A theoretical framework, proposed earlier by the authors to incorporate population heterogeneity in innovation diffusion models, which leads to generation of both unimodal and multimodal life cycle patterns, is investigated. Parameter variability randomness in diffusion (PVRD) models are used to capture saddles in diffusion patterns. The saddle may correspond to a sequence of peaks and troughs appearing in multi-modal life-cycle curves. A detailed analysis of the Indian television industry is carried out using PVRD model. It is seen that the deterministic modelling approach over predicts the system size in these product categories. Owing to high dimensional nonlinearity of the associated cost function the simulated annealing approach is adopted. The fits of the PVRD model are found to be extremely good in comparison to the existing Bass and NUI models while capturing appropriate product life cycle (PLC) curves.

Debasree Goswami & Karmeshu

Aims at designing a novel real-time scheme of image segmentation for object localization from dynamic video data stream for applications in mobile robotics. Segmentation of images under non-uniform illumination in real time is not amenable by the conventional algorithms. It employs the classical fuzzy c-means clustering algorithm for image segmentation even in the presence of non-uniform illumination of dynamic scenes. A novel algorithm for object localization based on the principle of 4-connectivity checking is also presented. The proposed algorithm is highly time-efficient and is thus appropriate for applications in interactive multi-agent co-ordination such as, tournament playing, target tracking and bricklaying realized with two mobile robots.

B Chattopadhyay, A Raychoudhury, A S Chowdhury & A Konar
CONTENTS

Papers

420  JIT-based manufacturing in Indian-forecast by Min-max Fuzzy Delphi

JIT and cultural factors play a less dominant role. Considering its potential in enhancing performance of organisations, investigation on the important issues of JIT-based approaches and their applicability in Indian context is a prime necessity. The global status of JIT implementation is reviewed for Indian managers to gain an insight and formulate policies. An attempt is made to forecast the year when JIT will be implemented as a whole and its various constituting sub-approaches in Indian manufacturing organisations. As it is a long-range forecasting, improved Delphi technique of Max-Min Fuzzy Delphi Method (MMFDM) is used that requires only one time survey. Based on a survey by the MMFDM involving 110 managers with about 65 per cent response data, it is forecasted that Indian manufacturing organisations will start realizing benefits of JIT around 2015 AD.

S S Mahapatra

428  The Five Year Plans and the role of the Council of Scientific & Industrial Research in the development of the country

The Planning Commission was established by the Government of India to function as the major instrument of planning and control in the management of its development activities. One of the policy instruments employed is the successive Five Year Plans to fulfill national socio-economic objectives. It is obvious that in the achievement of these objectives S&T, and the Council of Scientific and Industrial Research, play an important role. S&T will, in particular, encompass major strategies towards agricultural and industrial development within the framework of the overall objectives of the new industrial and trade policies. The Government policy framework will continue to encourage entrepreneurship, development of indigenous technology through investment in R&D, bringing in new technology wherever needed, and so would the CSIR.

Archana Gupta

436  Development of specialty paper is an art: abrasive base paper from NDLKCC (New Double Lined Kraft Corrugated Cuttings) — Part IV

Attempts are made to manufacture abrasive base paper from waste paper such as, New Double Lined Kraft Corrugated Cuttings (NDLKCC) as it is a cheaper source for food quality of fibres. Prior to manufacturing abrasive base paper, it is necessary to remove lignin and other interfering chemicals such as, melamine formaldehyde and fortified rosin size. The results have promising scope in the market. The manufacturing of abrasive paper allures the paper maker for production of abrasive base paper.

Dharm Dutt, J S Upadhyaya, R S Malik, A K Jindal & M K Upadhyaya

Development of specialty paper is an art: azure laid ledger paper from indigenous raw material — Part V

Dharm Dutt, J S Upadhyaya, A K Jindal & C H Tyagi

Bioconversion of Colocasia antiquorum and Aponogeton natans to citric acid by Aspergillus niger — effect of metal ions and kinetics

A R Angumeenal, P Kamalakannan, H J Prabhu & D Venkappayya

Wheat bran an inexpensive substrate for production of lactic acid in solid state fermentation by Lactobacillus amylophilus GV6 — optimization of fermentation conditions

B J Naveena, C Vishnu, Md Altaf & Gopal Reddy

Azure laid ledger paper usually having yellowish colour is used for making of registered envelope. Registered envelope provides a protective medium for document, which is to be sent from one place to another. In India the climatic conditions vary from one part to another part of the country. Also the registered envelope should have sufficient mechanical strength in order to secure the document from damage and harsh atmospheric conditions during posting. It is necessary to develop such properties that may be helpful to protect the covered document against harsh atmospheric conditions and wear and tear during handling. Attempts are made to impart such properties using indigenous raw materials like, eucalyptus, bamboo and sawmill waste of pine. The results of laboratory made hand sheets are encouraging and match the specifications prescribed by ISP.

Tuber crops belonging to the family Araceae namely, Colocasia antiquorum and Aponogeton natans are cultivated in large quantities for their edible portion. In this work, tubers are suitably treated and used as efficient substrates for citric acid production by fermentation using Aspergillus niger. The quantities of citric acid produced using these materials as substrates for bioconversion, using Aspergillus niger are compared with those produced in synthetic medium comprising glucose as substrate. Transition metal ions such as, chromium, molybdenum, cadmium, and lead are added at optimum concentration as nutritional supplements and their effect on the biosynthetic route of the citric acid cycle are discussed. Experimentally observed growth stages are used for mathematical modeling to evaluate the kinetic parameters. The values obtained by calculation agree well with the observed ones.

