules with many useful properties is defined as Microencapsulation.
12. The patent right allows a patent owner to exclude others from making use of, or producing the claimed invention for a limited time, especially in a commercial context.
13. The intelligent combination of different preservation factors or techniques to achieve multi-target, mild but reliable preservation effects is called Hurdle technology.
14. Name any two organisms used as probiotics
15. Name two commercially available nutraceuticals in the market
16. Health beneficial component of rice bran oil is \_\_\_\_\_.
17. Tomato is a rich source of a specific carotenoid called \_\_\_\_\_.

18. Name any one tannin rich food \_\_\_\_\_.
19. Nuts and oil seeds contain mostly \_\_\_\_\_ type of fatty acids.
20. Functional component of Turmeric is \_\_\_\_\_.

**Date:**

**Signature:**

**Appendix II**  
 Training programme schedule  
**Training Programme of CAFT in Home Science on**  
**“NEWER TECHNOLOGIES IN FOOD PROCESSING FROM**  
**PRODUCTION TO CONSUMPTION”**  
**19<sup>th</sup> November to 9<sup>th</sup> December 2010**

S.No.	Date	Time	Topic/Title	Resource Person
1.	19/11/10 Friday	10.00 am – 11.30 am	Registration	<b>Mrs. K. Shakuntala</b> Sr. Assistant
		11.30 am – 12.30 pm	Orientation to the CAFT (F & N), Acharya N.G. Ranga Agricultural University	<b>Dr. P. Yasoda Devi</b> Director , CAFT PGRC, ANGRAU
		2.00 pm – 3.30 pm	Orientation to the Training programme	<b>Dr. V.Vijaya Lakshmi</b> <b>Co-ordinator</b>
2.	20/11/10 Saturday	9.30 am – 11.00 am	Pre evaluation	<b>Dr. V.Vijaya Lakshmi</b> <b>Co-ordinator</b>
		11.30 am – 1.00 pm	Present status & future of food processing in India	<b>Dr. Anurag Chaturvedi</b> Associate Dean, CHSc ANGRAU, Hyderabad
		2.00 pm – 3.30 pm	Visit to ANGRAU Museum & Library	<b>Ms. T.Supraja</b> Assistant Professor, C.H.Sc ANGRAU
3	21/11/10	<b>SUNDAY - HOLIDAY</b>		
4.	22/11/10 Monday	9.30 am – 11.30 am	Elements of food processing: newer methods & equipments	<b>Dr.Gopala Rao</b> Prof (Rtd) Agri'l Engg, ANGRAU
		11.30 am – 1.00 pm	Consumer attitudes towards different food processing techniques – Influence and consumers benefits	<b>Dr.K.Uma Devi</b> Professor, CHSc

S.No.	Date	Time	Topic/Title	Resource Person
		2.00 pm – 3.30 pm	Probiotics - Nutritional And Health benefits	<b>Dr.P.Yasoda Devi</b> Director , CAFT PGRC, ANGRAU
5	23/11/10 Tuesday	9.30 am – 11.00 am	Application of Nanotechnology in food chain from production to consumption	<b>Dr. Manorama</b> Professor Dept of Biotechnology ANGRAU
		11.30 am – 1.00 pm	Application of Biotechnology in food chain from production to consumption	<b>Dr.Manorama</b> Professor Dept of Biotechnology ANGRAU
		2.00 pm – 3.30 pm	Application of Irradiation technology in food chain from production to consumption	<b>Dr.Anurag Chaturvedi</b> Associate Dean, CHSc ANGRAU, Hyderabad
6	24/11/2010 Wednesday	9.30 am – 11.00 am	Extrusion technology	<b>Dr.N.Lakshmi Devi</b> Professor, PGRC ANGRAU, Hyderabad
		11.30 am – 1.00 pm	Determining Micro organisms & / or their products in foods.	<b>Dr. Dhana Lakshmi</b> Dept of Microbiology SVVU
		2.00 pm – 3.30 pm	Tour of QC labs	<b>Dr.K.Uma Maheswari</b> Professor, QC labs & PGRC ANGRAU
7	25/11/2010 Thursday	9.30 am – 11.00 am	Newer techniques in food processing – An overview	<b>Dr. T. Jyothirmayi</b> Sr. Scientist CFTRI Resource Centre, Habsiguda, Uppal Road Hyderabad-7 PhoneNo. 9491043822
		11.30 am – 1.00 pm	Tour of pilot plant in CFTRI	
		2.00 pm – 3.30 pm	Visit to V H Agro foods Pvt Ltd	<b>Dr.K.V.V.Prasada Rao</b> Managing Director VH Agro Foods Pvt. Ltd
8	26/11/2010 Friday	9.30 am – 11.00 am	Thermal food processing technologies	<b>Ms. T. Supraja</b> Assistant Professor, C.H.Sc ANGRAU
		11.30 am – 1.00 pm	Visit to Hitex – Food Processing Exhibition	<b>Dr. K.Aparna</b> Assistant Professor PGRC, ANGRAU
		2.00 pm – 3.30 pm		
9	27/11/2010 Saturday	9.30 am – 11.00 am	Newer technologies in the processing of fruits & vegetables for food uses	<b>Dr. Sucharitha Devi</b> Assistant Professor, CHSc ANGRAU

S.No.	Date	Time	Topic/Title	Resource Person
		11.30 am – 1.00 pm	Newer technologies in the processing of oilseeds for food uses	<b>Dr. Nagaraj</b> Professor (DOR - Retd) Maruti Nagar, Hyderabad
		2.00 pm – 3.30 pm	Newer technologies in the processing of dairy products for food uses	<b>Dr.N. Krishnaiha</b> Professor & Head College of Veterinary Sciences SVVU, Rajendranagar
10	28/11/10	<b>SUNDAY - HOLIDAY</b>		
11	29/11/2010 Monday	9.30 am – 11.00 am	Supercritical fluid extraction in food processing	<b>Dr.T.V.Hymavathi</b> Associate Professor, PGRC ANGRAU
		11.30 am – 1.00 pm	Newer technologies in the processing of millets for food uses	<b>Dr. Kamini Devi</b>
		2.00 pm – 3.30 pm	Role of electron microscopes in food processing & safety	<b>Dr. Naga Malleswari</b> Assistant Professor Ruska Labs, SVVU Rajendranagar
12	30/11/2010 Tuesday	9.30 am – 11.00 am	Visit to Indian Institute of Packaging	<b>Dr.Karna</b> Indian Institute of Packaging Hyderabad
		11.30 am – 1.00 pm		
		2.00 pm – 3.30 pm	Newer technologies in food packaging from production to consumption	<b>Dr.Karna</b> Indian Institute of Packaging Hyderabad
13	01/12/2010 Tuesday	9.30 am – 11.00 am	Visit to ICRISAT	<b>Dr Saikat Datta Mazumdar</b> Technical Director NutriPlus Knowledge Centre Agri-Science Park @ ICRISAT <b>ICRISAT</b>
		11.30 am – 1.00 pm		
		2.00 pm – 3.30 pm		
14	02/12/2010 Thursday	9.30 am – 11.00 am	Financing Food Industry	<b>Mr. Srikant Mahapatra</b> Canara Bank, Hyderabad
		11.30 am – 1.00 pm	Visit to Masqati dairy	<b>Mr. Kiran Kumar</b> Manager, Canara Bank
		2.00 pm – 3.30 pm		
15	03/12/2010 Friday	9.30 am – 11.00 am	High intensity & High pressure electric field pulse technology	<b>Dr.V.Vijaya Lakshmi</b> Professor CHSc, Hyderabad
		11.30 am – 1.00 pm	Newer technologies in the processing of cereals and pulses for food uses	<b>Mr.Srinivasan</b> CFTRI (Rtd), Hyderabad

S.No.	Date	Time	Topic/Title	Resource Person
		2.00 pm – 3.30 pm	Prebiotics - Nutritional And Health benefits	<b>Dr.S.Sumathi</b> Professor & Head Department of Biochemistry ANGRAU
16	04/12/2010 Saturday	9.30 am – 11.00 am	Application of membrane processing technology in dairy foods.	<b>Dr.Kondal Reddy</b> Professor & Head, LPT, SVVU
		11.30 am – 1.00 pm	Microencapsulation Technology	<b>A. Poshadri</b> Scientist, Nutriplus Knowledge Centre, ICRISAT
		2.00 pm – 3.30 pm	Electron accelerators for food preservation	<b>A. Poshadri</b> Scientist, Nutriplus Knowledge Centre, ICRISAT
17	05/12/2010	<b>SUNDAY - HOLIDAY</b>		
18	06/12/2010 Monday	9.30 am – 11.00 am	Safety and sanitation – New sanitation technologies in food processing	<b>Dr.Sudershan Rao</b> National Institute of Nutrition Hyderabad
		11.30 am – 1.00 pm	Role of newer food processing technologies in nutrition security	<b>Dr. B. Sesikeran, Director</b> National Institute of Nutrition Hyderabad
		2.00 pm – 3.30 pm	Visit to NIN Library	
19	07/12/2010 Wednesday	9.30 am – 11.00 am	Evaluation of wholesomeness in newer methods of food processing	<b>Dr. S. Shobha</b> Professor CHSc, Hyderabad
		11.30 am – 1.00 pm	Importance of hurdle technology in food processing	<b>Dr.Dilip Babu. J</b> Sr. Scientist & Head Vegetables Section, APHU
		2.00 pm – 3.30 pm	Importance of IPR in food chain from production to consumption	<b>Dr. Durga Rani</b> Associate Professor Department of Biotechnology ANGRAU
20	08/12/2010 Wednesday	9.30 am – 11.00 am	Role of enzymes in food processing	<b>Dr.K.Uma Maheswari</b> Professor, QC labs & PGRC ANGRAU
		11.30 am – 1.00 pm	Importance of Supply chain management in food processing – Govt. initiatives and regulations	<b>Dr. Radhika</b> MABM, ANGRAU
		2.00 pm – 3.30 pm	Intermediate Moisture Foods concept to High Moisture Products.	<b>Dr. K.Aparna</b> Assistant Professor PGRC, ANGRAU

