Dated 22/9/2005

Dr.V.P.Potty,
Sivasthuthi, TC9/1441(1), Santhinagar, Sreekariyam,
Trivandrum 695 017, Kerala, India.

To
Dr Yves Brun,
Systems Biology/Microbiology Faculty Search,
Department of Biology, Indiana University,
Jordan Hall 142,1001 E 3rd St, Bloominton IN 47405 - 7005

Dear Sir,

Ref:- **Submission of application for the faculty Positions in Systems Biology/ Microbiology**

I came across your advertisement for the faculty position from **naturejobs** and your University web site. I am interested in the teaching position.

At present, I am working as Principal Scientist (Microbiology/Biotechnology), at Central tuber Crops Research Institute (ICAR), situated at Trivandrum, Kerala. I am having long years of experience in microbiology particularly in host microbe interaction, microbial biochemistry, root organ cultures(Hairy root culturing) for the production of secondary metabolites, enzymes , biofertilizers like- AM fungi, phosphobacterium, Azospirillum, Rhizobium and other related subjects. I have sufficient experience in isolation of marine and soil microbes particularly bacteria and actinomycetes and extraction of antimicrobial compounds and their assay. I have guided students for their PG programmes leading to M.Sc and Ph.D degrees of Kerala University. I have been able raise external funds for research projects from Indian Council of Agricultural Research and Defense Research and Development Organization of Govt. of India.

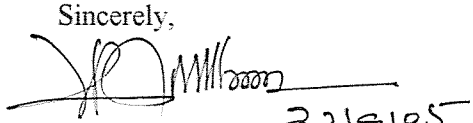
In conjunction with supervising coursework as well as research work I have accumulated many skills through interactive and personal discussion with students and their problems. I have worked with a good number of students of graduate and undergraduate levels. This internship gave me a chance to develop both professionally and personally through interaction with students. As a recognized guide for M.Sc and PhD, I have supervised other co -workers and students, I demonstrated the ability to work under strict deadlines to finish targets. In addition to working as Principal Scientist, while guiding students, I have served as external examiner of many South Indian Universities, and have been actively involved as a member of the scientific societies. I have a vested interest in teaching and this position would give me the opportunity to help put my Knowledge, training and experience into practice for you

I am appending my CV, list of publication and names, addresses and emails of two referees as attached mail for your perusal.

I can assure you that my dedication and hard work would be an asset to your organization. I look forward to hearing from you to further discuss about this exciting and challenging position. If my qualification and experience are sufficient to meet your requirement, please contact me at home at 091-471- 2591564 or by email at vppotty @ yahoo.com.

Thank you for consideration

Sincerely,



22/9/05

V.P.Potty

Statement of Research Activity -Dr V.P.Potty

Past

During my Post Graduate progamme for masters, my interest was to understand the biochemical changes and variation in the microbial profile of the phyllosphere microflora of Yellow vein mosaic virus infected plants. I further continued my interest to learn about the rhizosphere microbial population in the root (wilt) affected coconut palms and compiled. The infected palms showed higher percentage of microorganisms when compared to healthy palms. A concept of live with the disease was developed in coconut root (wilt) affected gardens as neither etiology nor control was available for the disease. Morphological, physiological and nutritional grouping of the organisms were made. Methodologies and techniques were standardized for the estimation of pyrogallol from plant tissues.A method was standardized for the estimation and removal of gallol tannins and pyrogallol tannins which normally interfere with the purification of proteins and viruses from plant tissues. .A perfect relation between the increase in the total phenol oxidizing enzymes and disease index of coconut root (wilt) disease was worked out. The "Kovac's indole test for assessing the indole producing microorganism from the food and other materials was not sensitive to detect the presence of these organisms and the test was modified by developing a colorimetric method which could detect indole and all indole derivative compounds

