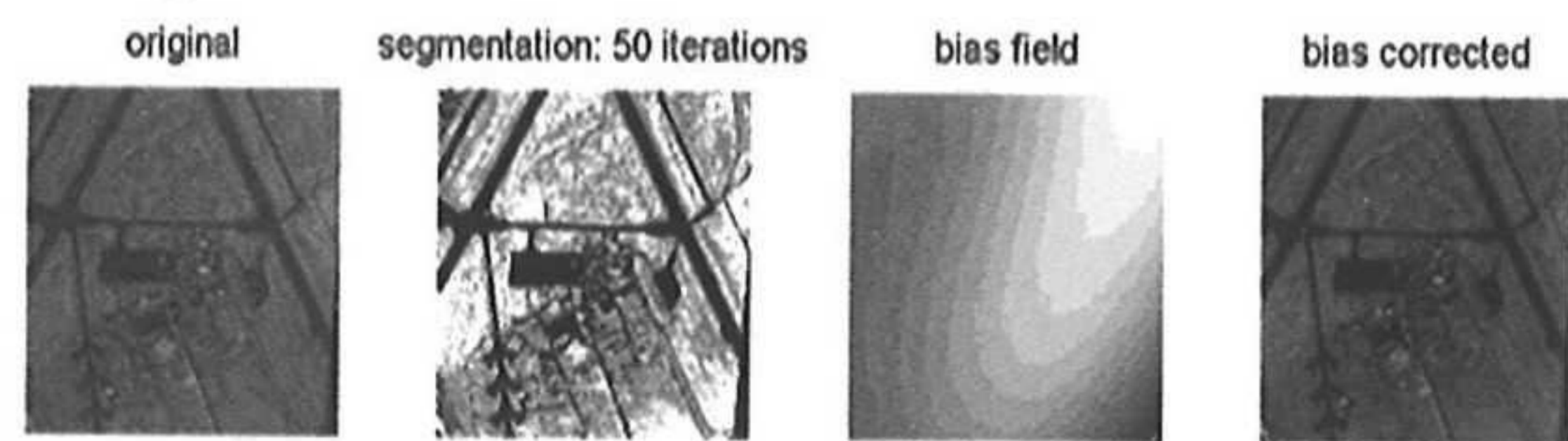


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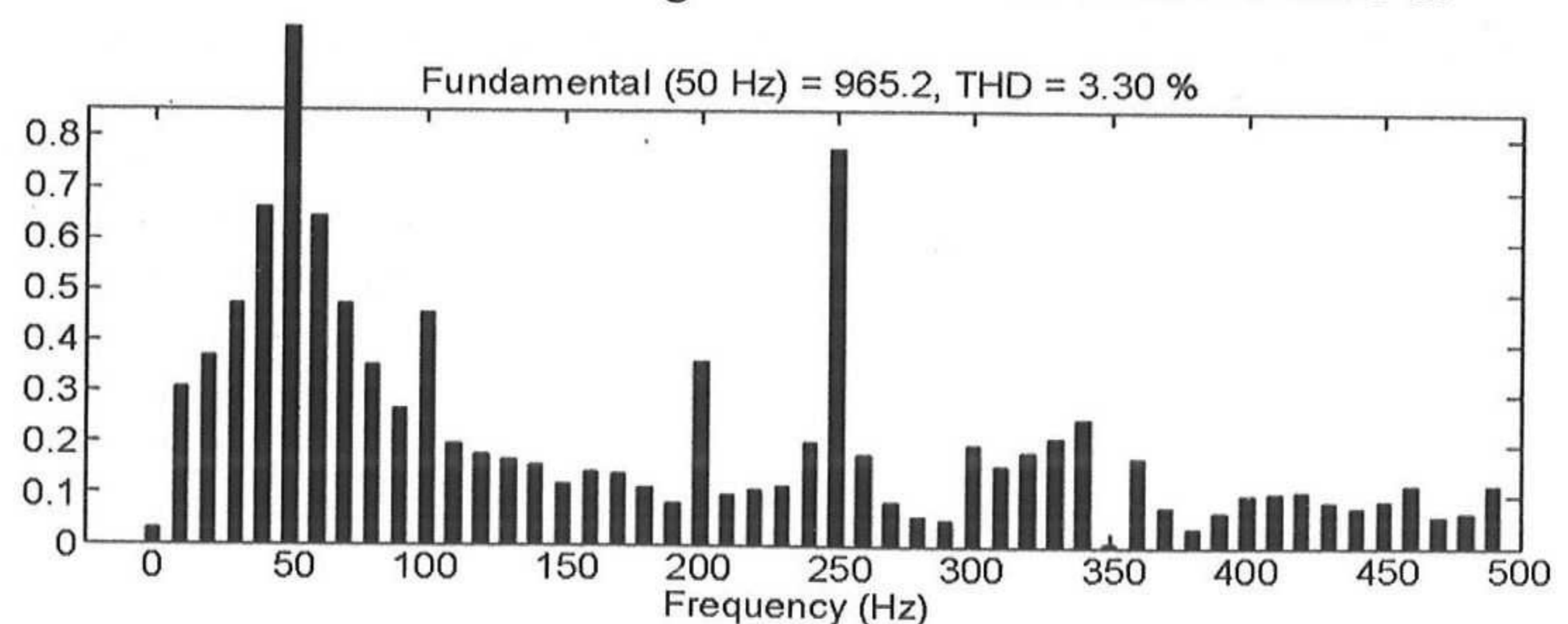
S & T and Industrial Research