S.No.	Date	Time	Topic/Title	Resource Person
21	09/12/2010 Thursday	9.30 am – 11.00 am	Post Evaluation	<b>Dr.K.Aparna</b> Assistant Professor, PGRC ANGRAU
		11.30 am – 1.00 pm	Valedictory	
		2.00 pm – 3.30 pm	Lunch	

- 11.00 am to 11.30 am – Tea Break
- 1.00 pm to 2.00 pm - Lunch Break

### Appendix III

#### PROFORMA FOR EVALUATION OF EACH LECTURER BY THE PARTICIPANTS

Training programme on “Newer Technologies in Food Processing from Production to Consumption”  
19-11-2010 to 09-12-10

S. No.	Date	Title of the topic	Name of Speaker	Relevancy for application	Adequacy of the information	A.V. Aids used	Deliverance of the content	Overall rating of the lecture
				Teaching / Research / Extension	Sufficient / not sufficient	Appropriate / Not appropriate	Adequate / Inadequate	Fair (1) Good (2) Excellent (3)
1.	19/11/10	Orientation to the CAFT (F & N), Acharya N.G. Ranga Agricultural University	<b>Dr. P. Yasoda Devi</b>					
2.	19/11/10	Orientation to the CAFT (F & N), Acharya N.G. Ranga Agricultural University	<b>Dr. P. Yasoda Devi</b>					
3.	20/11/10	Present status & future of food processing in India	<b>Dr. Anurag Chaturvedi</b>					
4.	20/11/10	Visit to ANGRAU Museum & Library	<b>Ms. T.Supraja</b>					
5.	22/11/10	Elements of food processing: newer methods & equipments	<b>Dr.Gopala Rao</b>					
6.	22/11/10	Consumer attitudes towards different food processing techniques – Influence and consumers benefits	<b>Dr.K.Uma Devi</b>					
7.	22/11/10	Probiotics - Nutritional And Health benefits	<b>Dr.P.Yasoda Devi</b>					
8.	23/11/10	Application of Nanotechnology in	<b>Dr. Manorama</b>					

		food chain from production to consumption						
9.	23/11/10	Application of Biotechnology in food chain from production to consumption	<b>Dr. Manorama</b>					
10.	23/11/10	Application of Irradiation technology in food chain from production to consumption	<b>Dr. Anurag Chaturvedi</b>					
11.	24/11/10	Extrusion technology	<b>Dr. N. Lakshmi Devi</b>					
12.	24/11/10	Determining Micro organisms & / or their products in foods.	<b>Dr. Dhana Lakshmi</b>					
13.	24/11/10	Tour of QC labs	<b>Dr. K. Uma Maheswari</b>					
14.	25/11/10	Newer techniques in food processing – An overview	<b>Dr. T. Jyothirmayi</b>					
16.	25/11/10	Visit to V H Agro foods Pvt Ltd	<b>Dr. K. V. V. Prasada Rao</b>					
17.	26/11/10	Thermal food processing technologies	<b>Ms. T. Supraja</b>					
18.	26/11/10	Visit to Hitex – Food Processing Exhibition	<b>Dr. K. Aparna</b>					
19.	27/11/10	Newer technologies in the processing of fruits & vegetables for food uses	<b>Dr. Sucharitha Devi</b>					
20.	27/11/10	Newer technologies in the processing of oilseeds for food uses	<b>Dr. Nagaraj</b>					
21.	27/11/10	Newer technologies in the processing of dairy products for food uses	<b>Dr. N. Krishnaiha</b>					
22.	29/11/10	Supercritical fluid extraction in food processing	<b>Dr. T. V. Hymavathi</b>					
23.	29/11/10	Newer technologies in the processing of millets for food uses	<b>Dr. Kamini Devi</b>					
24.	29/11/10	Role of electron microscopes in food processing & safety	<b>Dr. Naga Malleswari</b>					
25.	30/11/10	Visit to Indian Institute of Packaging	<b>Dr. Karna</b>					
26.	30/11/10	Newer technologies in food packaging from production to consumption	<b>Dr. Karna</b>					
27.	01/12/10	Visit to ICRISAT	<b>Dr Saikat Datta Mazumdar</b>					

28.	02/12/10	Financing Food Industry	<b>Mr. Srikant Mahapatra</b>					
29.	02/12/10	Visit to Masqati dairy	<b>Mr. Kiran Kumar</b>					
30.	03/12/10	High intensity & High pressure electric field pulse technology	<b>Dr.V.Vijaya Lakshmi</b>					
31.	03/12/10	Newer technologies in the processing of cereals and pulses for food uses	<b>Mr.Srinivasan</b>					
32.	03/12/10	Prebiotics - Nutritional And Health benefits	<b>Dr.S.Sumathi</b>					
33.	04/12/10	Application of membrane processing technology in dairy foods.	<b>Dr.Kondal Reddy</b>					
34.	04/12/10	Microencapsulation Technology	<b>A. Poshadri</b>					
35.	04/12/10	Electron accelerators for food preservation	<b>A. Poshadri</b>					
36.	06/12/10	Safety and sanitation – New sanitation technologies in food processing	<b>Dr.Sudershan Rao</b>					
37.	06/12/10	Role of newer food processing technologies in nutrition security	<b>Dr. B. Sesikeran,</b>					
38.	07/12/10	Evaluation of wholesomeness in newer methods of food processing	<b>Dr. S. Shobha</b>					
39.	07/12/10	Importance of hurdle technology in food processing	<b>Dr.Dilip Babu. J</b>					
40.	07/12/10	Importance of IPR in food chain from production to consumption	<b>Dr. Durga Rani</b>					
41.	08/12/10	Role of enzymes in food processing	<b>Dr.K.Uma Maheswari</b>					
42.	08/12/10	Importance of Supply chain management in food processing – Govt. initiatives and regulations	<b>Dr. Radhika</b>					
43.	08/12/10	Intermediate Moisture Foods concept to High Moisture Products.	<b>Dr. K.Aparna</b>					
44.	09/12/10	Post Evaluation	<b>Dr.K.Aparna</b>					

(Please do not write your name)



## **OBJECTIVE II**

To update the curriculum and courses of Foods and Nutrition and to strengthen teaching and evaluation at UG and PG level.

### **UG Programme**

As per the ICAR's IV<sup>th</sup> Dean's Committee recommendations, UG Curriculum was revised and being implemented from the year 2009-2010 and the same is being followed for the current academic year also.

### **PG Programme**

As per the ICAR's IV<sup>th</sup> Dean's Committee recommendations, PG Curriculum of M.Sc (Nutrition & Dietetics) was revised and implemented from the year 2009-10.

### **Action Plan**

The original strength of M.Sc (Foods & Nutrition) at ANGRAU is 12 in number, but has been reduced to six in recent years due to slight draw backs in the existing strength of Home Science students at UG level. In view of the good number of students at UG level and also the demand at state level, M.Sc (Home Science - Foods & Nutrition) and M.Sc (Food Technology) was enhanced from the existing strength of 6 number to 9 and 9 to 19 respectively to provide technical personnel to the state/country.

### **Rural Home Science Work Experience Programme (RHWEPP)**

The Rural Home Science Work Experience Programme, the unique programme introduced by Acharya N G Ranga Agricultural University was organized in 2 villages namely Muchintal and Kavva guda for 55 days from 4<sup>th</sup> March to 21<sup>st</sup> May 2010.

The students from Department of Foods and Nutrition were placed in both the villages 15 in Muchintal and 5 in Kavvaguda depending upon the population of these villages. The students were given with 5 projects as group work which were carried out during their stay

1. Assessment of Nutritional status of the selected villages
2. Nutrition education
3. Assessment of Mortality and Morbidity of the selected villages
4. Skill training in Preservation of locally available foods
5. Establishment of Diet counseling centres

First the students were instructed to identify the available resources, felt needs in the respective villages through Participatory Rural Appraisal (PRA) Technique. It was observed that the low birth weight, less consumption of protective foods in all the age groups, discarding colostrum, faulty feeding practices, food taboos and low per capita income are causing and growth faltering in children and malnutrition, anemia in general population. Dental fluorosis is also observed due to poor ground water availability. Communal toddy preparation and consumption was high irrespective of age and gender.

Keeping in view with all these observations method demonstrations and training programmes on preservation of fruit and vegetables, weaning mixes, safe storage of grains were organized. Mass campaigns on ill effects of alcoholism, prevention of usage of plastics, enhancing the usage of ecofriendly cotton bags, keeping environment hygienically, methods of safe drinking water were organized through rallies, skits and songs. Created awareness about balanced food for all age groups, dietary care to be taken during diseases and physiological changes like pregnancy, lactation and menopause through establishing diet counseling centres. For better adaptability of these issues each student has selected 5 host families where the family socio economic status was analyzed properly which enabled the villagers to lead healthy better life with maximum utilization of available resources.

### **Practical Manuals Developed**

UG practical manuals for the course:

In plant Training Manual for “PG Diploma in Food Analysis & Quality Control” By Dr.N.Lakshmi Devi

### **Experiential Learning:**

The facilities are being set up for Hands on training on preserved fruit and vegetable products Unit under Experiential Learning. Under this schemes an amount of Rs.20 lakhs has

been sanctioned by ICAR for civil works, consequently Laboratory construction has been taken up during this financial year. An exclusive laboratory with Extrusion unit with its accessories was established with financial sources of various research schemes to provide hands on training in Extrusion cookery and preparation of various nutritious snack items suitable for various age groups. Extrusion lab will be utilized for student's research work as well as experiential learning.

