

*Excellence is a continuous process and not an accident*

- A.P.J. Abdul Kalam

### CRITERION III: RESEARCH, CONSULTANCY AND EXTENSION

#### 3.1 Promotion of Research

3.1.1 Does the institution have recognized research center/s of the affiliating University or any other agency/organization?

Yes, Padmashree Institute of Management and Sciences have a full-fledged Biotechnology Research Centre recognized by Bangalore University.

3.1.2 Does the Institution have a research committee to monitor and address the issues of research? If so, what is its composition? Mention a few recommendations made by the committee for implementation and their impact.

Yes, PIMS has Research Advisory Committee (RAC). RAC consists of experts from Industry, Academia, Management and Research Institutions. The composition of RAC is as follows:

Director & Convener **Dr. Anuradha M**

Coordinator **Dr. S. Balasubramanya**

Members **Dr. Chidananda Sharma**  
Professor, Dept of Biotechnology, Bangalore University  
**Dr. K. Manjunath**  
Professor, Dept of Microbiology & Biotechnology, BUB  
**Mr. Rajesh Shenoy**  
Director, Padmashree Group of Institutions  
**Dr. C.N. Manoj**  
CEO, Pelican Biotech and Chemicals Pvt. Ltd., Kerala  
**Dr. Priya R. Rao**  
Director - R&D, Pelican Biotech & Chemicals Pvt. Ltd., Kerala  
**Mr. S. Swaminathan**  
Ex-Director, Katra Phytochem Pvt. Ltd., Bangalore  
**Dr. (Ms.) Rama Rao**  
Head, Dept of Chemistry, PIMS

The committee meets annually and discusses various aspects of research activities undertaken at PIMS including upgradation of research facilities, research activities undertaken by faculty and students. The major suggestions made by RAC are:

1. To make the research centre self-sustained by getting sponsorship and grants.
2. To earmark a separate budget for research activities.
3. To have funds and fellowships for research scholars from management or donor sponsorships from industries.
4. To extend analytical and consultancy services to industry and other academic institutes/research scholars/individuals.

The recommendations made by RAC have already implemented. The impact has been in upgradation of laboratory, faculty getting enrolled for M. Phil./Ph.D. (part-time or extra-mural) programmes, increase in number of research publications by faculty and students, Successful implementation of projects sanctioned by state/central government agencies and industries.

### 3.1.3 What are the measures taken by the institution to facilitate smooth progress and implementation of research schemes/projects?

- autonomy to the principal investigator
- timely availability or release of resources
- adequate infrastructure and human resources
- time-off, reduced teaching load, special leave etc. to teachers
- support in terms of technology and information needs
- facilitate timely auditing and submission of utilization certificate to the funding authorities
- any other

PIMS from the day of its inception has keenly focused on promote research and development. Management with its vision to achieve Centre for Excellence in life sciences supports research and related activities in every aspect. Promotion of research and encouraging young scholars to pursue their career in research and development has been the corner stone of PIMS mission.

**Autonomy to the principal investigator** – Provision of full autonomy to the project investigators and mentors is a practice at PIMS. There are many sponsored projects from various agencies. Planning, procurement of sanctioned equipment, execution of the project is done by PIs in coordination with management. Utilisation of funds, administrative and clerical support is made available throughout without any constraints. Separate budget is allocated and a separate account is maintained for research and projects.

**Adequate infrastructure and human resources** – There is a separate research facility supported with central instrumentation lab. Many faculty members are provided with the necessary infrastructure to pursue their research and doctorate program. Teachers are encouraged to register their M.Phil and Ph.D., programs.

**Time-off, reduced teaching load, special leave etc. to teachers** - Financial and leave benefits are provided when there is a need to attend conferences, seminars and workshops. Special leave is provided to teachers for completing course work, exams and viva voce related to their doctoral program.

**Support in terms of technology and information needs** – Faculty and students are encouraged to avail the facilities and free access to internet and digital library is provided. Membership cards to avail Bangalore University library facilities

are secured by paying annual subscription. Proposal to subscribe online journal facility is on cards and it is under process.

**Facilitate timely auditing and submission of utilization certificate to the funding authorities** - Institute facilitates timely auditing and provides the documentary support and finance department ensures timely submission of audited statement of accounts, statement of expenditure and utilization certificate to the funding agencies.

**Any other** – Institution encourages research oriented towards socio-economic improvement, women and child health.

#### 3.1.4 What are the efforts made by the institution in developing scientific temper and research culture and aptitude among students?

Students are always encouraged to take up research projects throughout the span of their course. Mentors guide the students in planning experiments, literature survey and preparing reports based on the results. They encourage the research aptitude in students in organizing R&D seminars, brain storm sessions in latest research topics and demonstrations. Our students have participated in various seminars and conferences and have given oral and poster presentations. The college has the credit of getting awards and prizes in research presentations made by students. Every year our students bring out their research findings to the scientific community by publishing their work in various national and international journals.

In the year 2011, the college has received grants from the Government of Karnataka in carrying out short term projects for undergraduate students. This is an initiative of Vision group of Science and Technology, an enterprise under the State Department of Science and Technology.

The college encourages students to pursue live projects sponsored by industry. It also supports to participate in national and international seminars. Organized visits to reputed research institutes/laboratories, where students will have an opportunity to interact with eminent scientists. Special talks or lecture series are planned to teach research methodology. Students are motivated to send projects and till now four projects got selected under VGST – SPiCE program of Dept. of IT, BT and S&T, Government of Karnataka to support their projects. Students during their courses at PIMS are guided to apply to fellowships offered by DST, New Delhi. Every year students of PIMS are bagging Rajat Jayanthi Vigyan Sancharak Fellowships sponsored by DST, New Delhi. Many students are pursuing either doctoral program and/or have joined as JRF's in reputed research institutes both in India and abroad and taken up research as a career.

**3.1.5 Give details of the faculty involvement in active research (Guiding student research, leading Research Projects, engaged in individual/collaborative research activity, etc.**

Dr. Anuradha has been recognized as Research Supervisor by Acharya Nagarjuna University, Guntur and Jawaharlal Nehru Technological University, Hyderabad. Under her guidance five research scholars have registered for Ph.D. program and presently pursuing their research work. Mr. Kumaraswamy has already been awarded both M.Phil degree and Ph.D. degree under her guidance. Mr. Thammaiah, English faculty has also obtained both M.Phil and Ph.D. degree. Mr. Sudipta Kumar Mohanty has submitted his Ph.D. thesis and three other faculty members are on the verge of completing their research work and submit their thesis.

**Details of research work carried out by faculty (Completed)**

Name of the Scholar	Title of the thesis	Name of the University	Remarks
M. Kumara swamy	Micropropagation of <i>Pogostemon cablin</i> – An aromatic plant	Acharya Nagarjuna University, Guntur, A.P.	M.Phil Awarded
M. Kumara swamy	Screening, selection, <i>in vitro</i> multiplication and germplasm conservation of elite clones of <i>Pogostemon cablin</i> Benth.	Acharya Nagarjuna University, Guntur, A.P.	Ph.D. Awarded
Sudipta Kumar Mohanty	A Systematic investigation of <i>Leptadenia reticulata</i> (Retz.) Wight & Arn.- an endangered medicinal plant of India	Acharya Nagarjuna University, Guntur, A.P.	Ph.D. thesis Submitted
Thammaiah	Indianness in the select novels of Shashi Tharoor	Annamalai University	M.Phil awarded
Thammaiah	Treatment of Women In Shakespearean Tragedies-A Study	Bangalore University	Ph.D. Awarded
Dhatri Devi N	Microbial production and characterization of L-Glutaminase from <i>Aspergillus wentii</i>	Vinayaka Mission	M.Phil awarded
Thilaka G K	Biosorption of Chromium from the industrial effluent using dead Bacterial and Fungal sp.	Annamalai University	M.Phil awarded

#### Details of research work carried out by faculty (ongoing)

Name of the scholar	Registration details	Research topic
Pradeep S Kaushik	2008, Part-time, Acharya Nagarjuna University, Guntur	Tissue culture studies, Biomass improvement and yield enhancement of <i>Ophiorrhiza mungos</i>
Lokesh P	2009, Part-time, Jawaharlal Nehru Technological University, Hyderabad	Biomass improvement and secondary metabolite production in tissue culture and conventionally propagated plants of <i>Nothapodytes foetida</i>
Raouf Ahmad Mir	2009, Part-time, Acharya Nagarjuna University, Guntur	Camptothecin producing endophytic fungus
G.K. Thilaka	2012, Part-time Bharathidasan University	A novel Approach to construct synthetic Human Erythropoietin gene and Cloning and Expression of Recombinant Human Erythropoietin in <i>Pichia pastoris</i>

#### Details of sponsored research projects

Sl. No.	Title of the project	Funding Agency	Status
1.	Cost effective study of micropropagation of <i>Leptadenia</i>	National	Completed

	<i>reticulata</i> to make it feasible for commercial supply of elite germplasm for farmers.	Medicinal Plants Board, New Delhi	
2.	Tissue culture and conventional propagation of <i>Nothapodytes foetida</i> for large-scale supply of quality saplings and comparative study with <i>Camphotheca acuminata</i>	National Medicinal Plants Board, New Delhi	Completed
3.	Adoption of innovative portable technology for generation of pre-grown vegetables, ornamentals, medicinal and aromatic plants for ready-to-grow plants to cities and marketing by farmers and rural youth	Department of Biotechnology, New Delhi	Approved

### Faculty involvement in student projects

So far the institute has been sanctioned four research projects for students under the VGST - SPiCE program of which three are completed with one on-going. The students are guided by our faculty members in implementing the project and submission of report.