- 335 **Efficient SAR Image Segmentation Using Bias Field Estimation**
- In this paper we propose a better energy and bias field estimation method called optimized multiplicative intrinsic component optimization. This method takes the responsibilities of decomposing the image into two multiplicative components, such as true image and bias field components for hyper spectral images in dark night regions. These components simultaneously derived by energy minimization and the process mainly aimed at achieve the optimum intrinsic components of Synthetic Aperture Radar (SAR) image. In this SAR image processing we are introducing a novel technique for minimizing the energy function by bias field estimation. This method performs two operations to optimize the intrinsic multiplicative components. These are bias field estimation and energy minimization. Our proposed method becomes robust due to convex of each variable in energy minimization algorithm. The performance of the proposed scheme is evaluated by comparing with conventional techniques.



Md Zia Ur Rahman & B M K Reddy

- 339 **Power Quality Improvement by Direct Power Control of Active Front End Rectifier**
- Active front End Rectifiers (AFE) are used as a powerful tool for Harmonic Mitigation. This paper proposes a new development of Direct Power Control (DPC) in AFE Rectifier technologies that are utilized to mitigate harmonics in utility power lines. In this paper, Voltage Oriented Control (VOC) based Direct Power control (DPC) of three phases PWM Rectifier with reduced input harmonics and improved power factor is presented. In the proposed Direct Power Control based on Voltage Oriented Control scheme, instantaneous active and reactive powers provided by harmonic component of input currents are directly controlled using predefined switching table with 12 switching states. A complete simulation model is developed using MATLAB/Simulink in order to test the performance of VOC based DPC of PWM rectifier and compared with SVPWM based AFE Rectifier. Results show effective harmonic compensation at front end for DPC based PWM rectifier and the current THD is 3.3% which is well below the IEEE standards. Also almost unity power factor is achieved with significant power ripple reduction and more sinusoidal grid current can be observed in DPC.