## **Departmental Research: Research projects completed**

### **Project No. 1:**

#### **Development and evaluation of micronutrient fortified fruit & vegetable bars**

It is estimated that the annual post harvest losses of Fruits and Vegetables ranges from 20-25 percent in our country. The technologies adopted for processing of fruit and vegetables now range from traditional sun-drying to sophisticated and state-of-the-art techniques of juice concentration and freeze drying. Production of fruit and vegetable bars using dehydration technology will not only adds value to these crops but also becomes a choice product of many age groups. Fortification of these bars with needed micronutrients will further enhance the nutrient quality and becomes a choice product for the people suffering from micronutrient malnutrition.

Project Duration: April 2009 to March 2010.

Principal Investigator: Dr.T.V.Hymavathi, Associate professor, (Foods & Nutrition)

Co-Investigators: Dr.P.Yasoda Devi , Professor, (Foods & Nutrition)

#### **Objectives**

- Testing and identification of suitable fruits and vegetables for bar production.
- Standardization of bar production for each of the selected fruit and vegetable/ blend.
- Testing the suitability of fortifying Fruit and Vegetable bars with different forms of zinc
- Physico-chemical, nutritional and microbiological analysis of the selected fruit and vegetable bars
- Sensory evaluation and consumer acceptability of the developed bars
- Determination of appropriate packaging material for the selected fruit and vegetable bars.

- Shelf life studies of the best selected fruit and vegetable bars.

Fruit and vegetable are selected based on various aspects such as crop production, nutritive value and chemical composition etc. Several Fruits and vegetables and their blends were tested for the suitability for preparation of bars.

Studies revealed that Pumpkin, Ash gourd, Bottle gourd, Tomato, Papaya and Banana are suitable for the preparation of bars using tray drier. The pulp of these fruits/ vegetables/ blends can be successfully dried in a tray drier for about 4 hours to produce bars with moisture content ranging from 15% to 20%. Addition of banana pulp at 25 % and 50% helped production of ash gourd bars. Pectin, Maltodextrin, Inulin Fructooligosachharides are added in various proportions to improve the gel formation, mouth feel, texture etc. Nutritional, physicochemical and sensory quality was assessed in the fresh bars. Studies on shelf life and fortification of these bars are underway.

## **Project No.2 :**

### **Name of the project: Consumer evaluation and commercialization of diabetic foods.**

Principal Investigator: Dr. V. Viyalakshmi, Professor & PI,

Co Principal Investigator: Dr. S. Shobha, Professor & Co-I,

Ms. T. Supraja, Assistant Professor & Co-I.

### **General objective:**

To study the effect of most acceptable diabetic products on blood glucose levels of diabetic subjects, commercialize the efficient products and modify the mixes by addition of fruits and nuts to improve the nutritional quality.

### **Specific objectives:**

- To select the most efficient millet based therapeutic food mix/es.
- To carry out clinical trials on diabetic consumers with the most acceptable food mix/es.
- To modify the mixes by addition of functional ingredients to improve the therapeutic value.
- To study the feasibility of commercialization in terms of packaging, cost and marketability of the food mixes.

Duration: 1 year (2009-2010)

Budget Rs.3.12 lakhs

### **Work done:**

- Millets like jowar, maize and foxtail millet was procured from local market and subjected to processing such as cleaning, de hulling, repeated autoclaving, cooling, drying and milling into flour and rawa.
- The flour and rawa was used for preparation of instant therapeutic breakfast mixes like idli, upma and roti to study the consumer evaluation of the products.

- Breakfast items like roti, idli, upma were prepared with the millet based therapeutic instant mixes and studied for sensory evaluation using a questionnaire by 50 diabetic and 50 normal subjects attending the diabetic clinics of Hyderabad.
- Results revealed that idli and upma of three millets were accepted at high score compared to roti.
- The most accepted products were studied for glycemic response in diabetic patients.
- For this the most accepted products for were given to diabetic subjects and their postprandial glucose levels were monitored.
- Results revealed that the breakfast items prepared with millets (due to resistant starch developed during repeated autoclaving and cooling processing) reduced postprandial glucose level compared to breakfast items with fully digestible starches.
- Among all the products maize idli and foxtail upma decreased glucose levels significantly than others.

### **Project No: 3**

**Project entitled “Critical study on mortality and morbidity among children below 15 years in the tribal areas of Adilabad District” sponsored by UNICEF**

Nutritional anemia and the problem of underweight are widely prevalent among the tribals. An analysis of the deaths that took place recently in the tribal mandals of Narnoor, Utnoor, Jaionoor, Sirpur-U and Indervalle in Adilabad District reveals that, out of 119 deaths that were reported up to 30-11-2007, ninety eight (98 No.) of them were children below the age of 15 years of them 59 were girls. Subsequent to that there are more deaths reported in the same area till Nov 2008 of which majority were children below 15 yrs. Similarly, the IMR and MMR rate in that tribal areas are very high. As against the state average of 57 per thousand, the IMR among ST's is 103.1 per 1000 live births.

It was therefore felt that there was urgent need to take up a critical evaluation study in collaboration with UNICEF, Hyderabad for finding out the reasons for the deaths in Adilabad Tribal areas as well as to suggest the corrective measures to be taken up by the Government to overcome the problem and provide suggestions for proper implementation of the Government programmes by the concerned personnel. The study was proposed with the following objectives:

- To investigate the causes of mortality and morbidity among children below 15 years in the tribal areas of Adilabad district
- To assess the existing health care and nutrition services, their systems and utilization
- To propose corrective measures for the identified causes and for providing quality services
- To recommend action strategies to the concerned agencies.

Duration : 3 Months

Budget Sanctioned : Rs. 10,56,000/-

Location : Five mandals of Adilabad Dist (Narnoor, Utnoor, Jainoor, Tirpoor & Indravalle)

Funding Agency : UNICEF

Principal Investigator : Dr. K. Uma Devi, Professor, Department of Foods & Nutrition

Co Investigators: Dr. K. Aparna, Assistant Professor, Department of Foods & Nutrition  
Dr. M. Shyama Chaitanya Kumari, Assistant Professor  
Department of Extension Education

The project was initiated in February 2008 and a preliminary visit was conducted to the district and mandal officials for collection of secondary data at district and mandal level for necessary planning and implementation of the project. Development and printing of questionnaires and schedules was taken up during the first month of the project. During the second month the project team conducted PRA, focused group discussions, interaction with key informants at Utnoor in Adilabad District on March 18<sup>th</sup> 2009. Data collection using schedules at household level, collection and analysis of blood, urine, stools, water and food samples will be completed by the end of March 2009. After the completion of statistical analysis and consolidation of data, a workshop will be conducted to propose corrective measures and suggestions for the identified causes for providing quality services, with recommendations and action strategies to the concerned agencies

#### **Project No: 4**

#### **Utilization of Micronutrient Encapsulated Underutilized Fruit and Vegetable Powders as Colourant for Designing Value Added Food Products**

<b>Funding Agency</b> :	State Government
<b>Year of starting</b> :	2009 -10
<b>Budget</b> :	Rs. 3.76 lakhs
<b>Duration of the project</b> :	1 year
<b>Scientists in-charge</b> <b>Principal Investigator</b> :	<b>Dr. K. Uma Maheswari, Professor</b>
<b>Co- investigators</b> :	Dr. K. Uma Devi, Professor



	Dr. K. Aparna, Assistant Professor
<p><b>Introduction</b></p> <p>With one sixth of the global population residing in India, one third of about two billion People suffering from vitamin and micronutrient deficit are in India. The loss due to micronutrient deficiency costs India 1% of its GDP. This amounts to a loss of Rs. 27,720 crore per annum terms of productivity, illness, increased health care costs and death.</p> <p>On the other side, India stands second in the world for production of fruits and vegetables. The country actually produces about 50 million MT of fruits and 71 million MT of vegetables per year. But just about 2% of this goes for processing, &amp; India loses about 35-40% of the produce due to improper post harvest management. Fruits and vegetables are the best sources of nutrients among the foods available to combat micronutrient malnutrition.</p> <p>There is wider scope for development of various products from fruits and vegetables and their blends. Due to their high water activity processing at peak harvest is necessary to minimize the losses, making the product available all the year round and permit transportation to places other than the site of production. Methods involving removal of this moisture such as dehydration are most accessible means of food preservation.</p> <p>The use of natural food coloring in food and beverages has been gaining popularity over the years. This can be largely attributed to the increasing consumer awareness on the ill effects of artificial food colorings. Most of the natural food colors are derived from fruits and vegetables They do not cause the health problems associated with artificial food coloring. On the contrary, they contain substances that promote several health benefits to an individual. Natural food colours also protect food from oxidation by enzymes.</p> <p>Therefore an attempt was made to utilize micronutrient rich underutilized fruit and vegetable powders as a natural colourants for development of value added foods such as RTS health drink mix, toffee, and RTE extruded snacks for micronutrient security.</p>	
<p><b>Objectives</b></p> <p><b>General objective</b></p> <ul style="list-style-type: none"> <li>• To utilize micronutrient encapsulated unconventional fruit and vegetable powders as natural colourant for designing value added foods.</li> </ul> <p><b>Specific objectives</b></p> <ul style="list-style-type: none"> <li>• To develop value added micronutrient encapsulated unconventional fruit and vegetable powders for natural colour.</li> <li>• To assess physico chemical and nutritional characteristics of the developed natural fruit and vegetable colour powders.</li> <li>• To develop and standardize value added foods using the developed natural fruit and vegetable colour powders.</li> <li>• To conduct sensory evaluation and consumer acceptability studies of the developed foods.</li> <li>• To conduct storage studies of the developed foods.</li> </ul>	

- To determine appropriate packaging technique for the developed fruit and vegetable food products

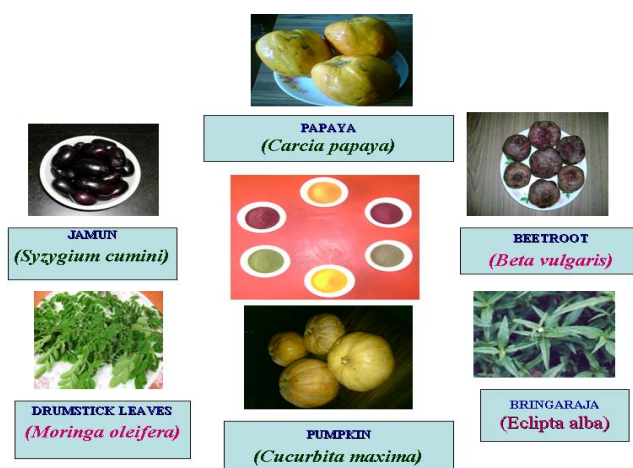
## Methodology

- Selection of underutilized fruits & vegetables**

Underutilized fruits and vegetables i.e papaya (*Carcia papaya*), jamun (*Syzygium cumini*), beetroot (*Beta vulgaris*), pumpkin (*Cucurbita maxima*), drumstick (*Moringa oleifera*) and bringaraja (*Eclipta alba*), leaves used in the formulation of value added products were procured

- Preparation of underutilized fruit & vegetable powders**

The selected underutilized fruits and vegetables were subjected to appropriate processing such as sorting, washing, peeling, blanching, drying, powdering etc. required for preparation of powders.