Sl. No.	Faculty Name	Student Name	Title of the project
1.	Rekha L	Ms. Julia Thomas & Ms. Santwana D	Identifying the mutagenicity of various commercially available hair dyes and hair colours
2.	Dr. Kumara Swamy M	Mr. Neeraj Pokharen & Mr. Santosh Dahal	Phytochemical and antibacterial analysis of leaf extracts of <i>Euphorbia neriifolia</i>
3.	Dr. Ravikumar H.N	Ms. Gurmeet Kaur & Ms. Geeta Devi	Phytochemical and antifungal evaluation of Castor plant leaves ( <i>Ricinus communis L.</i> ) -
4.	Lokesh P	Mr. Sudeep Shah	Evaluation of Biodiesel production from microalgae collected from fresh water habitats

The faculty is also involved in guiding students in doing minor projects. Few projects along with name of the student and faculty who guided are listed below.

Sl. No	Project title	Name of the students	Project guide	Year
1	Synthesis of Silver Nanoparticles from leaf extract of <i>Leptadenia reticulata</i> and its biological activity	Mr. Mahammad Sadik Ashiqhusen Ghanchi and Mr. Jayanta Kalai	Dr. Kumara swamy	2013
2	Isolation of camptothecin producing endophytic	Mr. Avula Bhargav	Mr. Rouf Ahmed	2013

	fungus	& Mr. Suman Singh		
3	Phytochemical screening, antioxidant, antimicrobial and cytotoxic activity of different extracts of <i>Lantana camara</i>	Mr. Bharath Pokhrel and Mr. Priyesh W	Dr. Kumara swamy	2013
4	Isolation, partial purification and characterization of protease and keratinase producing organisms from contaminated soil sample	Ms. Julia Sapam Mr. Vamshi Thota and Ms. Patel Ankita Ashokbhai	Mr. Sudipta K M	2013
5	Biological activity of the extract from the endophytic fungus isolated from <i>Adathoda vasica</i>	Mr. Pabal Ajith and Ms. Priyadarshani Yengkokpam	Dr. Kumara swamy	2013
6	Optimization and characterization of amylase production from bacteria	Ms. Swati Dubey	Dr. Kumara swamy	2013
7	Screening and characterization of microorganisms for degradation of azo-dyes	Ms. Priyanka Patel and Neha Babubhai Bhuva	Mr. Sudipta K M	2013
8	Production of keatinase from microbial sources	Manoj C, Shankar G	Dr. Pramod T	2013
9	Optimization of cultural conditions for the production of L asperginase	Athira N, Narendra and T E Devi	Dr. Pramod	2013
10	Extraction of natural dyes from <i>Spathodea campanulata</i> and its application on silk fabrics and cotton	Parthasarathi B, P Monika	Mr. Lokesh P	2012
11	Production and optimization of extra cellular Protease from <i>Bacillus</i> sp. Isolated from soil	S.S.N. Kashyap, R. Vijay, Rahul Tiwari,	Dr. Kumara swamy	2012
12	Phytochemical screening and in vitro antimicrobial activity of <i>Bougainvillea spectabilis</i> flower extracts	M Neeki A, Rashmi, S Bhaumik H, S Darshil H, R Vijay and SSN Kashyap	Mr. Sudipta K M	2012
13	Effect of carbon and nitrogen sources on the production of xanthan gum from <i>Xanthomonas campestris</i> isolated from soil.	Behlol Khan	Mr. Sudipta K M	2012
14	Identification and characterization of a novel isolate <i>Comomonas kerstersii</i> KSM7 for extracellular $\alpha$ - amylase production	P Sandip, Parthasarathi B, P Monika, M Neeki and N Nabendu	Dr. Kumara swamy	2012
15	Phytoconstituents and their influence on antimicrobial properties of <i>Morinda citrifolia</i> L.	Adhikari P	Dr. Sibi G	2012
16	Anti-dandruff activity of <i>Ricinus communis</i> L. leaf extracts	Gurmeetkaur G & Devi K	Dr. Sibi G	2012
17	Management of vegetable wastes by vermicomposting technology	M. Kaur	Dr. Sibi G	2011
18	Role of phosphate solubilizing fungi during phosphocompost production and their effect on the growth of tomato ( <i>Lycopersicon esculentum</i> L) plants	Premta Devi	Dr. Sibi G	2011
19	Molecular docking and receptor based analysis of H1N1 antiviral drugs	Bhimanagouda and Patil R	Dr. Dhananjaya K	2011
20	Prevalence, Microbiologic Profile of Urinary Tract Infection	Fouzia K and Dhahir	Dr. Sibi G	2010
21	Microbial Load assessment and characterization in water samples of Kommagatta lake.	Ankur and Anitha	Dr. Sibi G	2010
22	Biochemical characterization of amylase enzyme	Naseema and Kechu	Dr Sibi	2009
23	Microbial quality assessment at the local municipal	Pandey and Pradip	Mr. Naveen	2009



	hospital in Kengeri			
24	Extaction and phytochemical analysis of seed extracts of Watermelon.	Mr. Lokanath and Girija	Mrs. Dhatri devi	2010
25	Extraction and purification of turumerine from <i>Curcuma longa</i>	Manjunath and Ashish k	Ms. Kavitha A	2009
26	Evaluation of antioxidant activities of important medicinal plants	Diganta D and Sowmy Ranjan	Mr. Lokesh P	2012
27	Elicitation of gymnemic acid production in cell cultures of <i>Gymnema sylvestris</i>	Ashok Kandre	Dr. Anuradha M	2006
28	Production and partial purification of L-Asperginase from <i>Aspergillus terries</i>	Huchesh H and Uday B	Dr. Siddalingeshwara K G	2006
29	Encapsulation of <i>Coleus forskholi</i> explants	Nimisha Nigam	Dr. Anuradha M	2005

### Details of collaborations with Industry/Research Institutions

The college always believed that academy-industry is key aspect of higher education. In this connection we both formal and informal tie ups with many industries/Research institutes. In the year 2008, the institution started a novel program called “BiodHRona” which mainly focus on developing interactions and network with NGOs and Industries. This initiative aimed at giving services to students in terms of training and placement. During this process the college has entered into MOU with few industries while has obtained tie ups with many other industries. The list of important industries is as follows-

1. Rishi Herbal Technologies Pvt Ltd., Bangalore
2. Pelican Biotech and Chemical Labs Pvt. Ltd., Kerala
3. Sanat Products Pvt. Ltd., New Delhi
4. Charms Chem Pvt. Ltd., Pune
5. Katra Phyto Chem Pvt. Ltd., Bangalore
6. J K Agrigenetics Pvt. Ltd., Hyderabad
7. Zakini Labs, Bangalore.

Efforts are on to have collaborative interaction with the following organizations:

1. Gwalior Forest Products, Shivpuri, Madhya Pradesh

2. Hi-herbs Udyoga Extracts, Bangalore
3. Radiant Research and services, Pvt. Ltd., Bangalore
4. Navashakthi herbal labs, Bangalore
5. Natural Remedies Pvt. Ltd., Bangalore
6. Kisalaya Herbals Pvt. Ltd, Indore

3.1.6 Give details of workshops / training programmes / sensitization programmes conducted/organized by the institution with focus on capacity building in terms of research and imbibing research culture among the staff and students.

Details of workshops/training programs organized by the institution are given below.

Sl. No.	Workshop/Training on
1	Phytochemicals from Microbes
2	Metabolic Engineering of fermentation microbes for different applications
3	Chromatographic techniques and HPLC Training.
4.	“Computational Biology Pharmaceuticals and Life Sciences” jointly with Maharani Lakshmi Ammanni College for Women, Bangalore

Details of research oriented /sensitization programs

Sl. No.	Research oriented /sensitization program	Beneficiary
1	Aromatic species as an alternative for Mulberry	Government School in O.Mittur, Kolar through CIMAP, Bangalore
2	Training in plant tissue culture techniques	Government High School, Sulikere, Bangalore
3	Training in plant tissue culture techniques	Government High School, O. Mittur, Kolar

Details of seminars/conferences organized:

Sl. No.	Title seminar/conference	Date	Sponsored by
1.	Life Sciences – An evergreen option for blooming career	April 04, 2009	Self
2.	National conference on “Emerging trends in plant tissue culture and secondary metabolite production”	May 22 <sup>nd</sup> & 23 <sup>rd</sup> 2009	DST, New Delhi
3.	National conference and workshop on “Computational Biology Pharmaceuticals and Life Sciences” jointly with Maharani Lakshmi Ammanni College for Women, Bangalore	23 <sup>rd</sup> & 24 <sup>th</sup> November 2012	UGC and DBT, New Delhi