P S Jose, M Geetha, J Kanakaraj & C Abinaya

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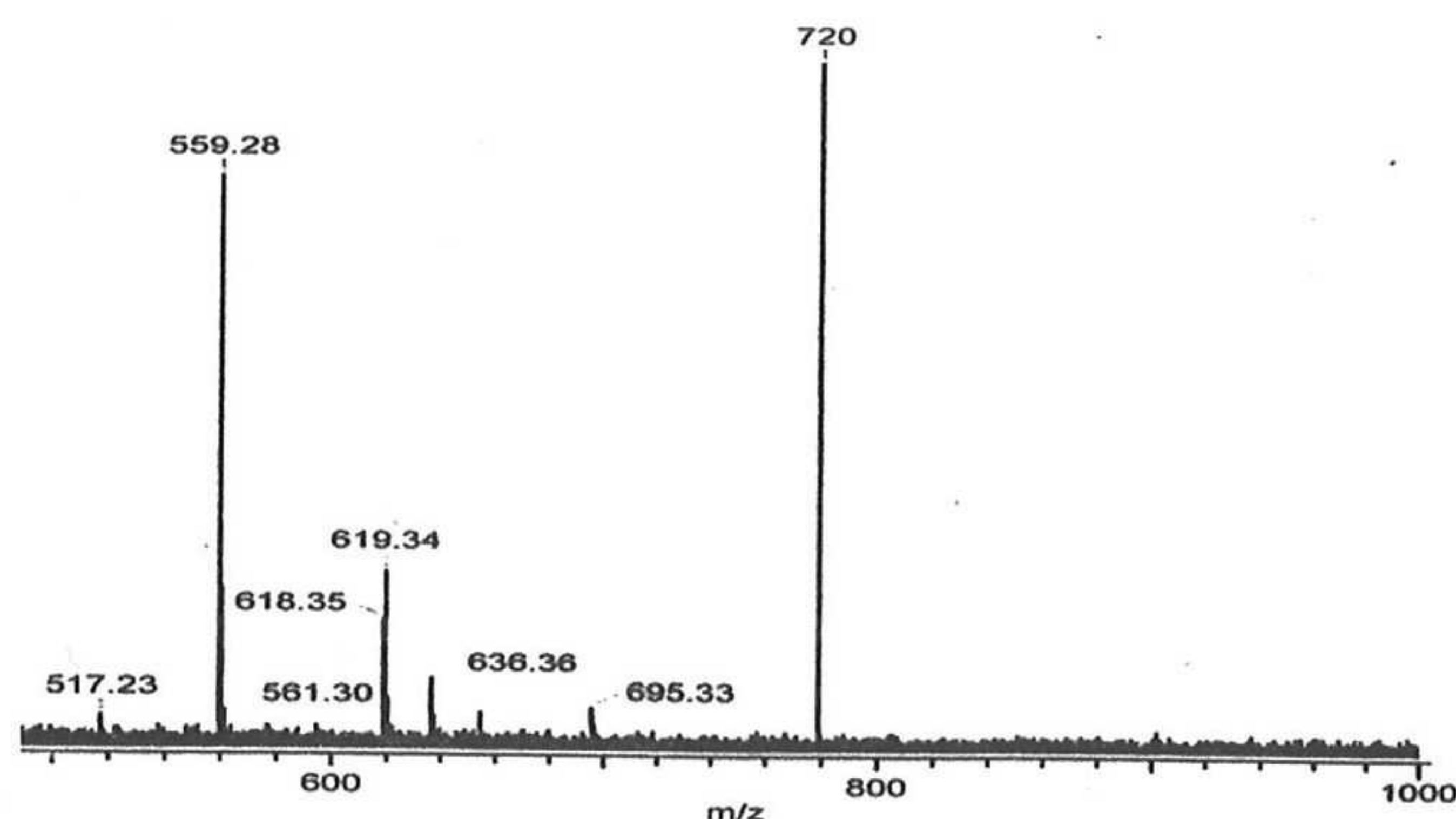
- 343 **Laser Power Estimation by Mass Ablation for High Power Laser** This paper reports an alternative method for estimation of laser power generated from high power carbon dioxide gas dynamic laser. An unstable resonator was employed for generation of laser. In this method an array of thin MS plates separated by an air gap is used for estimation of ablated mass from the array. High power laser beam was focused on the array by concave mirror of long focal length. A fraction of beam is absorbed by the surface which is opaque to laser wavelength @ 10.6 micrometers. The interaction of high power laser beam with array results in temperature rise of MS plates. If laser irradiation is continuous a phase change of material takes place in the array. In the array, 20 plates of mild steel got damaged by irradiation of laser beam and mass are removed by ablation. The paper also describes the development of software for estimation of laser power from ablated mass from each plate. The results are validated by measuring the laser power by a power meter. These results are in agreement with estimated power within $\pm 10\%$ of power measured by power meter/calorimeter.

S Kumar, R Kumar, A K Srivastava & N R Das



- 347 **Sweet Way to Produce Fullerenes** The sugars have been turned into fullerene via application to a beach sand substrate and subjected to 400 0C with exposure to Ar gas. The material produced is of comparable quality to that produced using current state-of-the-art methods for manufacturing fullerene. A distinct advantage of the present process of making fullerene is that of use of significantly lower temperature of several order of magnitudes and substantially low cost of the raw materials used as compared to the known process which contributes to the cost of the end product. The described method could form the basis of a practical industrial-scale process for fullerene manufacture.