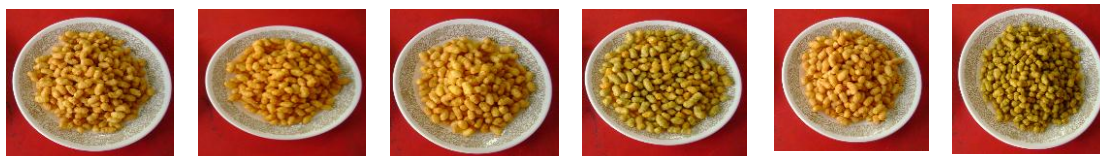
- Analysis of physico-chemical properties**

The physico chemical properties viz. Concentration of colour, Bulk Density, Antioxidant activity, Micronutrients (Iron, Calcium, Zinc and Vitamin C), Crude fibre & Total ash content of underutilized fruit & vegetable powders were analyzed.

- Development of value added products**

Three products namely Toffees, RTE extruded snacks and RTS Health drink mix with underutilized fruit & vegetable powders were developed

### EXTRUDED SNACKS PREPARED WITH FRUIT / VEGETABLE POWDERS



PAPAYA

BEETROOT

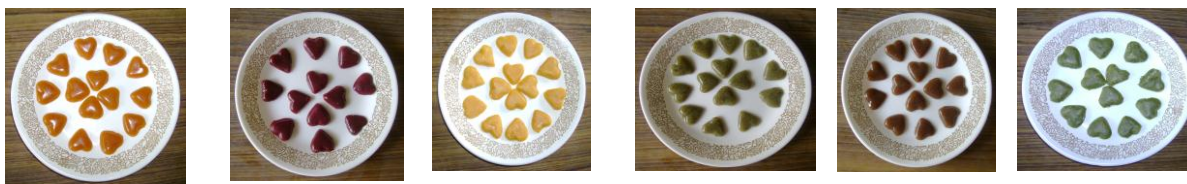
PUMPKIN

ECLIPTA ALBA

JAMUN

DRUMSTICK LEAVES

## TOFFEES PREPARED WITH FRUIT/ VEGETABLE POWDERS



PAPAY

BEETROO

PUMPKI

BHRINGARAJ

JAMUN

DRUMSTICK

## HEALTH DRINK PREPARED WITH FRUIT / VEGETABLE POWDERS



PAPAYA

JAMUN

BEETROOT

PUMPKIN

DRUMSTICK LEAVES

- **Acceptability studies of the products by sensory evaluation**

The developed products were evaluated for colour/appearance, texture, taste, flavour & overall acceptability.

- **Storage studies**

The prepared underutilized fruit and vegetable powders and products prepared by incorporating these powders were stored for 90 days at ambient temperature in two packaging materials viz. low density polyethylene (LDPE) & metallized polypropylene (MPP) & analysis of moisture & total viable bacterial count ( for powders and products) and sensory attributes ( for products) in the stored samples was carried out.

## Results

### Nutritional quality characteristics of fruit / vegetable powders

S.No	Parameter	Minimum	Maximum
1	Antioxidant activity (TBARS %)	206.45 (Jamun powder)	448.38 (Eclipta alba powder)
2	Crude Fibre (g/100g)	3.10 (Jamun powder)	11.92 (Eclipta alba powder)
3	Fe (mg/kg)	61.94 (Pumpkin powder)	272.55 (Eclipta alba powder)

4	Zn (mg/kg)	15.343 (Beetroot powder)	24.00 (Eclipta alba powder)
5	Ca (mg/kg)	1317.13 (Beetroot Powder)	21865.00 (Eclipta alba powder)
6	Vit. C (mg/100g)	10.00 (Eclipta alba powder)	374.80 (Beetroot powder)
7	Total Ash (g/100g)	3.200 (Jamun powder)	16.333 (Eclipta alba powder)

### Sensory Evaluation Studies

#### Maximum accepted level of incorporation (%) of fruit / vegetable powders in the products

S.No.	Product	Maximum level of acceptance (%)
1	Toffees	15
2	Extruded snacks	20
3	Health drink	25

- Highest scores for overall acceptability were obtained by extruded snacks prepared with dehydrated papaya powder i.e 4.8
- Health drink prepared from bringaraja was not found acceptable during initial trials so it was deleted from the further study

### Storage Studies

- All the products were packed in the following packaging materials to see the effect of storage on the chemical, sensory and microbiological parameters:
  - 1) Low Density Polyethylene
  - 2) Metallized Poly Propylene
- In all the products as the storage period progressed a slight increase in Total viable bacterial count & moisture content (except toffees, where moisture was observed in decreasing trend) was found
- The increase in Total viable bacterial count & moisture content was higher in Low Density Polyethylene packaging material at each storage interval as compared to Metallized Poly Propylene packaging material throughout the study.
- Though there was a gradual decrease in scores for sensory attributes during the storage period, all the products were found to be acceptable by the sensory panel members at the end of the study
- Microbiological analysis of the stored products revealed that there was a gradual increase in Total Bacterial Count (cfu/g) from initial to 90 days of storage for all the products However, it was well within the permissible limits.
- In Papaya, Beetroot & Pumpkin toffees after 60 days of storage there was visible mould growth on the surface which was not acceptable. So the storage studies were conducted only up to 0, 30 and 60 days interval and no studies were conducted after 60

days of storage.

### **Conclusions**

All the fruit & vegetable powders were rich in micronutrients, fibre and antioxidant activity. Miconutrient enriched products can be prepared by incorporating underutilized fruits & vegetable powders at different levels. Toffees (except papaya, beetroot & pumpkin), Extruded snacks & Health drink can be stored for 90 days at ambient temperature (30-35oc) without any undesirable change in the sensory attributes.

As per the results of study the trials gave encouraging results and the prepared fruit and vegetable products were well accepted by the sensory panel members. Therefore, these fruit and vegetable preparations need to be evaluated by a large group of consumers especially children and housewives. It is also necessary to make these products commercially viable. Hence, in the continuation project an attempt will be made to study the consumer acceptance and commercialization of the most accepted fruit and vegetable products i.e extruded snacks.

## **RESEARCH PROJECTS IN OPERATION**

### **Project No:1**

#### **National Agricultural & Innovative Project (NAIP) “Creation of Demand for Millet Foods through PCS Value Chain”**

The sub project on ‘Creation of Demand for Millet Foods Through PCS Value Chain’ was initiated in the month of December 2007, for which National Research Centre for Sorghum is the lead centre and the Department of Foods & Nutrition, ANGRAU is one of the consortium partners with Dr.Kamini Devi, Professor as a Co-Principal Investigator and Dr.T.V. Hymavathy as Investigator.

The project was launched on 5<sup>th</sup> February 2008 with the following objectives:

- To enable market-driven millets cultivation for specific end-products, procurement and primary processing for continuous supply-chain management.
- Fine-tuning the technologies for development of millet food products and up scaling.
- To carry out nutritional evaluation and safety of selected millet foods.
- To assess consumer acceptability, price and market strategies, and social and policy imperatives
- To develop entrepreneurship and appropriate strategies to promote and popularize millets for commercialization through value-addition branding as health foods.

Millets are considered valuable not only for their nutritive value, but also due to their ability to

grow in the harshest climates, in rain fed areas of cultivation. The rapid disappearance of millets from the markets and meals of people is therefore a cause for concern, and various strategies have to be designed to increase the production and consumption of millets. Also millets, like pearl millet, were found to be prone to rancidity and poor shelf life. Hence, it was felt necessary to find solution to overcome these problems and promote millets among farmers and consumers.

The focus of work by ANGRAU is on creation of demand for pearl millet grain through various activities planned to meet the objectives. Several pearl millet products were developed and their acceptability and nutrient analysis was carried out. Fine tuning and up scaling of targeted niche products like biscuits and extruded products are being tried for their development and promotion in the urban areas. Absence of processing techniques for millets to enhance quality was an important factor that was needed to be addressed. The dehulling machines available for dehulling sorghum and other grains are not efficient to dehull pearl millet as it is a smaller grain. Improved processing techniques are being tested which would result in increased demand and markets and also improve the bio availability of nutrients from diets based on millets. Survey on pearl millet production, productivity, consumption and utilization in Kurnool district in Andhra Pradesh and Jodhpur and Singur districts in Rajasthan was taken up. Study on the market potential of pearl millet in Andhra Pradesh and Rajasthan has been planned and is being initiated.

A combination of community based approaches, improved processing/post production value addition to millets have been planned to create increased awareness and demand for millets which could go a long way in increasing the production and consumption of millets.