3.1.7 Provide details of prioritized research areas and the expertise available with the institution.

Sl. No	Prioritized research	Expertise available
1.	Micropropagation of medicinal and aromatic plants	Dr. Anuradha M Dr. Balasubramanya S Dr. Kumara swamy M Mr. Sudipta K M
2.	Secondary metabolite production	Dr. Anuradha M Dr. Balasubramanya S Dr. Kumara swamy M Mr. Sudipta K M Mr. Lokesh P
3.	Phytochemical profiling of medicinal plants	Dr. Kumara swamy M Mr. Sudipta K M Mr. Lokesh P Mr. Pradeep S Koushik
4.	Bioprospecting of Endophytic fungus	Dr. Anuradha M Dr. Balasubramanya S Mr. Lokesh P Mr. Pradeep S Koushik
5.	Isolation and purification of active compounds from plants	Dr. Kumara swamy M Mr. Sudipta K M Mr. Lokesh P Mr. Pradeep S Koushik
6.	Elicitation and biotransformation studies.	Dr. Anuradha M Dr. Balasubramanya S Dr. Kumara swamy M Mr. Sudipta K M Mr. Lokesh P Mr. Pradeep S Koushik
7.	Studies on biological activities of plant extracts	Dr. Kumara swamy M Mr. Sudipta K M Mr. Lokesh P Mr. Pradeep S Koushik
8.	Molecular marker assisted selection of plants	Dr. Kumara swamy M Mr. Sudipta K M

9.	Nutraceuticals	Dr. Chetan L Hanchate Dr. Anuradha M Mr. Lokesh P Mr. Pradeep S Koushik
10.	Food and Nutrition	Dr. Balasubramanya S Dr. Chetan L Hanchate Mr. Lokesh P Mr. Pradeep S Koushik

**3.1.8 Enumerate the efforts of the institution in attracting researchers of eminence to visit the campus and interact with teachers and students?**

Faculty at PIMS has a mandate to invite researchers to the campus. The list of eminent researchers visited the campus are

Prof. B Thimme Gowda	Hon'ble Vice - Chancellor, Bangalore University, Bangalore
Dr. N. Prabhudeva	Former Hon'ble Vice – Chancellor, Bangalore University, Bangalore
Prof. H.A. Ranganath	Former Hon'ble, Vice – Chancellor , Bangalore University & Former Director, NAAC
Dr. Priya R. Rao	Director- R & D Pelican Biotech & Chemical Labs Pvt. Ltd., Kerala
Dr. Kameshwara Rao	Professor (Retd.), Dept. of Botany, Bangalore University, Bangalore
Dr. Doreswamy	Scientist (Retd.), IIHR & Plant Tissue culture Industry Expert
Dr. G. Purushottam	Director, Indus Seeds Pvt. Ltd., Bangalore
Dr. Manoj C N	Director & CEO, Pelican Biotech and Chemical Labs Pvt. Ltd., Kerala
Dr. G. A. Ravishankar	CFTRI, Mysore
Prof. Dilip Kumar Thakur	Former VP ,Wipro, Bangalore
Dr. Rajeev Gowda	Professor, IIM, Bangalore
Dr. Bhanu K M	Professor, S V University, Tirupati
Dr. Pullaiah T	Professor, S K University, Anantapur, A.P
Dr. Shiva Prakash N	Sr. Scientist and Transformation Biologist, Monsanto Research Center, Bangalore
Dr. D.H. Tejavathi	Professor, Dept of Botany, Bangalore University

Dr. Jitendra Prasad	President, In Vitro International Pvt. Ltd., Bangalore
Dr. Seenappa	Eminent Ornithologist

3.1.9 What percentage of the faculty has utilized Sabbatical Leave for research activities? How has the provision contributed to improve the quality of research and imbibe research culture on the campus?

The Institution had made provision for extending study leave for pursuing their M.Phil/Ph.D course work, attending *viva voce* and undertake research. Faculty are encouraged to attend national and international conferences, workshops, seminars, conferences, , etc., present papers and posters in the same. Nearly 25% of faculty has availed the facility so far. For attending conferences, traveling, boarding, lodging and local conveyance allowances are paid for the senior faculty. Free access to ICT, basic infrastructure like computers, internet, reprographic facilities, printing and library facilities are also provided. Letter of appreciation and performance based incentives are given to faculty and students.

3.1.10 Provide details of the initiatives taken up by the institution in creating awareness/advocating/transfer of relative findings of research of the institution and elsewhere to students and community (lab to land)

The research activities pursued at PIMS and the expertise available is utilized to create awareness and transfer the technology for the betterment of student and community at large. The students are encouraged to design teaching modules/kits specially targeted at rural school children and submitted projects to Department of Science and Technology, New Delhi for funding. The lists of **Rajat Jayanthi Vigyan Sancharak Fellowship** projects submitted by students of PIMS and selected

for funding are given under.

Year	Project title
2010	Development of low cost strategic modules and edukits for training science teachers in conventional and applied propagation techniques
2011	Creating awareness in rural schools about lignin contamination by coconut-husk and its biodegradation by cost effective methods
	Reducing the level of toxic substances at home, by educating school children of the use of household and natural ingredients
	Educating school children about the benefits of hydroponics and encouraging its use among them
2012	Designing low cost instruments and technology in molecular biology for higher secondary (rural and semi-urban) students
	Creating awareness about food safety in anganwadi kitchens

The faculty of PIMS have also made efforts to ensure that their research findings reach the masses. The list of projects implemented by faculty and/or submitted to external agencies for funding are as follows:

Adaptation, replication, scientific validation and scale-up of the patented formula that can enhance the micronutrient and phytochemical constituents in the staple food and its utilization towards improved nutritional and financial status of selected semi-rural poor woman of selected revenue villages of Kengeri Hobli, Bangalore in collaboration with RISHI Foundation, Bangalore and Pelican Biotech & Chemical Labs Pvt. Ltd., Kerala
Adoption of innovative portable technology for generation of pre-grown vegetables, ornamentals, medicinal and aromatic plants for ready-to-grow plants to cities and marketing by farmers and rural Youth in collaboration with Pelican biotech & Chemical Labs Pvt. Ltd., Kerala, and RISHI Foundation, Bangalore.
Tissue culture and conventional propagation of <i>Nothapodytes foetida</i> for large-scale supply of quality saplings and comparative study with <i>Camphotheca acuminata</i> in collaboration with RISHI Foundation, Bangalore and Charms Chem Pvt. Ltd., Pune
Cost effective study for micropropagation of <i>Leptadenia reticulata</i> to make it feasible for commercial supply of elite germplasm to farmers

### 3.2 Resource Mobilization for Research

#### 3.2.1 What percentage of the total budget is earmarked for research?

Give details of major heads of expenditure, financial allocation and actual utilization.

Sl. No	Budget Head	Amount allocated	Actual utilization	% of fund utilization	Remarks
1	Journals, periodicals and digital library	1,00,000/-	30,000/-	30 %	Remaining amount will be utilized in due course
2	Chemicals and glassware	5, 00,000/-	2,50,000/-	50 %	Remaining amount will be utilized in due course
3	Maintenance	2,00,000/-	1,00,000/-	50 %	Remaining amount will be utilized in due course
4	Seminars/ conferences and workshops	1,00,000/-	1,00,000/-	100 %	-
5	Paper publications	25,000/-	25,000/-	100 %	-
6	Equipment	1,00,00,000/-	70,00,000/-	70 %	Remaining amount will be utilized in due course
7	Travel	50,000/-	50,000/-	100 %	-

3.2.2 Is there a provision in the institution to provide seed money to the faculty for research? If so, specify the amount disbursed and the percentage of the faculty that has availed the facility in the last four years?

As the institution believes that research as the prime driving force in all the post graduate programs, the committee is keen in active participation of the faculty members in research. Institution encourages faculty members to register for their PhDs on extramural and part time basis, entire facility and consumables are provided to the faculty for their research activities. Financial assistance is provided for paper publication. On duty leave is granted for appearing for pre-Ph.D exams, viva-voce, attending seminars and conferences.

Seed money is sponsored to faculty members who are interested in carrying out short term research work and subsequent publication.

3.2.3 What are the financial provisions made available to support student research projects by students?

Students are provided with infrastructure and consumable support to pursue their research projects. Though the projects are restricted to final semesters, students are allowed to do projects from 3<sup>rd</sup> semester onwards, to enable them for completing

the work and publishing papers. Financial support in the form of stipend to selected students is provided by a collaborating industry Rishi Herbal Technologies Pvt. Ltd. Bangalore.

**3.2.4 How does the various departments/units/staff of the institute interact in undertaking inter-disciplinary research? Cite examples of successful endeavors and challenges faced in organizing interdisciplinary research.**

Padmashree Research and Innovation Forum (PRIF) to interact and undertake inter-disciplinary research utilizing the expertise and facility available with institute has been established. Dr. Anuradha is the Convenor and Dr. S. Balasubramanya is its Coordinator. The teaching faculty of Department of Chemistry & Biochemistry and Biotechnology & Microbiology are its members. They meet both formally and informally to discuss various aspects including research facilities required, funds mobilization and student participation in research activities.

For the inculcation of interdisciplinary research aptitude in the students and faculty, the college takes several initiatives like organizing guest talks on latest development, awareness about tools which can be used to improvise their research output for example, HPLC is an analytical tool which has application in chemistry, microbiology, biochemistry, biotechnology etc, The students and faculty are encouraged to take project topics with HPLC as one of the analytical parameter. In a similar way ICT, Statistics, molecular biology is intercalated into the research work. Faculty are registered their doctorate under different domains irrespective of their post graduation degree. In this regard, department of Biotechnology & Microbiology collaborates with Padmashree Institute of Clinical Research for undertaking animal studies.



During Eco–Week entire group institutions are invited to participate irrespective of their specialization. For example, Nursing College students came out with bio medical waste management.

Many faculty members of department of biochemistry, having basic degree in biochemistry are pursuing their Ph.D. program in plant biotechnology.