K Singh & A Deep



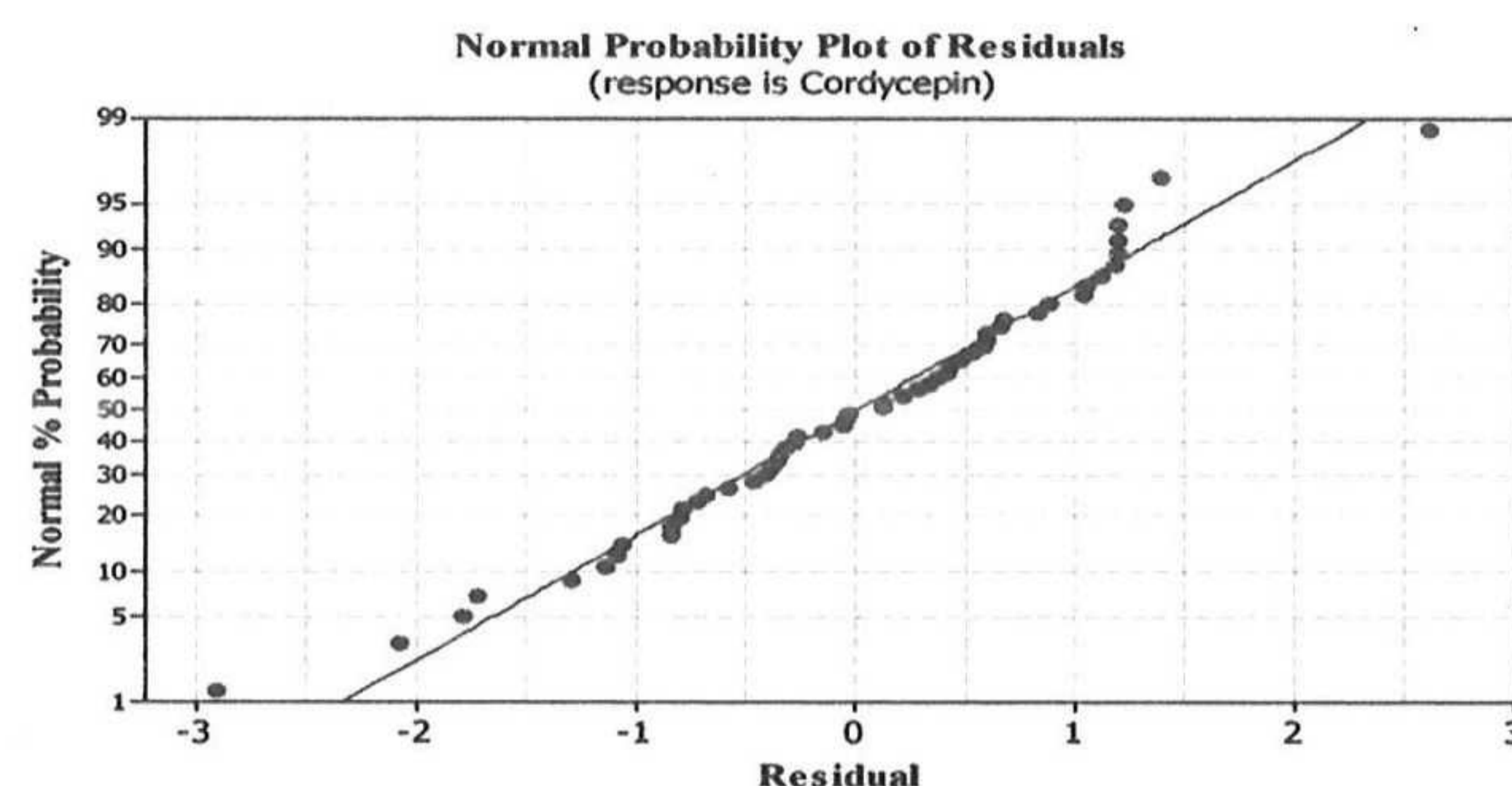
- 351 **Prevalence of Staphylococcus and Micrococcus in Traditionally Prepared Meat Products** Aerobic cocci from some of the ethnic meat products of the Eastern and the Western Himalayas were isolated and characterised. A total of 284 micrococcaceae were isolated from 68 samples of traditionally prepared meat products of different pockets of Sikkim and Uttarakhand in India. The occurrence of micrococcaceae was found at the level of 105-107 cfu/g. The total viable count in all the samples of meat products collected from different places of the Sikkim and Uttarakhand was ranging in between 105-109 cfu/g. Identification of the isolates revealed that about 91.0 % of the total isolates were identified and characterized as Staphylococcus spp. and remaining 9.0 % of the isolates were Micrococcus spp. in all the samples analysed.