## **Project No: 2**

**Name of the project: “Acceptability study of Hot Foods (Instant mixes)”, supplied by AP Foods to ICDS beneficiaries**

Principal Investigator : Dr.P. Yasoda Devi, Professor& Head

Co Principal Investigator : Dr. T. V. Hymavathi, Associate Professor

### **OBJECTIVES OF THE STUDY:**

- To assess the acceptability of the hot foods (instant mixes) by the beneficiary children, pregnant and lactating women.
- To assess the quantity of supplementary food that beneficiary children could consume in the spot feeding program.
- To solicit opinion of ICDS functionaries, local leaders and general public about instant food mixes.
- To assess the acceptability of Local Food model as a supplementary food.



**Duration:** April -09 to July 2010,

**Budget:** Rs.4,01,270/-

**Funding Agency:** Andhra Pradesh Foods, Hyderabad

The project is an on going project. The needed data is being collected using structured schedules form different ICDS projects of Andhra Pradesh.

## **Research Projects proposed for the year 2010 - 11:**

### **Project No: 1**

#### **Consumer evaluation and commercialization of RTE extruded snacks with underutilized fruit and vegetable powders**

The results of the study on “**Utilization of micronutrient encapsulated underutilized fruit and vegetable powders as colourant for designing value added food products**” were encouraging and the prepared fruit and vegetable products were well accepted by the sensory panel members. Among the three products RTE extruded snacks obtained highest scores for overall acceptability. These fruit and vegetable preparations need to be evaluated by a large group of consumers. It is also necessary to make these products commercially viable.

Hence, in the continuation project an attempt will be made to study the consumer acceptance and commercialization of the most accepted fruit and vegetable product i.e RTE extruded snacks.

**Funding Agency** : State Government  
**Year of starting** : 2010-11  
**Budget** : 1.68 lakhs  
**Duration of the project** : 1 year (2010-2011)  
**Scientists in-charge**

**Principal Investigator** : **Dr. K. Uma Maheswari, Professor**  
**Co- investigator** : **Dr. K. Uma Devi, Professor**

### **Objectives**

#### **General objective**

To study the consumer acceptability and commercial feasibility of developed RTE extruded snacks with underutilized fruit and vegetable powders.

#### **Specific objectives:**

1. To prepare RTE extruded snacks with underutilized fruit and vegetable powders.
2. To conduct consumer acceptability of a large group of subjects through sensory evaluation.
3. To study the feasibility of commercialization in terms of packaging, cost and marketability of the developed RTE extruded snacks.

#### **Technical programme of work**

##### **1. Procurement of raw material**

Underutilized fruits and vegetables i.e papaya, jamuns, beetroot, pumpkins,

drumstick and eclipta elba leaves will be procured and subjected to appropriate processing such as sorting, washing, peeling, blanching, drying, powdering etc. required for preparation of RTE extruded snacks for consumer evaluation.

- 2. Preparation of RTE extruded snacks** RTE extruded snacks will be prepared from underutilized fruit and vegetable powders.

**Consumer evaluation:**

The developed RTE extruded snacks will be given to 100 consumers for sensory evaluation using a structured questionnaire.

- 3. Commercialization of the developed product:**

Appropriate packaging and labeling for extruded snacks will be designed and cost will be fixed. Appropriate marketing strategies will be utilized to market the products.

**Project No: 2**

**Name of the project: Development and commercialization of health foods from millets**

Principal Investigator : Dr. S. Shobha, Professor &PI,

Co Principal Investigator : Dr. V. Vijayalakshmi, Professor & Co-PI,  
Ms. T. Supraja, Assistant Professor & Co-I.

**General objective:**

To develop products using the selected millets in combination with other nutritious foods, test their acceptability in the lab and field and commercialize the best products.

**Specific objectives:**

- To develop products using millets and by products.
- To analyse the proximate and fibre content of the products.
- To carry out the sensory evaluation of the products in the lab.
- To carry out consumer evaluation in the field.
- To develop a suitable label and packaging for the product.
- To commercialize the products.

Duration : 1 year (2010-2011)

Budget : Rs.1.66 lakhs

**Techniques to be adopted :**

- Development of products using different combination and proportion.
- Lab analysis.
- Studying sensory and consumer acceptability and shelf life of the products.
- Commercialization by sale at surrounding offices (through FN production centre).

**Expected benefits :**

The products have various health benefits.

They will increase the consumption of millets which provide sufficient fibre and complex carbohydrate.

**Staff Deputation Abroad**

Dr.K.Aparna, Assistant Professor was deputed by the NAIP, ICAR for International training in "Cutting edge areas of Agricultural Science" in the field of "NUTRACEUTICALS" in January

2009 for a period of three months under Dr.Peter Jones, Director at Richardson Centre for Functional foods and Nutraceuticals, University of Manitoba, Winnipeg, Canada from 5<sup>th</sup> January 2010 to 4<sup>th</sup> April 2010.

### Students Admissions in the year 2009-10

Name of the Programme	No. of Admissions		Total
	Open	ICAR	
M. Sc. Nutrition & Dietetics	2	2	4
M. Sc. Food Science & Technology	13	3	16
PG Diploma in Nutritional Therapy	5	-	5
PG Diploma in Food Analysis & Quality Control	2	-	2
Ph. D. Foods & Nutrition	1	-	1

### OBJECTIVE III

To support the Government in training the personnel by disseminating nutrition information to personnel of different sectors.

#### Training Programme and Certificate Courses conducted

To encourage self-employment and income generating activities among grass root level workers, farmwomen and house wives, training programmes on Foods and Nutrition and skill oriented certificate courses were organized by Centre of Advanced Studies in Foods and Nutrition

#### TRAINING PROGRAMME AND CERTIFICATE COURSES CONDUCTED

To encourage self employment and income generating activities among grass root level workers, farm women and house wives, training programmes on Foods and Nutrition and skill oriented certificate courses were organized by Centre of Advanced Faculty Training Centre.

#### 1. TRAINING PROGRAMMES AND CERTIFICATE COURSES ORGANIZED (1<sup>st</sup> April – 30<sup>th</sup> March 2011)

Sl. No	Coordinators	Name of the programme	Duration		No. of participants
			FROM	TO	
1	Dr.Kamini Devi and Dr.Vijaya Lakshmi	International training programme on “Baking technology”	28 <sup>th</sup> July 2010	30 <sup>th</sup> July 2010	participants of SAARC countries at ALEAP complex,

					Kukatpalli, Hyderabad
2	Dr. V. Vijayalakshmi, Professor & T.Supraja, Assistant professor	Bakery & Confectionary	19-10-2010	20-11-2010	10
3	Dr. P. Yasoda Devi, Course Director Dr. V. Vijayalakshmi Course Coordinator Dr. K. Aparna Course Coordinator	“Newer technologies in food chain from production to consumption”	19/11/2010	09/12/2010	15

Apart from conducting training programmes and certificate courses on the campus, staff of the Centre of Advanced Faculty Training also participate as resource persons, when they were invited by line departments, other Universities and NGOs.

## 2. STAFF AS RESOURCE PERSONS

Sl. No.	Name	Title of the programme	Topic	Date	Organization / venue
1	Dr. K. Uma Maheswari Professor	“Cottage level food processing entrepreneurship development for farmers”	Processing and value addition to grains	05/02/2011	KVK, Malyal ,for 100 farmers at Mahabubabad
2	Dr.N. Lakshmi Devi Professor	Extrusion processing – Sciences & Application	Utilization of extrusion technology in development of weaning foods and snacks for children	17 <sup>th</sup> to 18 <sup>th</sup> June 2010	Maharana Pratap University of Agriculture & Technology at Udaipur
3	Dr. K. Uma Maheswari Professor	Scientific methods of food grains and inspection	Pulses – varieties, constituents and milling procedures	14 <sup>th</sup> July 2010	Indian Grain Storage Management & Research Institute Field Station, Rajendranagar, Hyderabad
4	Dr. K. Uma Maheswari Professor	Training programme of Self Help Groups of urban Indira Kranthi Patham	Balanced diet and it’s importance	9 <sup>th</sup> and 20 <sup>th</sup> August 2010	Farmers hostel, ANGRAU, Hyderabad
5	Dr. K. Uma Maheswari Professor	Post harvest technologies and value addition in agriculture and allied sectors	Post harvest management and value addition to food grains	9 <sup>th</sup> to 13 <sup>th</sup> August	Extension Education Institute, ANGRAU, Rajendranagar

6	Dr.K.Uma Maheswari, Professor	”State level symposium on “Nutrition promotion for a stronger nation”	Diet for adolescent girls	6 <sup>th</sup> September 2010	National Institute of Nutrition on the occasion of world nutrition week
7	Dr.K.Uma Maheswari, Professor	Training programme of Self Help Groups of urban Indira Kranthi Patham	Balanced diet and it’s importance	6 <sup>th</sup> , 15 <sup>th</sup> 25 <sup>th</sup> and 27 <sup>th</sup> September 2010	Farmers hostel, ANGRAU, Hyderabad
8	Dr.N.Lakshmi Devi, Professor	Training programme of Self Help Groups of urban Indira Kranthi Patham	Food fads and fallacies	6 <sup>th</sup> , 14 <sup>th</sup> & 27 <sup>th</sup> September 2010,	Farmers hostel, ANGRAU, Hyderabad
9	Dr.K.Uma Maheswari, Professor	Cottage level food processing entrepreneurship development for farmers	Processing and value addition to grains	05/02/2011	KVK, Malyal ,for 100 farmers at Mahabubabad
10	Dr. K. Aparna Assistant Professor	Cottage level food processing entrepreneurship development for farmers	Processing and value addition to fruit and vegetable crops	05/02/2011	KVK, Malyal ,for 100 farmers at Mahabubabad
11	Dr. K. Aparna, Assistant Professor	“Biotechnological approach for the enhanced production of nutraceuticals in fruits and vegetables of arid zones”	1. Phytosterols as functional food ingredient 2. Medicinal plants for management of diabetes . 3. Dietary fiber - an overview 4. Anti oxidants in fruits and vegetables	18-02-2011 21-02-2011 22-02-2011 23-02-2011	Central Institute of Arid Horticulture, Bikaner, Rajasthan