As next step efforts are on to establish Padmashree Research Centre including other group institution departments to undertake inter-disciplinary research in the area of health and family welfare.

### 3.2.5 How does the institution ensure optimal use of various equipment and research facilities of the institution by its staff and students?

Institute ensures that the students and staff are properly trained to handle the equipment/facility purchased. Apart from organizing demonstration by technical people of equipment supplier, the staffs are sent to industries to get training in the optimal utilization of equipments installed. Industry experts are also invited to train staff and students in handling the equipments.

- List of faculty trained in handling HPLC

Mr. Pradeep S Kaushik, Rukaya Amin Chowdery and Mr. Lokesh

- List of faculty trained at Industries or Institutes –

Mr. Upendra Sharma, Dr. Kumaraswamy, Mr. Sudipta Kumar Mohanty

Faculty and students are allowed to interact in specific requirement and usage of high end equipment. Students are allotted to guides to supervise their projects. Project areas are selected by integrating the latest development and planned as per the infra structure and facility available. Teachers are allowed to register for extra mural and part time research programs, so that they will be pursuing their experimental work

in the college and there-by ensuring optimal utilization of research facilities.

We in turn organize hands-on training and workshops for students/faculty of other colleges and institutes for optimal utilization of equipments and facility.

**3.2.6 Has the institution received any special grants or finances from the industry or other beneficiary agency for developing research facility? If ‘yes’ give details.**

Yes, Institution received grants both from industry, central and state government agencies for developing research facility. The details of the same are as given under

<b>Name of the agency/Industry</b>	<b>Amount received</b>
National Medicinal Plants Board, New Delhi	7.00 Lakhs
Sanat products Ltd., New Delhi	0.40 Lakhs
National Medicinal Plants Board, New Delhi	25.00 Lakhs
KBITS, Dept. of IT, BT and S&T, GoK	100 Lakhs
VGST, SPiCE Program	1.20 Lakhs

**3.2.7 Enumerate the support provided to the faculty in securing research funds from various funding agencies, industry and other organizations. Provide details of ongoing and completed projects and grants received during the last four years.**

Faculty members are informed about the project advertisements published by various agencies. Interested teachers and students are motivated and helped in generating an idea, drafting a project, editing, framing budget proposal and handholding is provided by PRIF at every stage. If required, research coordinators and PIs of the projects are provided with financial support for visiting and presenting projects at New Delhi or any other place as required by the funding agencies.

Nature of the Project	Title of the project	Name of the funding agency	Total Grant		Total grant received till date
			Sanctioned	Received	
Minor projects	Cost effective study of micropropagation of <i>Leptadenia reticulata</i> to make it feasible for commercial supply of elite germplasm for farmers.	National Medicinal Plants Board, New Delhi	7.00 Lakhs	7.00 Lakhs	7.00 Lakhs
Major projects	Tissue culture and conventional propagation of <i>Nothapodytes foetida</i> for large-scale supply of quality saplings and comparative study with <i>Camphotheca acuminata</i>	National Medicinal Plants Board, New Delhi	25.00 Lakhs	25.00 Lakhs	25.00 Lakhs
Interdisciplinary projects	-	-	-	-	-
Industry sponsored	Feasibility study of large-scale cultivation of wild anti-cancer plant	Sanat Products Ltd., New Delhi	0.40 Lakhs	0.40 Lakhs	0.40 Lakhs
Students' research projects	"Identifying the mutagenicity of various commercially available hair dyes and hair colours"	SPiCE, VGST	30000	30000	30000
	Phytochemical and antibacterial analysis of leaf extracts of <i>Euphorbia neriifolia</i> "	SPiCE, VGST	30000	30000	30000
	Phytochemical and antifungal evaluation of castor plant leaves ( <i>Ricinus communis</i> )	SPiCE, VGST	30000	30000	30000
	Evaluation of Biodiesel production from microalgae collected from fresh water habitats"	SPiCE, VGST	30000	30000	30000
Any other (specify)	Establishment of Biotech Finishing School	Dept. of IT, BT and S&T	100 lakhs	100 lakhs	100 lakhs

### 3.3 Research Facilities

3.3.1 What are the research facilities available to the students and research scholars within the campus?

The list of research facilities available are

- State of art laboratories (Plant tissue culture and genetic transformation laby,

Nutraceutical and Phytochemistry lab, Applied Microbiology lab, Food Processing Testing Lab and Central Instrumentation Facility)

- Green house and experimental field
- Digital library facility
- Internet and Wi-fi facility
- Access to Bangalore University library facility

3.3.2 What are the institutional strategies for planning, upgrading and creating infrastructural facilities to meet the needs of researchers especially in the new and emerging areas of research?

Institutional strategies –

- Securing grants from state, national and international agencies for upgrading research facility
- Establishing centre for excellence for research
- Initiating research facility in food, nutrition and health
- Full-fledged research facility for the entire group institutions with interdisciplinary approach

3.3.3 Has the institution received any special grants or finances from the industry or other beneficiary agency for developing research facilities?? If 'yes', what are the instruments / facilities created during the last four years.

Yes, institution has received grants from National Medicinal Plants Board, New Delhi, VGST & KBITS, Dept. of IT & BT and S&T, Government of Karnataka. The instruments and facilities created in the grants received are as follows:

Equipment and facilities established	Granting agency	Grant received
Green house	NMPB	7.00 Lakhs
HPLC System	NMPB	25 Lakhs
Modular Laboratories (5 Nos.)	KBITS, Dept. of IT, BT and S&T, Govt. of Karnataka	100 Lakhs
UV Spectrophotometer		
Stereo Zoom Trinocular Microscope		
Cooling centrifuge with accessories		
Refrigerated Orbital Shaker Incubator		

### 3.3.4 What are the research facilities made available to the students and research scholars outside the campus / other research laboratories?

PIMS is having collaborations with various institutes and industries. Students and research scholars are informed about the same. The list of major facilities outsourced by students, research scholars and teaching staff are

Industry/Institution	Facilities availed
Radiant Research & Services Pvt. Ltd., Bangalore	Animal cell culture
Maharani Lakshmi Ammani college for Women, Bangalore	Animal studies
GKVK, Bangalore	Herbal plant material
Dhanvantari Vana, Forest Dept., Karnataka	Herbal planting material
Rishi Herbal Technologies Pvt. Ltd., Bangalore	Phytochemical Stanadards
Natural Remedies Pvt. Ltd., Bangalore	Phytochemical Stanadards
Indian Institute of Science, Bangalore	Library, SEM and XRAD
Chromus Biotech Pvt. Ltd., Bangalore	Molecular studies
Bangalore University	Library
Shiva Analytical Labs Ltd., Bangalore	Analytical services
National Chemical Laboratories, Pune	Microbial cultures
IMTECH, Chandigarh	Pure Cultures of microbes
HCG, Bangalore	Molecular studies
Padmashree Diagnostic center, Bangalore	Proximate analysis
Pelican biotech and Chemical labs, Kerala	Herbal extraction and purification
Charms chem. Pvt. Ltd, Pune	Optimization of HPLC protocols

### 3.3.5 Provide details on the library/ information resource center or any other facilities available specifically for the researchers?

Wi-fi and internet services are provided with free of cost. Bangalore University Library subscription has been taken by the college and we have been

given ten library cards, which are used by researchers to access journals and books available in the library. Researchers are given On Duty leave to visit other libraries located at Bangalore and nearby cities. Our students and faculty also visit IISc., GKVK and IIHR library regularly for collection of literature and refer books and periodicals.

**3.3.6 What are the collaborative research facilities developed/created by the research institutes in the college. For ex. Laboratories, library, instruments, computers, new technology etc.**

Research facilities developed by the college through the collaborative projects are:

- Green House – Established in project sponsored by National Medicinal Plants Board, New Delhi.
- HPLC System - Procured in collaborative project with RISHI Foundation, Bangalore and funded by National Medicinal Plants Board, New Delhi.
- Plant tissue culture facility – Established in collaboration with Rishi Herbal Technologies Pvt. Ltd., Bangalore.
- Technology training collaboration in animal cell culture – Radiant Research and Services Pvt. Ltd, Bangalore and & Probiosys, Bangalore.
- Training collaboration in Bioinformatics – Maharani Lakshmi Ammani College for Women, Bangalore.
- State of Art Laboratories – Nutraceutical lab, quality control lab, central instrumentation facility – supported by Department of IT, BT, government of Karnataka

### 3.4 Research Publications and Awards

3.4.1 Highlight the major research achievements of the staff and students in terms of

**\* Patents obtained and filed (process and product)**

1) 2316/CHE/2010

Enhancing secondary metabolites and nutrients in plants and plant parts.

Inventors: M. Anuradha and S. Balasubramanya

2) 3123/CHE/2010

Method of producing secondary metabolites from isolated fungus.

Inventors: M. Anuradha, S. Balasubramanya, Rukaya Amin Chowdery, Raouf Ahmad Mir and Pradeep S. Kaushik.

3) 169/CHE/2013 - GIS for Life Sciences.