A K Rai & J P Tamang

355 **Optimization of Cordycepin Extraction from Cordyceps militaris Fermentation Broth**

Cordyceps is one of the components of traditional Chinese medicine. This mushroom becomes worldwide famous due to its significant therapeutic effects on various diseases. Nucleoside like cordycepin, a major bioactive compound from *Cordyceps militaris*, is commonly known as promising anticancer and antitumor compound. The aim of study is to determine an optimal mixture ratio of solvent-solvent-based extraction method, which is used for extraction of cordycepin, from cultivated *Cordyceps militaris* DSMZ 23612 fermentation broth. Hence, the optimization process was performed using statistical (RSM) design led an optimal cordycepin extraction using solvent mixture including hot water (23%), ethanol (30%), methanol (25%) and ethyl acetate (22%). In addition, the final extracted cordycepin (786.94 mgL⁻¹ of 81% purity) was achieved through extraction parameters as sample: solvent ratio (v/v), extraction temperature, extraction time and frequency at (1:10), 35 °C, 90 min and 1 cycle, respectively. The experimental values obtained were fit with those predicted, thus indicate the suitability of RSM and method for optimization of cordycepin extraction.

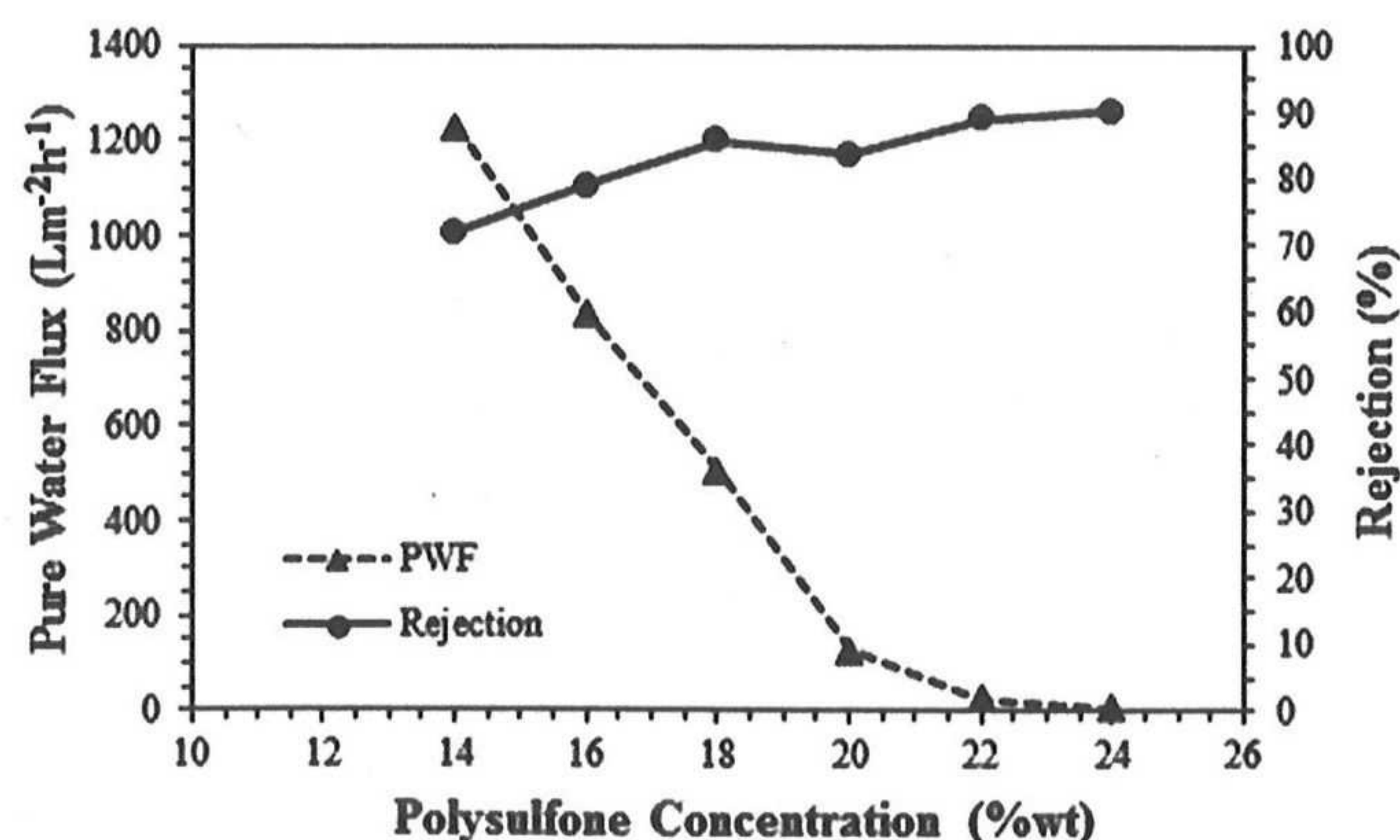
M Soltani, R Abd Malek, I Ware, S Ramli, E A Elsayed, R Aziz & H A El-Enshasy