## 1. Scientific articles published during the year:

S.No.	Name	Title	Journal Name	Volume No.	P. No.	Year
1	B. Dayakar, JV Patil, Dr. T. V. Hymavathi Associate Professor MP Rajendraprasad, Vishala Devender & N. Kachui	Poster Abstract on Health and convenient food through innovations for sustainable food and nutritional security	Proceedings of international conference on food technology Edition II INFOTECH		228	2010
2	A. Peter Amala Sujith	Supercritical	International Journal	6	78-86	2010

	Dr. P. Yasoda Devi, Professor & Head & Dr. T. V. Hymavathi, Associate Professor	extraction of lutein esters from marigold flowers and their Hydrolysis by Improved saponification and enzyme Biocatalysis	of Biological and life sciences			
3	Dr. T. V. Hymavathi, Associate Professor B. Dayakar Rao, JV Patil, Balatripurasundari, E. Krinanmai, S. Spandana and CV Rathnavathi	Interventions in millet processing technologies for creation of demand. Present status and future strategies	A compilation of lead presentations and abstracts of papers submitted for national seminar on millets, November 12, 2010 of DSR at NIRD, Hyderabad			2010
4	Anurag Chaturvedi, Sujatha.M, V.Deepthi, Aparna Kuna, Dilip Babu.J & Sridhar .M	“Development of shelf stable intermediate moisture carrot ( <i>Daucas carota</i> ) using radiation as hurdle technology”	Proceedings of 4 <sup>th</sup> Indian Horticulture Congress			2010
5	Aparna Kuna, Poshadri. A and Dagadkhir.R	Speciality fats for food and dairy industry: A review	Beverage & food world	37 (7)	42-44	2010
6	Aparna Kuna & Kamini Devi	To consume soy or not – A paradigm for health care professionals	Proceedings of 43 <sup>rd</sup> Annual National Conference of Indian Dietetic Association of Dietetics – widening horizons	-		2010
7	Poshadri.A and Aparna Kuna	Microencapsulation Technology: A review	Journal of Research ANGRAU	38 (1)	86-102	2010
8	N. Lakshmi Devi, S. Shobha & Sajid et al	Development of protein rich sorghum based expanded snacks using extrusion technology	International Journal of food properties.( accepted for publication )			
9	V. Vijayalakshmi,	Age & gender related changes in body composition in pre adolescent girls	Indian Journal of public health research & development (accepted)			

## OBJECTIVE IV:

To disseminate the nutrition information to personnel of line departments, research institutes, State Agricultural Universities etc.

To disseminate research highlights of various aspects of Nutrition to different sectors and its personnel a quarterly issue of Foods and Nutrition News letter is brought out by Centre of Advanced Studies. During the report period, two quarterly issues of Foods & Nutrition News Letters were brought out for circulation among the line departments and the organizations involved in nutrition related programmes and to disseminate nutrition information to personnel of different sectors.

### News Letters released during the year 2009-10

S.No.	Title	Month	Year	Volume	Number	Issue Editor
1	Pro and pre bio tics for human health	March	2010	1	1	Dr .N.Lakshmi Devi

### 3. GUEST LECTURES TO PG STUDENTS & STAFF ORGANIZED

The following guest lectures have been arranged at Centre of Advanced Faculty Training for the benefit of both staff and P.G students.

Sl. No.	Resource person	Topic	Date
1	Dr.M.V.Rao	Production of food grains for food security of Indian population	24-06-2009
2	Dr. Lakshman	Patenting and marketing	13-08-2009
3	Dr.Kamini Devi	Millets as Nutraceutical foods	17.02.2010
4	Dr.Kamini Devi	Fish and fish oils as functional foods	19.02.2010



5	Dr.Giridharan	Care & planning of animal experiments	19/02/2010
6	Dr.Suhasini	Interrelation between nutrition & agriculture	29/01/10
7	Dr.Kala Kumar	Pharmacokinetics	22/01/09
8	Dr.Kala Kumar	Pharmacodynamics	23/01/09

### **PRACTICAL MANUALS DEVELOPED**

**UG:** Practical Manual for Normal & Therapeutic Nutrition  
Practical Manual for Bakery & Confectionery

**P.G:** Manual on Nutritional anthropometry  
Manual for FST 501

### **E-COURSE MATERIALS DEVELOPED FOR UG COURSES:**

Following e-course materials were developed for B.Sc (Home Science- Foods & Nutrition)

- Human nutrition
- food toxicology
- biochemistry
- food science

### **BOOKS /REPORTS PUBLISHED BY THE FACULTY OF HOME SCIENCE**

1. Glimpses of Home Science Faculty
2. Compendium of viable Home Science Technologies
3. PG thesis abstracts from 1996 to 2007
4. Compendium of Research projects , Faculty of Home Science from inception to 2007

## **6. Training Programmes/Seminars/Workshops attended by the faculty**

Sl. No	Name / Designation	Programme attended	Organization / venue	Period	Purpose
1	Dr. K. Aparna Assistant Professor	“NUTRACEUTICALS” sponsored by National Agricultural Innovation Project (NAIP), ICAR	Richardson Centre for Functional foods and Nutraceuticals, University of Manitoba, Winnipeg, Canada	5 <sup>th</sup> January 2010 – 4 <sup>th</sup> April 2010	International training program
2	Dr. P.Yasoda Devi, Director, Centre of Advanced Faculty Training (CAFT)	CAS / CAFT review meeting	Krishi Anusandhan Bhavan, ICAR, New Delhi	26 <sup>th</sup> May 2010	Presented achievements of CAS / CAFT, since inception at ANGRAU
3	Dr. T. V. Hymavathi, Associate Professor	Annual Work Shop of NAIP Component II	TNAU, Coimbatore	15 <sup>th</sup> -16 <sup>th</sup> April 2010	Annual progress presentation
	Dr. N. Lakshmi Devi	International Seminar on - Extrusion	Maharana Pratap University of	17 <sup>th</sup> to 18 <sup>th</sup> June 2010	Invited speaker

		processing – Sciences & Application	Agriculture & Technology at Udaipur organized by KSU, USA		
4	Dr. T. V. Hymavathi, Associate Professor	MDP in public private partnerships for innovations in Agriculture	IIM, Lucknow	15 <sup>th</sup> -20 <sup>th</sup> July 2010	Faculty Development
5	Dr.K.Uma Maheswari, Professor, Dr.N.Lakshmi Devi, Professor, Sr.Sucharitha Devi, Assistant Professor and Ms.T.Supraja, Assistant Professor	Nutrition promotion for a stronger nation	National Institute of Nutrition	6 <sup>th</sup> September 2010	state level symposium on the occasion of world nutrition week
6	Dr.P.Yasoda Devi, Professor, Dr. Dr.K.Uma Maheswari, Professor, Dr. T.V.Hymavathi, Associate Professor and Dr.K.Aparna, Assistant Professor ” on, at.	Emerging trends in food processing industry	organized by Confederation of Indian Industries, Hyderabad	17 <sup>th</sup> September , 2010	one day seminar
7	Dr. T. V. Hymavathi, Associate Professor	International conference on Food Technology – Edition II, Greening food processing technology for sustainable safe food supply	IICPT, Thanjavur	30 <sup>th</sup> and 31 <sup>st</sup> October 2010	Oral presentation on Physico-chemical, Nutritional and Sensory quality of Inulin (IN)and Fructooligos acharides (FOS)incorporated functional fruit bar
8	Dr. K. Aparna Assistant Professor	4 <sup>th</sup> Indian Horticulture Congress	IARI, New Delhi	18 <sup>th</sup> to 21 <sup>st</sup> November 2010	Poster presentation on “Development of shelf stable intermediate

					moisture carrot ( <i>Daucas carota</i> ) using radiation as hurdle technology”
9	Dr. T. V. Hymavathi, Associate Professor	NIN-WHO Total Diet Study Dissemination workshop	NIN	16 <sup>th</sup> November 2010	To participate in scientific deliberations
10	Dr. T. V. Hymavathi, Associate Professor	National seminar on millets	NIRD	November 12 <sup>th</sup> 2010	Poster presentation Efficacy of selected treatments on the shelf life of pearl millet
11	Dr. T. V. Hymavathi, Associate Professor	43 <sup>rd</sup> Annual National Conference of Indian Dietetic Association of Dietetics – widening horizons, Jointly organized by IDA, AP Chapter and NIN	NIN		Chairperson of Poster review session
12	Dr. V. Vijayalakshmi, Professor Dr. Uma Devi, Professor, T.Supraja, Assistant professor & Dr. S. Sucharitha Devi, Assistant professor	Development of tutor marked assignment	AP Open School Society, Hyderabad at SCERT campus, Basheerbag, Hyderabad	29-11-10 to 30-11-10	workshop
13	Dr. K. Uma Maheswari, Professor	Nanotechnology A Nano smart world	Kochin, Kerala	19 <sup>th</sup> – 21 <sup>st</sup> , November 2010	Presented a poster on “Micronutrient encapsulated under Utilized fruit & vegetable powders as natural colorant in value added