Lactic acid production by an amylolytic bacterium Lactobacillus amylophilus GV6 is studied, using wheat bran in solid-state fermentation. Conditions of solid-state fermentations are optimized. Moisture content 83 per cent at 37°C, pH 6.75, inoculum size 3.5 mL and incubation period of 5d are found to be optimum. Different brans of pigeon pea, green gram, black gram, and corn fibre are also tested in addition to wheat bran. Wheat bran is found to be the best as solid support and substrate among all brans tested.
### CONTENTS

#### Papers

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>Pilot plant processing data for the isolation of artemisinin from the new variety of Artemisia annua 'Jeevanraksha'</td>
<td>S Tandon, A P Kahol, D C Jain, R S Bhakuni &amp; Sushil Kumar</td>
</tr>
<tr>
<td>462</td>
<td>Usage of polyester textile wastes in composites</td>
<td>Telem Gok Sadikoglu, Cagri Shikim, Canan Ganze Guleryuz &amp; Barlas Eryurek</td>
</tr>
<tr>
<td>468</td>
<td>Occurrence of enterobacteria and Clostridium during gelatin manufacture</td>
<td>Anjana Sharma, Sandeep Agarwal, Sushma Rajput &amp; R S Mehta</td>
</tr>
</tbody>
</table>

*Artemisia annua*, known as ‘qinghao’ in China is a major source of artemisinin, used for the synthesis of many potent drugs effective against malaria caused by chloroquine sensitive and resistant strain of *Plasmodium falciparum*. CIMAP has recently developed a new variety of *Artemisia annua* 'Jeevanraksha' containing high levels of artemisinin. Processing parameters for an improved and economic process for the isolation of artemisinin from *Artemisia annua* are standardised that are useful for commercial equipment design.

A composite material is produced by using polyester textile wastes as reinforcement material and mainly urea formaldehyde as matrix material. This composite is used in banks, tables, shelves, and pots. The bending strength and absorption properties of the textile reinforced composite are investigated and compared with fibreboard and medium density fibreboard which are alternative materials for the same end-uses. The polyester wastes such as, yarns, woven, and knitted fabrics cut at random dimensions are used as reinforcement material. Matrix material is prepared by mixing urea formaldehyde resin, ammonium sulphate, and flour in a weight ratio of 100:5:10 consecutively. The bending strength of the textile reinforced composite is less than the fibreboard and the medium density fibreboard, but it absorbs less water. It shows that the properties of the textile reinforced composite can be improved by considering the test results obtained.

The study is made for the occurrence and isolation of enterobacteria and *Clostridium* during different stages of gelatin manufacture in an industry. Samples are collected during each stage of manufacturing, i.e., from the raw material ossein to the finished product and analysed for the enterobacterial and clostridial species. The enterobacterial species identified are *Escherichia coli*, *Klebsiella oxytoca*, *Proteus mirabilis*, *Salmonella typhi*, and *Shigella sonnei*. Among the genus *Clostridium*, the species identified are *C.perfringens* and *C.botulinum*. The finished product, barring technical grade gelatin do not show the presence of any bacterial species. Presence of these bacterial species may be responsible for severe health hazards, since gelatin is commonly used in the preparation of various food products.
CONTENTS

Papers

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Abstract</th>
</tr>
</thead>
<tbody>
<tr>
<td>473</td>
<td>Energy efficiency improvement of electrical transmission distribution networks</td>
<td>Strategies for improvement in T &amp; D efficiency, minimizing the capacity losses and improvement in power quality, are presented. The results of experimental work on systems are also presented in the form of curve fits. The main suggestions are centered on upgrading operating voltage, automation, network re-configuration, operational optimization, demand management, and system modernization.</td>
</tr>
</tbody>
</table>

M Siddhartha Bhatt

Conference Report

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>491</td>
<td>International workshop on recent advances in nanotechnology of magnetic fluids (RANMF-2003)</td>
</tr>
</tbody>
</table>

R S Beniwal

Book Reviews

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
</table>
| 502  | The coaching manager — developing top talent in business  
Reviewer: S Mohan |

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 502  | International yearbook of industrial statistics, 2002, UNIDO, Vienna  
Reviewer: Pradosh Nath |

Sci-Tech Update

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>505</td>
<td>China has world’s tightest internet censorship</td>
</tr>
<tr>
<td></td>
<td>First step to cutting reliance on oil</td>
</tr>
<tr>
<td></td>
<td>The Wi-Fi boom</td>
</tr>
<tr>
<td></td>
<td>UN embarks on International Year of Freshwater 2003</td>
</tr>
</tbody>
</table>
CONTENTS

Sci-Tech Update

- Alternative web browsers
- Bioharcodc to detect source of DNA in food
- Germany and European space efforts
- A chance to learn
- New premise in science — get the word out quickly, online
- Genetically modified (GM) foods debate in Latin America
- India’s short message: we c u
- Drug makers battle plan to curb rewards for doctors
- The CDA-1 anaemia gene discovered
- Medicine and biology in 2002
- A high-tech fix for one corner of India
- Announcements