362 **The Effect of Polymer Concentration on Flux Stability of Polysulfone Membrane**

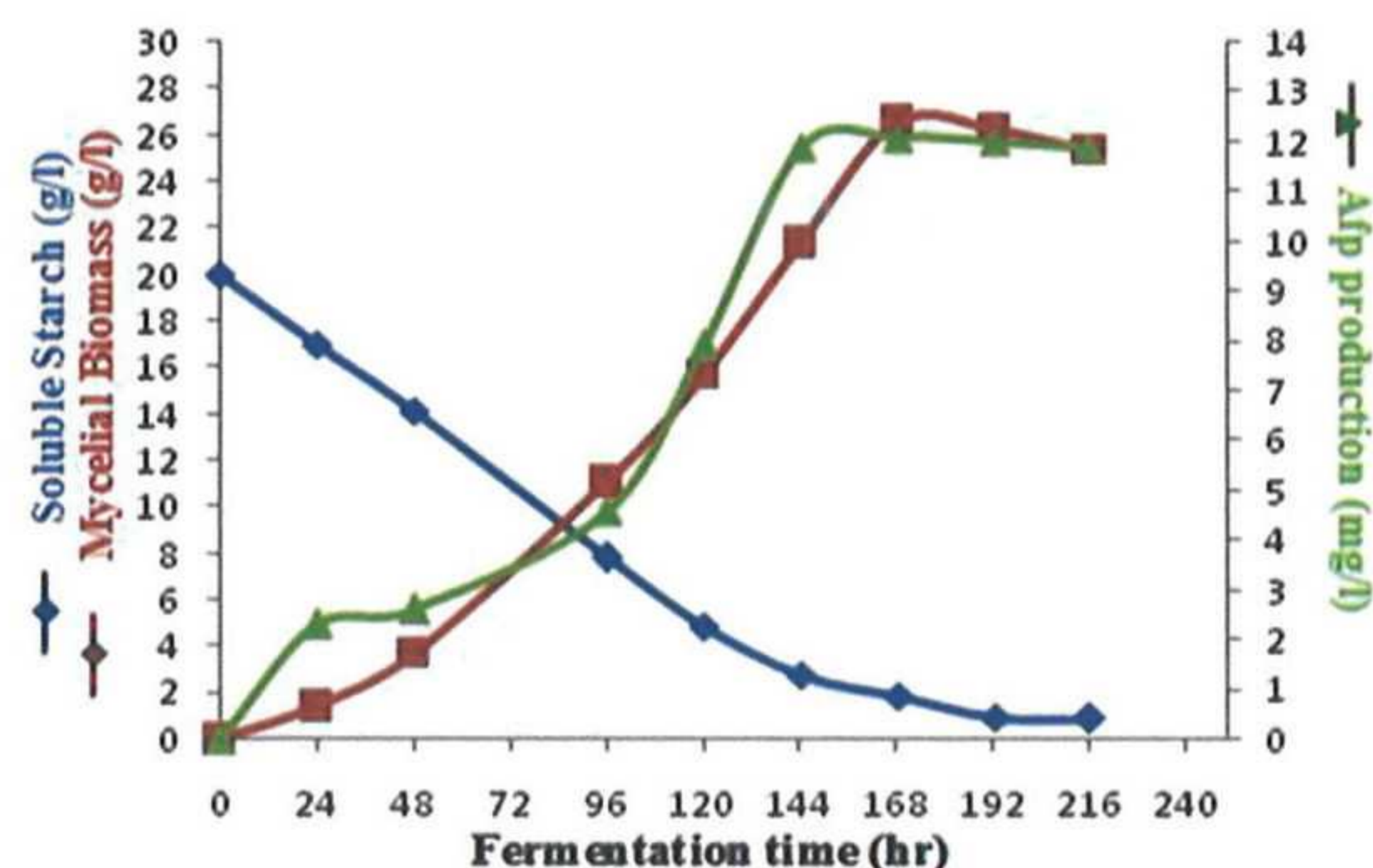
The influence of various polymer concentrations on flux stability of polysulfone membranes was investigated. The polysulfone membrane was prepared by blending polysulfone in DMAc with 25%wt concentration of PEG400 and 4% wt concentration of acetone. It was found that the pure water flux was sharply decreased from 1230 to 7 Lm⁻²h⁻¹, when the polysulfone concentration was increased from 14% to 24%wt. Furthermore, the increase of polysulfone concentration also affects the fouling behavior of the membranes, in which almost of 90% of FRR was achieved by the addition of 18 %wt of polysulfone concentration. It was suggested that fouling formed on the membrane surface was dominated by reversible fouling, thus it could be easily cleaned by flushing method. In addition, the applied transmembrane pressure (TMP) also plays an important role in fouling behavior of polysulfone membrane. It was observed that irreversible fouling of organic matter was deteriorated by the increase of TMP, which contributed to the reduction of water flux. More stable membrane flux performance was achieved although it was operated at high TMP, when 20% wt concentration of polysulfone was added into membrane solution.