Inventors: M. Anuradha, S. Balasubramanya and Omprakash S. Sringeri

4) 2313/CHE/2013-Method, System and Apparatus for growing and extracting plant and/or plant parts for enhanced benefits

Inventors: M. Anuradha and S. Balasubramanya

5) 2314/CHE/2013-Techniques for enhancing nutrients and phytochemicals in a plant/plant parts

Inventors: M. Anuradha and S. Balasubramanya

6) 2315/CHE/2013 - Post-harvesting Techniques for enhancing nutrients and phytochemicals in Plant/plant parts

Inventors: M. Anuradha and S. Balasubramanya

**\* Original research contributing to product improvement**

The faculty at PIMS apart from undertaking research on basic aspects of science, also focus on product development and improvement. Identification of

cheaper alternatives to anticancer compounds and biofortification studies undertaken has resulted in generating IPRs. Now efforts are on to transfer technology or collaborate with industry for scale up studies.

**\* Research studies or surveys benefiting the community or improving the services**

The research activity of PIMS is focused towards developing products or models that benefit the community at large. DST Rajat Jayanthi Fellowship candidates have developed models/edukits meant for creating awareness about technology among rural high school students; they have also visited aganwadis, household to communicate the benefit of science.

**\* Research inputs contributing to new initiatives and social development**

PIMS students are selected for DST Rajat Jayanthi Fellowship, which is aimed at communicating science for the benefit of communities. Faculty, fellowship holders in collaboration with RISHI Foundation team has visited various rural schools and conducted workshops regarding plant propagation, cleanliness, hygiene, toxic chemicals used at home and alternatives, cost effective modules for molecular biology to conduct experiments at school level.

**3.4.2 Does the Institute publish or partner in publication of research journal(s)? If 'yes', indicate the composition of the editorial board, publication policies and whether such publication is listed in any international database?**

Institution does not publish or partner in publication of research journals. However Dr. Anuradha was a guest editor of International Journal of Fundamental & Applied Sciences, Vol. 2, No. 1 (2013). ISSN 2278-1404



## 3.4.3 Give details of publications by the faculty and students:

\*Publication per faculty

\*Number of papers published by faculty and students in peer reviewed journals (national / international)

\*Number of publications listed in International Database (for Eg: Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)

\*Monographs

\* Chapter in Books

\* Books Edited

\*Books with ISBN/ISSN numbers with details of publishers

\*Citation Index

\*SNIP

\*SJR

\*Impact factor

\*h-index

Few publications carried out by the faculty of PIMS are given below.

Title of the Article	Author	Co-Authors	Name of the Journal, Vol. No. & pp	International /National	Impact Factor as on 2010
Micropropagation of Mulberry ( <i>Morus alba</i> L.)	M. Anuradha	T. Pullaiah	Annali Di Botanica, 1992, Vol. 15: 35-41	International ISSN 2239 – 3129	
Salt stress and antioxidant response in high and low proline producing cultivars of Niger, <i>Guizotia abyssinica</i> (L.F) Cass.	A. Sarvesh	M. Anuradha, T. Pullaiah, T.P. Reddy and P.B. Kavikishore	Indian Journal of Experimental Biology, 1996, Vol. 34: 252-256	International ISSN 0019 – 5189	1.195
Investigations on germination of <i>Pterocarpus santalinus</i> (Red Sanders) with special reference to <i>in vitro</i> seed culture.	M. Anuradha	T. Pullaiah	The Indian Forester, 1998, Vol. 124 (5), pp. 309 – 313,	National ISSN 0019 - 4816	
<i>In vitro</i> seed culture and induction of enhanced axillary branching in <i>Pterocarpus santalinus</i> and <i>P. marsupium</i> : A method for rapid multiplication.	M. Anuradha	T. Pullaiah	Phytomorphology 1999, Vol. 49 (2): 157-163	International (ISSN 0031 – 9449)	
Propagation studies of Red Sanders ( <i>Pterocarpus santalinus</i> ) <i>In vitro</i> - an endangered taxon of Andhra Pradesh,	M. Anuradha	T. Pullaiah	Taiwania, 1999, Vol. 43(3): 311 – 324	International ISSN 0372 – 333X	

India.					
<i>In vitro</i> propagation of <i>Hardwickia binnata</i> Roxb.	Anuradha M	Kishor P.B. Kavi & Pullaiah T	Journal of the Indian Botanical Society, 2000, Vol. 79 (1-4): 127-131	International ISSN 0019-4468	
Production of anticancer compounds from cultures of <i>Nothapodytes foetida</i> of selected geographical origin.	M. Anuradha	Rinku Rajani, Indu B. K., K.M. Divakar	Phytomorphology, 2005, Vol. 54 (3 & 4): 185-191	International ISSN 0031 - 9449	
Somatic embryogenesis in <i>Nothapodytes foetida</i> : A potent antineoplastic plant.	M. Anuradha	Indu B. K, Rinku Rajani, K.M. Divakar	Plant Cell Biotechnology and Molecular Biology, 2007, Vol. 7(1&2): 77- 80	International ISSN 0972 - 2025	
Germplasm conservation of selected lines of <i>Coleus forskohlii</i> (Willd.) Briq by nodal segment encapsulation.	G Swaroopa	Nimisha Nigam & <b>Anuradha Maniyam</b>	<i>Phytomorphology</i> , 2007. Vol. 57(3&4): 221-225	International ISSN 0031 - 9449	
Germplasm conservation of Patchouli ( <i>Pogostemon cablin</i> Benth.) by encapsulation of <i>in vitro</i> derived nodal segments.	Kumara Swamy M	S. Balasubramanya & <b>M. Anuradha</b>	International Journal of Biodiversity and Conservation, 2009, Vol. 1(8): 224 – 230	International ISSN 2141 – 243X	
<i>In vitro</i> multiplication of <i>Pogostemon cablin</i> Benth. through direct regeneration.	Kumara Swamy M	S. Balasubramanya & <b>M. Anuradha</b>	African Journal of Biotechnology, 2010 Vol. 9 (14), 2069 – 2075	International ISSN 1684 - 5315	0.45
Micropropagation of <i>Pogostemon cablin</i> Benth. through direct regeneration for production of true to type plants.	Kumara Swamy M	<b>M. Anuradha</b>	Plant Tissue Cult., & Biotech, 2010, Vol. 20(1): 81-89	International ISSN 1817 - 3721	
Effect of different carbon sources on <i>in vitro</i> morphogenetic response of patchouli ( <i>Pogostemon Cablin</i> Benth.).	Kumara Swamy M	K. M. Sudipta, S. Balasubramanya & <b>M. Anuradha</b>	Journal of Phytology, 2010, Vol. 2(8): 11-17	International ISSN 2075 - 6240	
Cost effective approach for <i>in vitro</i> propagation of ( <i>Leptadenia reticulata</i> Wight & Arn.) – a threatened plant of medicinal importance.	Sudipta K.M,	Kumara Swamy M, Balasubramanya S & <b>Anuradha M</b>	Journal of Phytology, 2011, Vol. 3(2): 72-77	International ISSN 2075 - 6240	
Effect of plant growth regulators on morphogenesis and forskolin production in <i>Plectranthus barbatus</i> Andrews.	Balasubramanya S	L. Rajanna, & <b>M. Anuradha</b>	<i>In Vitro Cellular and Developmental Biology - Plant</i> , 2011, Vol. 48(2): 208-215	International ISSN 1054 - 5476	1.060
Phytochemical and antimicrobial studies of leaf extract of <i>Euphorbia neriifolia</i>	Kumara Swamy M	Neeraj Pokharen, Santosh Dahal and <b>Anuradha M</b>	Journal of Medicinal Plants Research, 2011, Vol. 5(24): 5785- 5788.	International ISSN 1996 - 0875	0.59
Analysis of genetic variability in patchouli	Kumara swamy M	<b>Anuradha M</b>	Research in Biotechnology, 2011,	International ISSN 2229 –	

cultivars (Pogostemon cablin Benth.) using RAPD Markers.			Vol. 2(6): 64-71	791X	
Improved propagation technique for <i>Nothapodytes foetida</i> .	Anuradha M	Lokesh P, Pradeep S Kaushik and Balasubramanya S	Intl. Journal of Research & Reviews in Pharmacy & Applied Sciences, 2011, Vol.1(4):270-277	International ISSN 2249 1236	
Production and Optimization of Extra Cellular Protease from <i>Bacillus</i> Sp. Isolated from Soil.	M. Kumara Swamy	S.S.N. Kashyap, R. Vijay, Rahul Tiwari, M. Anuradha	International Journal of Advanced Biotech & Research, 2012, Vol. 3 (2): 564-569	International ISSN 0976 - 2612 ISSN 2278 – 599X	
Plant regeneration from leaf-derived callus in <i>Plectranthus barbatus</i> Andr. [Syn.: <i>Coleus forskohlii</i> (Wild.) Briq.]	Sreedevi E	Anuradha M & Pullaiah T	African Journal of Biotechnology, 2013, Vol. 12(18): 2441-2448	International ISSN 1684 5315	
Influence of various carbon sources and organic additives on in vitro growth and morphogenesis of <i>Leptadenia reticulata</i> (Wight & Arn)–A valuable medicinal plant of India.	Sudipta KM	Kumara Swamy M & Anuradha M	Int. J. Pharm. Sci. Rev. Res., 2013, Vol. 21(2): 174-179	International ISSN 0976 – 044X	
Cost effective quantification of camptothecin and a comparative study of its content in <i>Nothapodytes foetida</i> and <i>Ophiorrhiza mungos</i> sourced from selected geographical locations.	Lokesh, P	Balasubramanya S & Anuradha M	Orient. Pharm. Exp. Med., 2013. Published online <a href="http://link.springer.com/article/10.1007%2Fs13596-013-0124-4#page-1">http://link.springer.com/article/10.1007%2Fs13596-013-0124-4#page-1</a>	International ISSN 1598 – 2386	
Elicitation of Forskolin in suspension cultures of <i>Coleus forskohlii</i> (Willd.) Briq. using elicitors of fungal origin	Swaroopa G	Anuradha, M & T. Pullaiah	Current Trends in Biotechnology and Pharmacy, 2013, Vol. 7(3): 755-762	International ISSN 0973 8916	
Elicitation of Forskolin in suspension cultures of <i>Coleus forskohlii</i> (Willd.) Briq. using bacterial elicitors.	Swaroopa G	Anuradha, M & T. Pullaiah	J. Indian Bot. Soc., 2013, Vol. 92(1&2): 97-100	National ISSN 0019 - 4468	