					products”
14	Dr. T. V. Hymavathi, Associate Professor	International conference on impact of diseases and social issues affecting women and their amelioration	Third World Organisation of Women in Science (TWOWS) and institute of genetics Hospital for Genetic Diseases, Osmania University	12 <sup>th</sup> - 14 <sup>th</sup> December 2010	Invited Speaker Prebiotics and bone health in women
15	Dr. T. V. Hymavathi, Associate Professor and Prernanath	2 <sup>nd</sup> International Seminar on Medicinal plants & herbal products 2010 at S. V. University	Tirupati, A.P., India	27 <sup>th</sup> to 29 <sup>th</sup> December	Functional Foods from Roselle (Hibiscus Sa fdariffa. L)
16	Dr. T. V. Hymavathi, Associate Professor	Seminar on Indian Agriculture	The Park Hotel, Hyderabad	19 <sup>th</sup> Feb 2010	Delegate
17	Dr. T. V. Hymavathi, Associate Professor	ASEAN’s Advanced International Food Conference	Organised by Mistry of Commerce and Food Industry Network of Thailand At Bangkok, Thailand	3-6 <sup>th</sup> March	Paper presentation -Traditional Conventional and Functional Foods from Nutritious Millets – An opportunity for Food Industry.
18	Dr.Anurag Chaturvedi, Professor and Associate Dean, Dr.V.Vijaya Lakshmi, Professor, Dr.Uma Maheswari, Professor and Dr.T.V.Hymavathi, Associate Professor	Millet, health nutrition promotional policies	National Institute of Nutrition (NIN), Hyderabad	18 <sup>th</sup> January 2011	Seminar on Deccan Development Society (DDS) and Millet Network of India (MINI)
19	The staff and students of Department of Foods and Nutrition	Indian Agriculture – Are we Heading for a Malthusian Crisis	Park hotel, Hyderabad	19 <sup>th</sup> February 2011	Conference in Confederation of Indian Industry (CII).
20	Dr. T. V. Hymavathi Associate	NAIP Component – II Annual Meet	UAS, Dharwad	15-16 <sup>th</sup> March 2011	NAIP, ICAR, New Delhi

Professor				
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### 7. Popular Articles published

Sl. No.	Name / Designation	Title	Magazine / news paper / news letter	Date / month / year
1	Aparna Kuna, Hima Bindu. N & Poshadri . A	Garlic: A Review	Health action	May, 2010
2	Aparna Kuna, Poshadri . A & Spandana . S	Preventing Cardiovascular Disease through a healthy diet and lifestyle	Health action	October, 2010
3	Aparna Kuna, Spandana . S & Poshadri . A	Medicinal plants for Diabetes mellitus	Health action	December, 2010

### 8. Radio talks given:

Sl. No.	Name / Designation	Title	Date of broadcast	Place / venue
1	Ms.T.Supraja Assistant Professor	“Importance of nutritional contribution by millets in daily diets”	16 <sup>th</sup> July 2010.	All India Radio, Hyderabad
2	Dr. Sucharitha Devi, Assistant Professor	Role of Ragi in prevention of diseases	6 <sup>th</sup> August 2010	All India Radio, Hyderabad
3	Dr. V.Vijaya Lakshmi, Professor	Diet for pregnant and lactating mothers	24 <sup>th</sup> August 2010	All India Radio, Hyderabad

### 9. T.V. Programmes:

Sl.	Name / Designation	Title	Date of	Place / venue
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No.			broadcast	
1	Dr.Kamini Devi, Dr.Vijaya Lakshmi and Dr.S.Shobha, Professors	“Consumption of raw vegetable juices”	13 <sup>th</sup> July 2010.	“Maa TV” interview
2	Dr. V.Vijaya Lakshmi, Professor	Early menarch in childhood	18 <sup>th</sup> August 2010	“Snehita”, TV5

### 10. Extension Activities organised:

Sl. No	Name / Designation	Programme	Place, Date	Purpose
1	Dr. T. V. Hymavathi, Associate Professor	Millet exhibition organised by DSR at NIRD during Millet seminar	NIRD, 12 <sup>th</sup> November 2010	Public Awareness on Millet consumption
2	Dr. T. V. Hymavathi, Associate Professor	Conducted 2 days training programme on Value addition from sorghum for the SHG group members of Jammikunta, KVK (Karimnagar district) and SHG group members of NGO , Indira Priyadarsini, Women Welfare Agency (IPWWA) at Jadcherla, Mahabubnagar district	Post Graduate and Research Centre, December ,2010	For establishing Millet processing units

### OTHER EXTENSION ACTIVITIES:

- World Breast Feeding Week celebrations were conducted by the Department of Foods and Nutrition in collaboration with Food and Nutrition Board, Government of India. Dr. Shahnaaz Vazir, former Deputy Director (NIN) and scientist Emeritus was the chief guest, Dr.Himabindu, Associate Professor of Pediatrics, Nilofer hospital was the speaker on the occasion on 01/08/2009.
- **PCS UNIT ESTABLISHED:** Department has established a production cum sale unit which is functioning in the college from the month of August, 2009. The products on sale are
  1. Ragi malt
  2. Multigrain flour
  3. Tomato pickle
  4. Tomato toffee
  5. Millet based snacks

The department has taken up consultancy service on Design of Diet & Nutrition framework for child Development Centres for the alumni entrepreneurs of Indian School of Business, Hyderabad.

- Recipe contest based on egg was conducted in the department. The contest was sponsored by National Egg Coordination Committee (NECC) on 08/10/09.
- Food fiesta an exhibition cum sale of food products was held in the College of Home Science on 15/02/2010.
- Five faculty members and seven M.Sc (nutrition) students of department participated in a seminar in connection with World Food Day celebrations organized by CII, AP Chapter on 16/10/2009.
- Poustik atta is being manufactured by production unit of Department of Foods and Nutrition and successfully marketed to consumers in the university, college and adjoining institutes. In order to give a safe, wholesome and reliable product, the atta samples have been sent for FPA certification on 12/01/2010.
- **FPO license** was issued to the Department of Food & Nutrition to manufacture Fruit & vegetable products for one year during 2009-10. Proposal for extension of FPO license for a further period of 5years has been submitted and received the sanction in the month of April 2010.

## 11. Visitors

S.No.	Name/address of the visitor	Purpose	Date
1	A team from Kingston University , New Zealand	Research collaboration	20.05.2009
2.	Jaya sree, professor, Arcot university of New south Wales, Sydney, Australia	Opportunities for students at University of New South Wales.	17.06.2009
3.	Dr.R.K.Goyal, National Co- Ordinator, NAIP	To discuss with the NAIP staff about the work being carried out under NAIP millet value chain project	20.02.2010
4	Dr.Michael Keusgen, Dean, Germany	Research colloboration	17/03/2010
5	Dr Whittman and Dr Henke	Scientists from Germany	4.3.2009
6	Principal Secretary, Agriculture and Commissioner	Agriculture to the QC lab	21.4.2009
7	Commissioner of Extension and other officers	GOI	6.5.2009
8	Dr GJN Rao, Head, Crop Improvement, and other Scientists on	CRRI, Cuttack	11.5.2009
9	Director and Executive Director marketing	Bambino Foods	30.9.09



10	US delegation led by Mr. Ronald of KSU accompanied by Ex- VC, ANGRAU Dr. Raghu vardhan Reddy visited the lab on.		18-01-10
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### 12. Research projects completed:

S.No.	Project title	Investigators	Funding agency	Period/duration	Budget Rs. In lakhs
1.	Consumer evaluation and commercialization of diabetic foods	Dr.V.Vijayalakshmi, Dr. S.Shobha and Ms. T.Supraja	State plan research project	1 year	Rs. 3.12 lakhs
2.	Critical evaluation study on causes of mortality and morbidity of Tribals in adilabad district	Dr.K.Uma Devi, Dr.K.Chaithanya kumari and Dr.K.Aparna	UNICEF	Feb 2009 to July 2009	Rs.12.90lakhs
3	Utilization of micronutrient encapsulated underutilized fruit and vegetable powders as colorant for designing value added food products	Dr.K.Uma Maheswari, Dr.K.Uma Devi & Dr.K.Aparna	State plan Research	1 year	3.67 lakhs
4	Establishment of Food Quality Control lab	Dr Anurag Chaturvedi Dr M Sreedhar	Ministry of Food Processing, GOI	Continuous	171.00
5	Development of shelf life intermediate moisture fruit and vegetable products using radiation processing as a hurdle technology	Dr Anurag Chaturvedi Dr J Dilip Babu	Board of Research in Nuclear Sciences, DAE	3 years	26.00
6	Effect of Gamma radiation on morphological, cyto-physiological and molecular aspects in food crops	Dr Anurag Chaturvedi Dr M Sreedhar	Bhabha Atomic Research Center, DAE	3 years	25.00
7	Impact of				

	environmental pollution on heavy metal toxicity and Nutritional profile of rice and fodder varieties cultivated in the Musi river ayacut areas of Ranga Reddy and Nalgonda districts of AP.	Dr M Sreedhar Dr Anurag Chaturvedi	ANGRAU	2 years	4.44
3.	Consumer evaluation and commercialization of millets based diabetic foods	Dr.VVijayalakshmi Principal Investigator, Dr.K.Uma Devi	State Plan	July,2008- March 2009	2.8
3.	Development & evaluation of micronutrient fortified fruit and vegetable bars	Dr.T.V.Hymavathi, Principal Investigator, Dr.K.Uma Maheswari,	State Plan	July,2008- March 2009	3.6

### Research Projects Proposed

S.No.	Project title	Investigators	Funding agency	Period/duration	Budget Rs. In lakhs
1	Utilization of fish mince for formulation of RTE extruded snacks	Dr. Lakshmi Devi Dr.K.Aparna	State plan research project	1 year	1.66 lakhs
2	Consumer evaluation and commercialization of RTE extruded snacks with underutilized fruit and vegetable powders	Dr. K. Uma maheswari & Dr.K. Uma devi	State plan research project	1 Year	1.68 lakhs
3	Development and commercialization of health foods from millets	Dr.V.Vijayalakshmi, Dr. S.Sobha and Ms. T.Supraja	State plan research project	1 year	1.66 lakhs
4	Health status studies around the proposed uranium processing	Dr.K. Uma devi, Dr. K. Uma maheswari	BARC	2 years	38,02,350

	plan at sheripally, Nalgonda district, Andhra Pradesh				
5	Health status studies around the proposed uranium processing plan at Lambapur, Nalgonda district, Andhra Pradesh	Dr. K. Uma maheswari & Dr.K. Uma devi	BARC	2 years	38,02,350