D Ariono, P T P Aryanti, S Subagjo & I G Wenten



CONTENTS

- 369 Effect of Carbon and Nitrogen Sources on Mycelial Biomass and Biosynthesis of Antifungal Protein from *Aspergillus giganteus* MTCC 8408 in Submerged Fermentation**
- The objective of the present study was to determine the role of macroelements (various carbon and nitrogen sources) with various physical parameter (pH, temperature, slant age and inoculum volume) on both mycelial growth and extracellular antifungal protein (afp) production optimization in submerged culture of *Aspergillus giganteus* MTCC 8408. Maximum production of growth associated afp was observed with soluble starch as carbon source and corn steep liquor (CSL) with proteose peptone (PP) as organic nitrogen source. The optimal temperature and initial pH for both mycelial growth and afp production by *Aspergillus giganteus* in submerge culture were 25°C and 6.3, respectively. Soluble starch at 30 g/l was the most suitable carbon source for maximum mycelial growth. Shifting from glucose to soluble starch (2%) supplemented with CSL (2%) and Proteos Peptone (1%) caused a shift from pelleted morphology to dispersed, 'pulp-like' morphology with consequent increase in afp production. Maximum specific growth rate (μ) and specific rate of product formation (Q_p) were 0.012 h⁻¹ and 0.0026, respectively. Slant age at 5 days old and inoculum level at 5% (v/v) appeared to have profound effect on afp production. Under optimal culture condition, mycelial biomass growth was enhanced by 1.22 times with growth associated afp production by 2.21 times compared to the basal Olson medium.