**Chapters/Articles in Subject books by National level publishers/State and Central Govt. publications with ISBN/ISSN number:**

Title of the Book	Author	Co-Authors	Name of the Publisher/Month/Year	ISBN/ISSN
<i>In vitro</i> shoot regeneration in <i>Hardwickia binata</i> Roxb. Chapter II: Tissue culture and Biotechnology, In: Frontiers of Plant Science, (Ed.) Irfan A	M. Anuradha	T. Pullaiah	The Book Syndicate, Hyderabad	

Khan				
<i>In vitro</i> shoot regeneration from seedling Explants of <i>Peltophorum Pterocarpum</i> (DC.) Heyne. Chapter II: Tissue culture and Biotechnology, In: Frontiers of Plant Science, (Ed.) Irfan A Khan	U.N. Lakshmi Devi,	<b>M. Anuradha</b> , E. Sreedevi & T. Pullaiah	The Book Syndicate, Hyderabad	
Tissue culture of tree legumes: a review. In: Plant Tissue Culture – Emerging Trends	Pullaiah T	M. Sowghandika, P. Kalavathi & <b>M. Anuradha</b>	Regency Publications/Daya Publishing House, New Delhi, 2011	9788189233693
Bioelicitation of gymmemic acid in suspension cultures of <i>Gymnema sylvestre</i> (Retz.) Schultes. In: Plant Tissue Culture - Emerging Trends.	Balasubramanya S	L. Rajanna & <b>M. Anuradha</b>	Regency Publications/Daya Publishing House, New Delhi, 2011	9788189233693

**Subject books by other local publishers with ISBN/ISSN numbers (if any):**

Sl. No	Name of the faculty	Title of the book	Publisher	Year of publication
1.	K.S. Dayananda	Biochemistry B.Sc. 1 <sup>st</sup> Semester	Subash Stores	2005
2.	K.S. Dayananda	Biochemistry B.Sc. II Semester	Subash Stores	2005
3.	K.S. Dayananda	Biochemistry B.Sc. III Semester	Subash Stores	2005
4.	K.S. Dayananda	Biochemistry B.Sc. IV Semester	Subash Stores	2006
5.	K.S. Dayananda	Protein Purification Theory & Techniques	Viva Books Private Limited	2007
6.	K.S. Dayananda	Theory & techniques of electrophoresis proteins and nucleic acids	Subash Stores	2005
7.	K.S. Dayananda	Text book of biotechnology IV (Molecular biology)	Subash stores	2006
8.	Dr.K. Dhananjaya.	Introduction to bioinformatics	IBX	2005
9.	Dr. K. Dhananjaya	Introduction to bioinformatics (Guiding manual)	IBX	2005

## 3.4.4 Provide details (if any) of

\*research awards received by the faculty

\*recognition received by the faculty from reputed professional bodies and agencies, nationally and internationally

\*incentives given to faculty for receiving state, national and international recognitions

for research contributions.

Name of the faculty	Award or prize received
Dr. M. Anuradha	Secured 2 <sup>nd</sup> Prize for poster presentation in International Symposium on Frontiers in Genetics and Biotechnology – Retrospect & Prospect, Osmania University, Hyderabad. January 08 – 10, 2006
Dr. S. Balasubramanya	Won 2 <sup>nd</sup> Prize for Poster “Elicitation of Forskolin in root cultures of <i>P. barbatus</i> through chemical elicitors” at DST sponsored National Seminar ‘Tissue culture and secondary metabolite production’ organized by Padmashree Institute of Management and Sciences, Bangalore, May 22 – 23, 2009.
Mr. Lokesh	Won prize in 2 <sup>nd</sup> International Seminar on Medicinal Plants & Herbal Products (ISMPHP-2010) organized by Sri Venkateswara University, Tirupati, A.P during 27-29 December, 2010.

### 3.5 Consultancy

#### 3.5.1 Give details of the systems and strategies for establishing institute-industry interface?

Dr. S. Balasubramanya, Research Coordinator has been appointed with a major responsibility of establishing industrial collaborations and tie-ups. The list of industries having collaborations or tie-ups are:

Rishi herbal technologies Pvt. Ltd., Bangalore

Pelian Biotech & Chemical Labs Pvt. Ltd., Kerala,

Katra Phyto Chem Pvt. Ltd., Bangalore

J K Agrigenetics Pvt. Ltd., Hyderabad

Zakinl Labs, Bangalore

Charms Chem Pvt. Ltd., Pune

Industry experts are regularly invited as Resource Persons for interaction with faculty and students through Seminars, Workshops, Panel Discussions etc. The

network developed is utilized to establishing institute-industry collaborations and tie-ups. Also, students are encouraged to do their internships and projects at the following industries, there by building a relationship with industry. Students are also sent to industrial visits and provided an opportunity for interaction with industry experts.

**3.5.2 What is the stated policy of the institution to promote consultancy?  
How is the available expertise advocated and publicized?**

Institution promotes consultancy in an informal way. Students from other organizations and even employees of industries underwent training at PIMS. Dr. Anuradha and Dr. S. Balasubramanya are extending consultancy services to industries like Pelican Biotech and Chemical Labs and Radiant Research & Services, Pvt. Ltd. The service rendered is of mutual advantage and hence there is no monetary aspect involved.

**3.5.3 How does the institution encourage the staff to utilize their expertise and available facilities for consultancy services?**

The Management of the Institution is open and appreciates staff with expertise to take up consultancy services to share and disseminate knowledge. However, the Institution also undertakes project consultancies for revenue generation. Institution permits research scholars and employees of other organizations to utilize expertise at PIMS. HPLC services are provided to Ph.D., Scholars and small scale industries. Staffs are provided with an incentive, if they are engaged in such activities.

Consultancy services are extended to industries in terms of research and development. Honorary consultancy services in terms of R & D are provided to industries such as Rishi Herbal Technologies Pvt Ltd., and Pelican Biotech and Chemical Labs Pvt Ltd., Kerala. We have developed technical knowhow for the commercial propagation of anticancer plants for a Pune based industry, Charms Chem Labs Pvt Ltd., The institution conducted a workshop on “Microbiological Quality Control” at the campus for a team of industry employees from Marqatus QED (India) Pvt. Ltd., Pondicherry The college has conducted many workshops in other colleges and organizations in the field of plant tissue culture and secondary metabolite production. Remunerative consultancy was extended to Sanat Product Pvt Ltd., for implementing project for isolation and purification of select phytochemicals.

#### **3.5.4 List the broad areas and major consultancy services provided by the institution and the revenue generated during the last four years.**

The broad area of expertise available for providing consultancy services are:

- Plant tissue culture and secondary metabolite production
- Phytochemistry
- Molecular biology with special reference to marker analysis
- Biofortification and nutrition

Consultancy services so far extended to industries are in terms of mutual benefits or as part of collaborative research projects. Now efforts are on to extend consultancy and transfer technical knowhow developed for the commercial propagation of anticancer plants and scaling up of biofortification experiments.

#### **3.5.5 What is the policy of the institution in sharing the income generated through consultancy (staff involved: Institution) and its use for institutional**

development?

Institution shares 10% of the income generated with the staff involved in consultancy, training and services. 90% of the income is utilized for consumables, servicing and maintenance of the equipment.

### **3.6 Extension Activities and Institutional Social Responsibility (ISR)**

3.6.1 How does the institution promote institution-neighborhood- community network and student engagement, contributing to good citizenship, service orientation and holistic development of students?

Institution takes interest in promoting institution-neighbourhood-community network, involving students and faculty. Eco awareness campaign is designed by integrating into Annual Eco-Week celebrations. During the program neighborhood rural shools are visited by our faculty. Headmasters and teachers are convinced about the program. Students and teachers are invited to the campus by organizing a bus facility. High school students are trained for environment conservation. They are all explained with the models and posters displayed inside the campus. Quiz program, competition for posters, eco-Rangoli were conducted and prizes were distributed on the valedictory day of Eco-week. PIMS in collaboration with RISHI Foundation is actively participating in extension programs. PIMS students working for RISHI Foundation under DST Rajat Jayanthi Vigyan Sancharak Fellowship societal scheme are engaged in popularizing science by designing and implementing various modules.

3.6.2 What is the Institutional mechanism to track students' involvement in various social movements / activities which promote citizenship roles?

Students' involvement in various social extension programs and monitored by directing them to submit a report along with photographs after completion of the



activity. Students and staff are duly recognised by issuing letters of appreciation/certificates. To deserved candidates performance incentive is given after successful completion. Proper planning, programming, implementation, execution is done with a team leader supported by team members.

### 3.6.3 How does the institution solicit stakeholder perception on the overall performance and quality of the institution?