The bad odours present in coconut toddy due to the production of hydrogen sulphide during fermentation, limited its popularity among tourists especially foreigners. In order to improve the commercial release of toddy a low cost technology was developed to deodorize and preserve Coconut toddy without losing the alcohol and protein content. In 1978 I joined Central tuber Crops Research Institute where Mycorrhizal associations in tropical tuber crops like Cassava, Sweet potato, Chinese potato, Yams Aroids and Yam beans and its role in crop improvement, production nutrient uptake mechanism and interaction with other soil microbes like Azatobacter, Phosphobacterium and Nitrogen fixers were studied. Mycorrhizal association in these crops was first reported from this Institute in 1978. Since the AM fungus is non specific to the tuber crops multiplication in cassava was found to be effective alternate host and cassava tuber skin was found to harbor more than 103 infective propagules per square cm. Subsequently, a method was standardized for multiplication of AM fungi. Lignite slurry was found to retain the viability of spores and mycelial bits; a technique was standardized to store the mycorrhizal fungal inoculum under normal room temperature. In continuation of the work, an inoculation method for seed tuber as well as vegetative propagated crops was developed. A compact technique for multiplication, storage and inoculation in the field is now available for tropical tuber crops. The mass multiplication of AM fungi is difficult and a suitable technology was developed using genetically modified roots (Root organ culturing -Hairy roots) and standardized the growth conditions favoring both transformed root and mycorrhizal fungi *Glomus microcarpum* var. *microcarpum*. The growing inoculated and infected transformed roots can be supplied to farmers as inoculum in plastic pouches. In between 1984-87 I was given a position at IARI regional station Hyderabad, where I could concentrate my investigation on the interaction of mycorrhizal fungi with Rhizobium in Groundnut crop. The AM fungi *Glomus* sp forms best coinoculant for groundnut crops inoculated with Rhizaobium sp which enhanced nitrogen fixation, dry matter and yield production.

Role of cellulolytic and pectinolytic enzymes were established in cassava damage during storage.Developed and standardized methodology for production of itaconic acid from cassava by fermentation using *Aspergillus itaconicus*.Actively participated in the industrial alcohol production from cassava by fermentation. Standardized packing materials for storage of cassava chips.

Current

Currently employed as Principal Scientist (Microbiology) in Central Tuber Crops Research Institute, (Under ICAR) , at Trivandrum. Mainly working on various aspects of the PGPR and Mycorrhizal fungal association in tropical tuber crops like Cassava, Sweet Potato, Chinese Potato, Yams Aroids and Yam beans and its role in crop improvement, production nutrient uptake mechanism and interaction with other soil microbes like Azotobacter, Phosphobacterium and Nitrogen fixers. Host - microbe interaction also forms part of the study. Development of technologies for mass multiplication using latest biotechnological methods like growing AM fungi in root organ culture, and their storage and inoculation techniques in the field also being attended.

Supervising students for their PG programmes leading to M.Sc and Ph.D in microbiology and biotechnology, mainly on aspects of value addition of tuber crops by fermentation for enzyme production. Siderophore production by PGPR organisms also forms a major activity.

Following are some of the thrust areas where I would like to pursue my research

1) Regulation of siderophore production by PGPR organisms:- The production of siderophores and the proteins required for their uptake needs to be tightly regulated in order to avoid waste of energy and accumulation of iron that can be toxic for the cell because free Fe^{2+} can generate toxic oxygen radicals via the Fenton reaction .*Pseudomonas* siderophores have also been implicated in inducing systemic resistance (ISR) in plants, that is, an enhancement of the defense capacity of the plant against a broad spectrum of pathogens, triggered by nonpathogenic plant growth-promoting rhizobacteria. The regulation of the production of pyoverdines as a function of iron availability via the Fur regulator and the PvdS sigma factor has been the topic of a recent investigation.
2) Siderotyping of PGPR organisms:- It is established recently that a very nice correlation between the pyoverdines (PVD) type and the species as defined by polyphasic taxonomy methods. This approach, termed 'siderotyping', also confirmed that some *Pseudomonas* species, such as *P. fluorescens*, are poorly defined, as heterogeneity was found in the PVDs produced by different isolates from this group. Besides PVD, *P. aeruginosa* produces another siderophore, pyochelin (PCH), with a lower affinity for iron (III) Interestingly, a role for PCH in combination with pyocyanin has also been suggested for the induction of resistance in tomato by the root-associated *P. aeruginosa* against the aerial pathogen *Botrytis cinerea.* PCH is produced by more than one strain of as well. Recently, a microarray analysis of the *P. aeruginosa* genes transcribed under conditions of iron limitation in wild type and in a Δ*pvdS* mutant led to the discovery of new PvdS-regulated genes for the biosynthesis of PVD. It is understood that PvdS also controls the transcription of *P. aeruginosa* endoprotease PrpL and other extracellular factors.
3) Certainly, other siderophores will be discovered in the future, with interesting characteristics, such as complexation of other metals, redox activity, antibiotic activity or induction of resistance against pathogens in plants. Besides its siderophore activity, bacterial SA has an important role in inducing resistance in plants against pathogen infection. There are evidences that SA biosynthesis in *P. fluorescens* is linked to the synthesis of a siderophore which has been chemically identified as pseudomonine.
4) Interestingly, siderophores can induce systemic resistance (ISR). One may therefore consider whether the mode of action of other bacterial metabolites that have been implicated in disease suppression also involves triggering of systemic resistance mediated by rhizobacteria. The mechanisms involved in disease suppression are diverse and include competition for iron, production of antibiotics, and induction of systemic resistance.