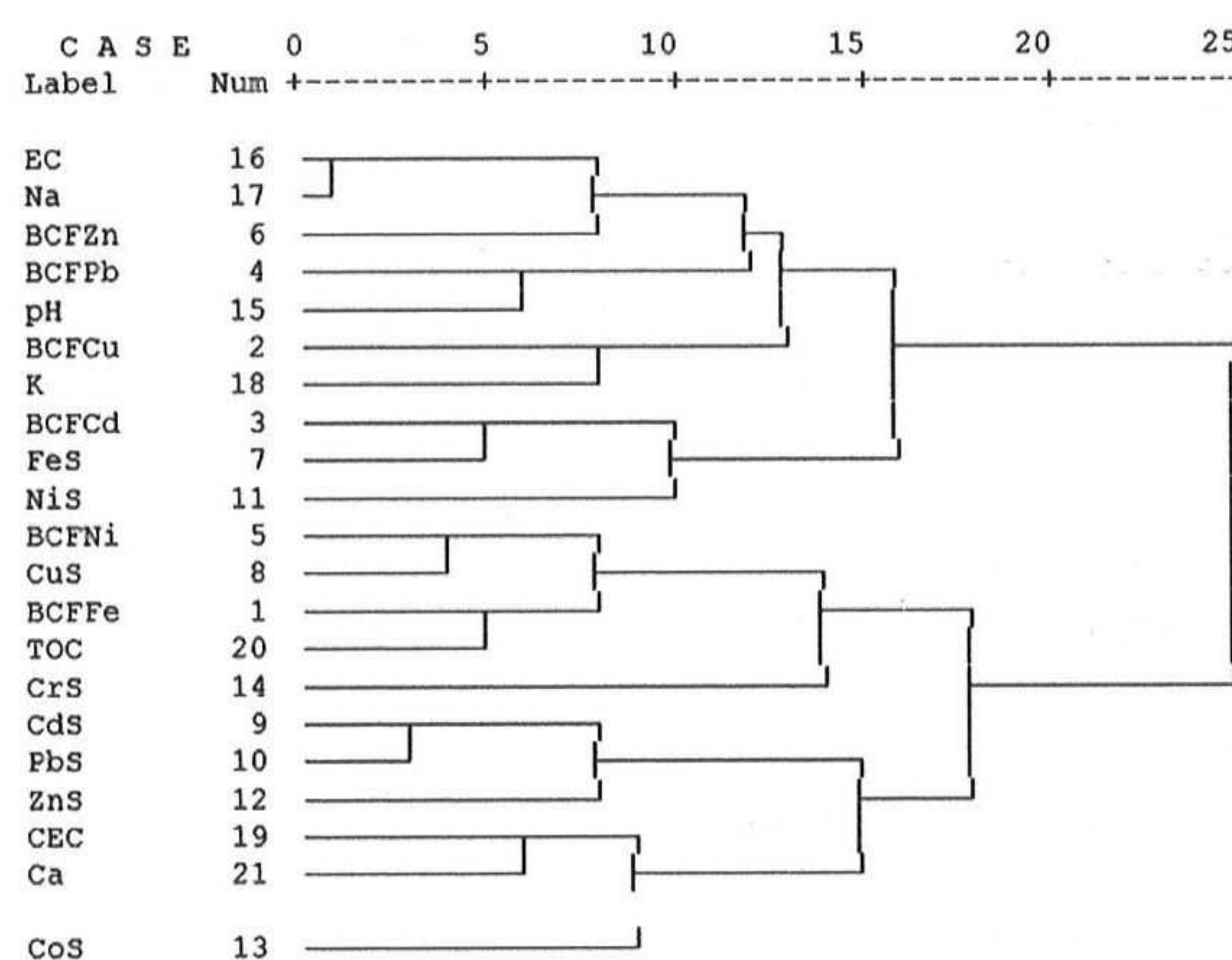
D Dutta & M Debnath Das

Energy and Environment

- 376 Study on Effect of Aging and Aging Temperature on Frictional Properties of Coconut Oil Samples**
- The present study evaluates the effect of aging and aging temperature on the frictional properties of Unrefined Coconut oil (URCO), Refined Coconut oil (RCO) and Virgin Coconut oil (VCO) samples using four ball tester. It was observed that the variations in the physicochemical properties of fresh URCO, RCO and VCO samples were attributed to the difference in their composition. This study showed that URCO, RCO and VCO samples followed same trend in their physicochemical and tribological properties when subjected to aging. The drop in flash point of aged oil samples with aging was attributed to the increased content of free fatty acids generated due to the degradation of triglyceride molecules. It was observed that the degradation of peroxide molecules has resulted in the stabilization in the peroxide content of URCO, RCO and VCO samples when aged at 100 °C.
- J K Mannekote, N Kathyayini, K Venkatesh & S V Kailas**

CONTENTS

- 381 Assessment of Bio-Concentration Factor of Heavy Metals in Indian Soil-Crop System**
- Bioaccumulation of heavy metals in different agricultural products in soil-crop systems has fascinated pervasive attention in yester years due to food safety issues. The objectives of this study were to determine the influence of different soil quality parameters on bio-concentration factors of heavy metals' from soil to pearl millet grains. For the purpose, heavy metals were examined in pearl millet grain and corresponding fields' rhizospheric soil samples from study site Haryana, India. The mean pearl millet grain concentrations of Cd, Pb, Ni, Zn, Fe and Cu were found to be 0.50, 6.74, 3.86 49.72, 142.0 and 10.17 mg kg⁻¹ respectively. Pearl millet showed strong capacity to transfer essential metals Zn and Cu from soil to grains while presented a restricting effect to the uptake of Co and Cr. Further multivariate statistical techniques like correlation analysis, principal component analysis and cluster analysis were applied to the data for supplementary and qualitative evaluation of inter-dependences among the studied parameters. Bio-concentration factors of all the studied heavy metals in pearl millet grains showed significant negative correlations with their respective soils total metal concentrations. The results revealed decreased metal uptake with increasing soil total metal concentrations. In spite of the great variety of investigated soils, significant correlations among soil quality parameters and metal accumulation in grains were reported. Cluster analysis revealed formation of many primary cluster pairs such as EC- Na, CEC- Ca, BCFNi - Cus, BCFFe - TOC, BCFzn - EC, BCFPb - pH, BCFCu - Na and CdS- Pbs etc.



P Yadav, V K Garg, B Singh & S Mor

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