The Institution solicits stakeholder perception through feedback mechanism. Feed backs are obtained from the beneficiaries, students, industry personnel and all other stake holders. Feedback from the Industry is also obtained during the Internship/Industrial Exposure/Training provided to the students. Mentors are requested to submit their feedback and report. All these are discussed in IQAC and necessary steps are initiated for improving the performance and quality of the institution.

### 3.6.4 How does the institution plan and organize its extension and outreach programmes? Providing the budgetary details for last four years, list the major extension and outreach programmes and their impact on the overall development of students.

In the beginning of the academic year the list of extension and outreach programmes are planned and included in the calendar of events. Based on the plan and schedules a meeting is conducted well in advance. Team leader, committees and members are decided with mutual consent. Roles and responsibilities of each committee is decided and monitored. The list of major extension programs and budgetary provisions made for the same is as given under:

Name of the	Organising	Team members	Budget	Supported
-------------	------------	--------------	--------	-----------

program	secretary/team leader		head	by
Eco Week	Pradeep S. Kaushik	Sudipta Kumar Mohanty	40,000/-	Self
Rajat Jayanthi Vigyan Sanchark Fellow	Dr. M. Anuradha	Dr. S. Balasubramanya Pradeep S Kaushik Lokesh P	-	In collaboration with RISHI Foundation, Bangalore Funded by DST, New Delhi
Hand on training in Plant Tissue Culture and Secondary metabolite Production	Dr. M. Anuradha	Dr. Kumara swamy Prad		

### 3.6.5 How does the institution promote the participation of students and faculty in extension activities including participation in NSS, NCC, YRC and other National/International agencies?

An active NSS wing is already established in the group of institutions and our students take part in all its activities. Students of our college participate in various social activities and extension programs. The Padmashree Group of Institutions conducts Blood donation camps, free medical checkups and rural hygiene education programs throughout the year. Our students take active part in these activities. During the annual eco-week of the college students go to nearby villages and rural schools and help students and rural folk get educated about environment related issues.

An NSS unit is set up at PIMS with the support of Bangalore University and activities have started from last academic year.

3.6.6 Give details on social surveys, research or extension work (if any) undertaken by the college to ensure social justice and empower students from under-privileged and vulnerable sections of society?

Social justice and student empowerment is the core objective of the Institution and management consistently promotes through various activities. PIMS management made conscious efforts to bring quality education to the weaker and underprivileged sections of the society. Special fee concessions are given to economically backward students on request.

3.6.7 Reflecting on objectives and expected outcomes of the extension activities organized by the institution, comment on how they complement students' academic learning experience and specify the values and skills inculcated.

The list of extension activities conducted at PIMS

1. Eco – week
2. Blood donation camps
3. Road safety awareness camps
4. Plantation programs
5. Science teaching practices in rural school
6. Creating awareness about importance of Voting

With the above extension activities, the students are expected to gain social responsibility, inculcate values of social justice, environment protection, empathy, compassion, service to mankind and fundamental duties. As they are involved in

science teaching and Eco–Week programs, they will gain teaching and learning experience because of interaction with experts and rural school children.

**3.6.8 How does the institution ensure the involvement of the community in its reach out activities and contribute to the community development? Detail on the initiatives of the institution that encourage community participation in its activities?**

Involvement of community and their active participation is ensured by publicizing the activity and involving all the stake holders. The institutes’ initiatives for community participation are as follows:

- One-to-one meetings with school headmasters highlighting the importance of the program proposed is done to fix the schedules and dates.
- During eco-week and training in plant propagation techniques, lab visits, students are provided with transportation, refreshments and material.
- Free saplings of endangered and endemic plants were distributed to participants.
- Local visits were made by faculty and students to create awareness about, health, hygiene and avoiding usage of toxic chemicals at home and workplace.
- Talks were supported by flip charts and videos made in simple language.
- Small experiments were given as assignments by providing material to them and the results of the same are discussed with students.

**3.6.9 Give details on the constructive relationships forged (if any) with other**

institutions of the locality for working on various outreach and extension activities.

The following are the constructive relationships established with other Institutions with respect to extension activities.

Program	Collaborating institution	Beneficiaries
Eco – awareness camp	RISHI Foundation, Bangalore	Govt. school Children of Sulekeri
Blood donation camps	Padmashree Institute of Nursing Padmashree School of Public Health	Rotary club
Extension program about plant propagation techniques	RISHI Foundation, Bangalore	Government school children of O. Mittur, Kolar & Govt. High School, Sulikere, Bangalore
Awareness about medicinal plant cultivation	CIMAP, Rishi Herbal Technologies Pvt. Ltd., Bangalore	Farmers of Mittur
Awareness about voting rights	Janagraaha, Bangalore	Students and public
Awareness about functional foods	Centre for Processed Foods & Rishi Herbal Technologies Pvt. Ltd., Bangalore	Students of group institution and other college students
Awareness about health, hygiene and household pesticides	My Clean Malleswaram & RISHI Foundation, Bangalore	Local residents of Malleswaram
Awareness about environment and free sapling distribution	Bruhut Bangalore Mahanagara Palike (organisers of Hasiru Santhe)	Local residents of Malleswaram

3.6.10 Give details of awards received by the institution for extension activities and/contributions to the social/community development during the last four years.

PIMS out going batch students are encouraged to submit for the award of DST Rajat Jayanthi Vigyan Sanchar Fellowships meant for communicating science to students and rural populations. Projects are submitted through an NGO RISHI Foundation which has collaboration with our institute. From past three years PIMS students are getting selected for these fellowships regularly. This is a grant with a fellowship of Rs.12000/- per month for one year. The details of extension activities selected for the DST fellowship are as under.

Year	Project title
2010	Development of low cost strategic modules and edukits for training science teachers in conventional and applied propagation techniques.
2011	Creating awareness in rural schools about lignin contamination by coconut-husk and its biodegradation by cost effective methods.
	Reducing the level of toxic substances at home, by educating school children of the use of household and natural ingredients.
	Educating school children about the benefits of hydroponics and encouraging its use among them.
2012	Designing low cost instruments and technology in molecular biology for higher secondary (rural and semi-urban) students.
	Creating awareness about food safety in anganwadi kitchens.
2013	Creating medicinal plant gardens in schools and training school children for the sustainable utilization of selected herbs - Shortlisted
	Popularize the use of bamboo in construction – Shortlisted

### 3.7 Collaboration

3.7.1 How does the institution collaborate and interact with research laboratories, institutes and industry for research activities. Cite examples and benefits accrued of the initiatives - collaborative research, staff exchange, sharing facilities and equipment, research scholarships etc.

With the inception of research center, the institution is making constant efforts to have fruitful collaborations with many industries (Pelican Biotech and Chemical Labs Pvt. Ltd., Kerala, Rishi Herbal Technologies Pvt Ltd, Bangalore, Katra Phytotech Ltd., Bangalore, Charms Chem Pvt Ltd., Pune, J K Agrigenetics Ltd., Hyderabad, Radiant Research and Services Pvt. Ltd., Bangalore). Also we are exploring for having collaborative projects with scientists working at IIHR,

Bangalore, GKVK, Bangalore and Maharani Lakshmi Ammani College for Women, Bangalore. The Institution has collaborated with RISHI Foundation, Bangalore an NGO working for social causes of environment protection and biodiversity conservation. College organizes an annual eco week with the support from RISHI Foundation.

3.7.2 Provide details on the MoUs/collaborative arrangements (if any) with institutions of national importance/other universities/ industries/Corporate (Corporate entities) etc. and how they have contributed to the development of the institution.

The college always believes in an academy-industry interaction for giving better deliverables to students. In this notion we developed tie ups with many industries. In the year 2008, the institution started a novel program called “BiodHRona”- Get started immediately which mainly focus on developing interactions and network with NGOs and Industries. This initiative aimed at giving services to students in terms of training and placement. During this process the college has entered into MOU with few industries while has obtained tie ups with many other industries. The list of important industries is as follows-

- Rishi Herbal Technologies Pvt Ltd.,Bangalore( MOU)
- Pelican Biotech and Chemical Labs Pvt Ltd, Kerala  
(MOU)
- Sanat Products Pvt Ltd., New Delhi
- Charms Chem Pvt Ltd., Pune
- Katra Phyto Chem Pvt Ltd.,Bangalore

- J K Agrigenetics Pvt Ltd., Hyderabad
- Zakini Labs, Bangalore.

Discussion is already on to have collaborative interaction with the following organizations-

- Gwalior Forest Products, Shivpuri, Madhya Pradesh
- Hi-herbs Udyoga Extracts, Bangalore
- Navashakthi Herbal Labs, Bangalore
- Natural Remedies Pvt. Ltd., Bangalore
- Global Calcium Ltd, Hosur
- Orac, Hosur
- Kisalaya Herbals Pvt. Ltd., Indore

3.7.3 Give details (if any) on the industry-institution-community interactions that have contributed to the establishment/creation/up-gradation of academic facilities, student and staff support, infrastructure facilities of the institution viz. laboratories / library/ new technology /placement services etc.

Padmashree group in general and PIMS in particular focuses on projects that facilitates having industry and community interactions. This has resulted in implementing several projects sponsored by many funding agencies. Some of the notable examples are:

The research project “Tissue culture and conventional propagation of *Nothapodytes foetida* for large scale supply of quality saplings and comparative study



with *Camptotheca accuminata*” was collaboration of PIMS, RISHI Foundation and Charms Chem Pvt. Ltd., Pune. This project was funded by National Medicinal Plants Board, Dept. of AYUSH, Govt. of India, New Delhi. The project had a sanctioned amount of rupees twenty five lakhs for a period of three years. Even after completion of project, the company is very keen and has shown interest to collaborate in project to transfer technology to farmers.