### 8. Research Projects in operation:

Sl. No.	Project title	Investigators	Funding agency	Period / duration	Budget Rs. in lakhs
1	Creation of Demand on millet foods through PCS value chain	Dr. T. V. Hymavathi	NAIP	Since December 2007	59 lakhs
2	Consumer evaluation and commercialization of RTE extruded snacks with under utilized fruit and vegetable powders.	Dr. V. Vijayalakshmi, Dr. S. Shobha & Ms.T. Supraja	State funded project	April 2010 to March 2011	
3	Utilization of fish mince in	Dr. N. Lakshmi Devi & Dr. K. Aparna	State funded project	April 2010 to March	1.76 lakhs

	formulation and development of extruded product			2011	
4	Development and commercialization of health foods from millets	Dr. K. Uma Maheswari & Dr. K. Uma Devi	State funded project	April 2010 to March 2011	
5	Health status studies around the proposed uranium processing plant in Lambapur, Nalgonda district, Andhra Pradesh	Dr. K. Uma maheswari, Professor & Dr.K.Uma Devi, Professor	BARC		
6	Health status studies around the proposed uranium processing plants in Sheripally, Nalgonda district, Andhra Pradesh	Dr.K. Uma devi, Pofessor & Dr.K.Uma Maheswari, Professor	BARC		

### 13. Proposals for the year 2010-11

#### i) Training programmes/ short courses:

1. Training programme on “Newer technologies in food processing from production to consumption” for 21 days from 22/6/2010.
2. Advanced analytical techniques for Food Quality and safety assessment
3. Bio Technology applications in Foods & Nutrition
4. Recent advances in food Toxicology

#### iii) Any other

##### 1. Proposals for the year 2010-11

- Creation of demand for millet foods through PCS value –chain
- Cereal and millet based product development using Extrusion processing
- Micronutrient fortification of the fruit and vegetable products
- Development and commercialization of Diabetic foods
- Extraction of phytochemicals from fruits and vegetables
- Development of user friendly dietary guidelines for different diseases
- Value added unconventional fruit and vegetable dehydrated powders for micronutrient security.

##### 2. The out turn UG and PG Students

- B.HSc with specialization in Foods & Nutrition - 25
- M. Sc- Nutrition and Dietetics - 4
- M.Sc Food Science and Technology - 1
- PG Diploma in Nutrition Therapy - 4
- Ph.D - 0

#### IV. Budget Proposals for the year 2010-11

S. No.	Particulars	Amount (Rs.)
1	21 days trainings (2 Nos)	7,42,000
2	Short term trainings to various clientele	1,50,000
2	TA / DA	50,000-00
3	Purchase of books and printing educational material for different clientele	1,50,000-00
4	Recurring contingencies	2,00,000
5	Staff Salary	3,00,000
	<b>GRAND TOTAL Rs.</b>	<b>15,92,000</b>

**(RUPEES FIFTEEN LAKHS NINETY TWO THOUSAND ONLY).  
APPENDIX-1**

## **WORKPLAN FOR CENTRE OF ADVANCED STUDIES**

**Department of Foods & Nutrition  
Post Graduate & Research Centre, ANGR Agricultural University  
Rajendranagar, Hyderabad-500030**

### **I OBJECTIVES**

1. To serve as a national resource and training centre for faculty in the field of Foods & Nutrition
2. To update the curriculum and courses of Foods & Nutrition to strengthen teaching and evaluation at UG and PG level.
3. To support the government in training personnel
4. To disseminate nutrition information to personnel of different sectors.

### **II. OUTPUTS/PROGRAMMES TO BE IMPLEMENTED DURING THE CURRENT PLAN PERIOD**

#### **Objective 1**

To serve as a national resource and training centre for faculty in the field of Foods & Nutrition in State Agricultural Universities.

#### **Action Plan**

##### **A. Summer Institutes / Short courses**

Conducting two Short Courses of twenty one days duration in priority areas of Foods & Nutrition and two Summer Institute Programme every year.

##### **Priority areas identified for Summer Institute Programme/Short Courses**

- Recent developments in nuts & oils in relation to health
- Newer technologies in food chain from production to consumption
- Analytical methods for nutrition research
- Grain science and technology
- Role of enzymes and microbes in food processing

## **B. Allocation of Seats under PG Programme**

Provision of seats in M. Sc. and Ph. D. in Foods & Nutrition and Food Science & Technology to outside State candidates selected through a common test conducted by ICAR.

### **Objective 2**

To update the curriculum and courses of Foods & Nutrition and strengthen teaching and evaluation at UG and PG level

#### **Action Plan**

**To implement the course curriculum for UG programme keeping in view the recommendation of IVth Dean's Committee from the year 2009-10.**

### **Objective 3**

**To support the Government in training personnel and in implementation and evaluation of nutrition programmes.**

#### **Action Plan**

**Assessing and developing the training needs of the line departments (Women's Development & Child Welfare; Social & Tribal Welfare, Panchayat Raj & Rural Development) through meetings and group discussions.**

### **Objective 4**

**To disseminate nutrition information to personnel of different sectors.**

#### **Action Plan**

**To bring out the quarterly issue of Food & Nutrition News letter for circulation among the line departments and the organizations involved in nutrition related programmes.**

**Organizing group meetings for academicians, administrator, planners and extension workers to appraise them of nutrition situation and integrate nutrition component in the programmes of their departments. Food & Nutrition information through mass media (TV, Radio and Press)**

## **III . EXPECTED OUTCOME BY THE END OF THE PLAN PERIOD**

**Faculty improvement in terms of teaching, research and extension.**

**Strengthening Post Graduate Education and Research in Foods & Nutrition in other State Agricultural Universities. Conducting need based multi centric studies to provide feed back to the planners and policy makers.**



**PROPOSALS FOR THE YEAR 2009 - 10**

**APPENDIX – II**

**WORK PLAN FOR CENTRE OF ADVANCED STUDIES  
FOR THE YEAR 2009 - 10 FOR APPROVAL**

**Department of Foods & Nutrition, Post Graduate & Research Centre  
Rajendranagar, Hyderabad - 500 030.**

**I. OBJECTIVES**

- To serve as a national resource and training centre for faculty in the field of Foods & Nutrition
- To update the curriculum and courses of Foods & Nutrition to strengthen teaching and evaluation at UG and PG level.
- To support the government in training personnel
- To disseminate nutrition information to personnel of different sectors.

**II. OUTPUTS/PROGRAMMES IMPLEMENTED DURING THE X PLAN PERIOD**

**Objective 1**

To serve as a national resource and training centre for faculty in the field of Foods & Nutrition in State Agricultural Universities.

**Action Plan**

**A. Short courses**

Conducting two Short Courses/Training programmes in priority areas of Foods & Nutrition as per the need.

**Priority areas identified for Summer Institute Programme/Short Courses**

- Recent developments in nuts & oils in relation to health
- Newer technologies in food chain from production to consumption
- Analytical methods for nutrition research
- Grain science and technology

- Role of enzymes and microbes in food processing

## **B. Allocation of Seats under PG Programme**

Provision of seats in M. Sc. and Ph. D. in Foods & Nutrition and Foods Science & Technology to outside State candidates selected through a common test conducted by ICAR.

## **C. Research**

### **Research proposals for XI Five year plan**

1. Acceptability study on Hot Foods (Instant Mixes): A two months (April- May 2009) research study will be taken up in 3 regions of Andhra Pradesh to test the acceptability of the instant mixes (*Upma, Kichidi & Halwa*) developed by A.P. foods, Hyderabad in ICDS centres. The target groups selected will be pre school children, pregnant & lactating women. Pretested & structured schedules will be developed to collect the needed data from the target groups, Anganwadi workers & Village key personnel. Recommendations will be made after analyzing the data.
2. Consumer evaluation and commercialization of Diabetic foods – Dr. V. Vijayalakshmi -3.12
3. Development and evaluation of micronutrient fortified fruit & vegetables - Dr. T.V. Hymavathi – 3.12
4. Utilization of micronutrient encapsulated underutilized fruit and vegetable powders as natural colourant for designing value added food products - Dr. K. Uma Maheswari – 3.76

### **Objective 2**

To update the curriculum and courses of Foods & Nutrition and strengthen teaching and evaluation at UG and PG level

#### **Action Plan**

**The Revision of PG curriculum of Nutrition and Dietetics programme is in progress and the revised curriculum will be implemented from 2009-10 admitted batch.**

### **Objective 3**

**To support the Government in training personnel and in implementation and evaluation of nutrition programmes.**

#### **Action Plan**

**Assessing and developing the training needs of the line departments (Women's Development & Child Welfare; Social & Tribal Welfare, Panchayat Raj & Rural Development) through meetings and group discussions. Food & Nutrition information through mass media (TV, Radio and Press) for awareness creation. Conducting evaluation study titled "Impact assessment of food security Programme of Indira Kranthi Patham".**

#### **Objective 4**

**To disseminate nutrition information to personnel of different sectors.**

#### **Action Plan**

**To bring out the quarterly issue of Food & Nutrition News letter for circulation among the line departments and the organizations involved in nutrition related programmes.**

#### **Forth Coming Foods & Nutrition News letters**

**Three issues of quarterly news letters will be coming up on latest topics which will be prepared by the staff of Department of Foods & Nutrition in their specialized areas.**

### **III . EXPECTED OUTCOME BY THE END OF THE PLAN PERIOD**

**Providing common resource material for teaching and evaluation of food and nutrition programmes at UG and PG level.**

**Faculty improvement in terms of teaching, research and extension.**

**Strengthening Post Graduate Education and Research in Foods & Nutrition in other State Agricultural Universities.**

- **Conducting need based multi centric studies to provide feed back to the planners and policy makers.**

# **APPENDIX - I**