In this project, regular field trips are been conducted to different places of Western Ghats like Amboli, Kodachadri, Khanapur, Agumbe, Sirsi and Hebri. In these field trips our research scholars have been collecting plant samples and seeds of different anti-cancer plants. The field trips also helping in a team building process. A team of researchers including industry expert and academic scientist surveyed Kemmanagundi and parts of western ghats for collecting anti-cancer plant for research purpose.

Another project entitled “**Isolation and characterization of Pregnane Glycosides from *Caralluma fimbriata***” was funded by M/s Sanat Products Ltd., New Delhi with support grant of 3.2 lakh rupees.

3.7.4 Highlighting the names of eminent scientists/participants who contributed to the events, provide details of national and international conferences organized by the college during the last four years.

The college has so far organized the following seminars/conferences:

April 04, 2009	Organised seminar on “Life Sciences – An evergreen option for blooming career” at Nayana Auditorium, Bangalore.
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May 22 & 23, 2009	Organised National seminar sponsored by DST on “Emerging Trends in Plant Tissue Culture and Secondary Metabolite Production”.
Nov. 23 to Dec. 07, 2012	UGC, New Delhi & DBT, New Delhi sponsored National level Conference and Workshop on Computational Biology, Pharmaceutical Sciences & Life Sciences jointly with Maharani Lakshmi Ammanni College of Women, Bangalore.

The list of eminent / guests speakers who have

Prof. B Thimme Gowda	Hon’ble Vice - Chancellor, Bangalore University, Bangalore
Dr. N. Prabhudeva	Former Hon’ble Vice – Chancellor, Bangalore University, Bangalore
Prof. Ranganath	Former Hon’ble, Vice – Chancellor , Bangalore University & Former Director, NAAC
Dr. Priya R. Rao	Director- R & D Pelican Biotech & Chemical Labs Pvt. Ltd., Kerala
Dr. Kameshwara Rao	Professor (Retd.), Dept. of Botany, Bangalore University, Bangalore
Dr. R. Doreswamy	Ex-Scientist, IIHR & Industry PTC Expert
Dr. Purushottam	Director, Indus Seeds Pvt. Ltd., Bangalore
Dr. Manoj C N	Director & CEO Pelican Biotech & Chemical Labs Pvt. Ltd., Kerala
Dr. G. A. Ravishankar	CFTRI, Mysore
Prof. Dilip Kumar Thakur	Former VP ,Wipro, Bangalore
Dr. Rajeev Gowda	Professor, IIM, Bangalore
Dr. Bhanu K M	Professor, S V University, Tirupati
Dr. Pullaiah T	Professor, S K University, Anantapur, A.P
Dr. Shivakumar	Monsanto Research Center, Bangalore
Dr. D.H. Tejavathi	Professor, Dept of Botany, Bangalore University
Dr. Jitendra Prasad	President, <i>In Vitro</i> International Pvt. Ltd., Bangalore
Dr. Seenappa	Eminent Ornithologist

Dr. Mittur N. Jagadish	Director, Manosanto Research Centre, Bangalore
Dr. H.N. Shiva Prasad	Dy. Manager & Head, Research Data Management, Natural Remedies Pvt. Ltd., Bangalore
Dr. Abirami Srikanth	GE India Technology Centre, Bangalore

3.7.5 How many of the linkages/collaborations have actually resulted in formal MoUs and agreements? List out the activities and beneficiaries and cite examples (if any) of the established linkages that enhanced and/or facilitated –

The list of industries where institution has linkages with formal agreements or MOU or letter of consents.

- ❖ Rishi Herbal Technologies Pvt Ltd., Bangalore (MOU)
- ❖ Pelican Biotech and Chemical Labs Pvt Ltd, Kerala (MOU)
- ❖ J K Agrigenetics Pvt Ltd., Hyderabad (MOU)
- ❖ Zakinl Labs, Bangalore (Letter of consent).
- ❖ Charms Chem Pvt Ltd., Pune (Letter of consent)
- ❖ Katra Phyto Chem Pvt Ltd., Bangalore (Letter of consent)

**a) Curriculum development/enrichment**

For Biotech Finishing School Program sponsored by Government of Karnataka, industries are involved in curriculum development and enrichment. Rishi Herbal Technologies Pvt. Ltd., and Pelican Biotech and Chemical Labs Pvt. Ltd, Kerala have contributed in framing the syllabus for Nutraceutical and Food processing Course. This syllabi has been vetted by Sami labs Ltd., Bangalore and Natural Remedies Pvt. Ltd., Bangalore..

**b) Internship/On-the-job training/Summer training**

Students of PIMS are regularly getting selected for Department of Biotechnology, New Delhi sponsored Biotech Industry Training Program with stipend. Apart from this, students are encouraged to apply for summer training conducted by IISc, Bangalore and other research institutions. Also many students have undergone on-job training/internship at various industries situated both within Karnataka and outside. The brief list of industries where students are placed for internship/on- job training are give below.

- Radiant Research & Services Pvt. Ltd., Bangalore
- Natural Remedies Pvt. Ltd., Bangalore
- Sami Labs Limited, Bangalore
- Hindustan Lever Ltd., (Modern Foods Division) Bangalore
- Himalaya Drug Company, Bangalore
- Maiya's Beverages and Foods Pvt. Ltd., Bangalore
- Halidram, Delhi
- Bikanervala, Delhi
- Stanes & Co., Coimbatore
- Robust Technologies Pvt.Ltd., Bangalore
- Abexome Pvt. Ltd., Bangalore
- Biogene, Bangalore
- G.K.V.K–Plant Biotechnology/ Horticulture/Genetics and Plant Breeding, Bangalore
- Centre for Horticulture and Biotechnology – Hulimavu, Bangalore
- Mother Dairy, Yelhanka, Bangalore
- Jagadale Group of Industries , Bangalore
- AlfaNyme Biotech Pvt. Ltd., Belgaum
- Haldirams, New Delhi
- Doehler Pvt. Ltd., Pune
- Stanes and Co., Coimbatore
- Synthite Industries Ltd., Cochin

#### d) Faculty exchange and professional development

Following are the list of industries and institutions where faculty are sent under exchange program / professional development:

- Maharani Lakshmi Ammani College for Women –

## Bioinformatics

- Radiant Research and Services Pvt. Ltd – Animal Cell Culture
- Probiosys Pvt. Ltd. – Microbial quality control
- Monsanto Research centre – Plant Genetic transformation techniques
- Rishi Herbal Technologies Pvt. Ltd – Phytochemistry and nutraceutical research

**e) Research**

PIMS is collaborating with the following industries/ Institutions for R&D

- Rishi Herbal Technologies Pvt. Ltd.
- Pelican Biotech and chemical labs Pvt. Ltd.
- Radiant Research Labs Pvt. Ltd.
- Maharani Lakshmi Ammani College, Bangalore
- Charms Chem Pvt. Ltd., Pune
- RISHI Foundation, Bangalore

**f) Consultancy**

Faculty has extended consultancy services to Sami labs Pvt. Ltd, Bangalore, Sanat Products Ltd., New Delhi, Rishi Herbal Technologies Pvt. Ltd., Pelican Chemical and Biotech labs Pvt. Ltd., and Strides Arco Lab Ltd., Bangalore.

**g) Extension**

Various extension programs related to environment, health hygiene, conservation of plants, blood donations camps, traffic awareness, voting rights awareness are conducted and details are mentioned in other chapters of this report.

**h) Publication**

Staff and students are very pro active and published papers in various journals

of national and international repute and the list is provided in departmental evaluative reports and other chapters of this report

**i) Student Placement**

Placement assistance is extended to students through Placement Cell and Career Development Cell. Students pursuing courses under Biotech Finishing School are provided with 100% internship and referred to various industries for jobs. The list of Alumni working at various industries is provided.

**j) Twinning programmes**

As we follow Bangalore University curriculum, there is no facility for twinning program in any course.

**k) Introduction of new courses**

Many add on certificate courses are introduced for the benefit of the students. Noteworthy is the PG diploma program offered under Biotech Finishing School concept supported by Dept. of IT, BT and S&T, Govt. of Karnataka and Department of Biotechnology, New Delhi.

**l) Student exchange**

Students are sent to Probiosys and Maharani Lakshmi Ammani College for Women and in turn their students are trained at PIMS in Plant tissue culture and Chromatography.

**m) Any other**

**3.7.6 Detail on the systemic efforts of the institution in planning, establishing and implementing the initiatives of the linkages/ collaborations.**

The research activities in the college have provided a new approach to students in adapting research methodology supporting the regular curriculum. The

research findings in the different projects have increased the subject knowledge particularly in the field on micro-propagation and secondary metabolite production. Our students and research scholars have gained expertise over these years in the field of plant tissue culture and are competent enough to carry out experiments on any given plant. The research activities in the college have helped in development of standardized protocols. This knowhow has been given to some of the industries that are in collaboration with the institution.

In collaboration with RISHI foundation, an NGO, institution is involved in various community developmental activities in terms of rural development, helping farmers in self sustenance through our research findings.

Some of the research findings are filed for patent in collaboration with Rishi foundation with research scholars and teachers as inventors.

*Any other relevant information regarding Research, Consultancy and Extension which the college would like to include.*