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EDITORIAL

Chemical and Bioprocess Engineering: A Special Issue of Journal of Applied Sciences

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Abstract: ICCBPE-2005/SOMChE conference discussed the recent developments in chemical and bioprocess engineering. In this introduction to the special issue dedicated to the conference, an overview of selected papers outlined.

Key words: Bioprocess engineering, environmental engineering, material technology, product formulation

INTRODUCTION

Chemical and bioprocess engineering play an important role in the manufacture of many chemical products. The theme for 2nd International Conference on Chemical and Bioprocess Engineering: Symposium of Malaysian Chemical Engineers (ICCBPE/SOMChE) Product Innovation for Excellent Future emphasized the emerging paradigm that valuable products and novel processes need to be developed based on the in depth understanding of chemical and bioprocess engineering and extending to all chemical engineering aspects. A total of 250 papers were received from around the globe as shown in Fig. 1. Papers were contributed from academia, industry and research institutions. Three hundred participants attended the conference and the international character of conference is reflected by the fact that attendees came from 15 countries.

During the conference 6 key note lectures and 200 oral presentations were presented. The present special issue contains selected papers from the 2nd International Conference on Chemical and Bioprocess.

Engineering (ICCBPE-2005) in conjunction with 19th Symposium of Malaysian Chemical Engineers (SOMChE) held in December, 2007 at Universiti Malaysia Sabah in Kota Kinabalu. The objective of this conference was to bring together leading experts from academia and industries to discuss the status quo and to identify the future challenges in this area. The conference program covered a broad range of topics such as chemical process engineering, bioprocess engineering, material technology, environmental engineering sciences and product formulation engineering and brought together specialists from different countries to discuss the latest developments. Based on the ICCBPE-2005 conference technical committee's recommendations, the authors

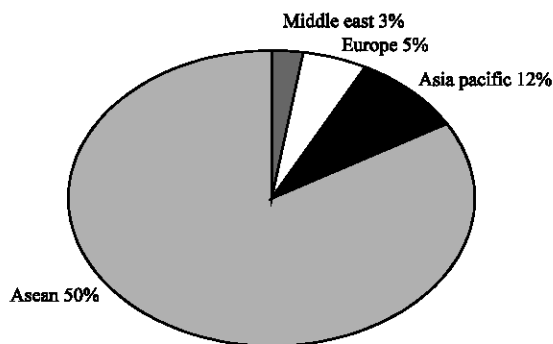


Fig. 1: Statistical data of paper presented

of 65 contributed papers were invited for possible publication in this special issue. All the submitted manuscripts were peer reviewed by experts and followed by revisions according to the established guide lines of Journal of Applied Sciences.

OVERVIEW OF SPECIAL ISSUE

The first conference key note lecture was delivered by Dr. Richard England (University of Bath, UK). In his lecture, discussed the critical review on membranes application in the chemical and bioprocess industries. In another study, it was highlighted on chemical engineering aspects of biotechnology and it concerned with the knowledge of products, processes and all the artifacts that result from engineering. Prof. Masahito Taya (Osaka University, Japan) presented the invited paper on ROS (Reactive Oxygen Species) biotechnology, results from biocidal activity of TiO₂ thin films, physiological properties of *E. coli* cells with pYGE under oxidative stress, application of microbes with pYGE plasmid to bioproduction processes and search of genes with similar

function to *yggE* in different organisms including human cells. Finally, various aspects such as modeling of cell growth, simulation of biofilter, bacterial desulphurization of coal, PHAs recovery through enzymatic digestion, biosorption by various seaweeds, membrane bioreactors and protein purification of bioprocess engineering were considered in the papers.

The product and process design problems were treated in the studies on biodiesel from palm oil, natural synthetic lubricant for hydraulic fluid, trimethylolpropane ester from palm oil, highly reactive electrogenerated zinc, decontamination of chloroaromatic compounds, genetic expressions in type 2 diabetes mellitus-an anti-inflammatory approach, cultivation of lactic acid bacteria, clog removal formulation by using mixture design method, bonding analysis for amino resin wood adhesive with pesticide, antioxidants from *Morinda citrifolia* and single cell protein by *Aspergillus niger* from fruit waste.

Environmental aspects and approaches were discussed in the papers anaerobic fermentation, composting of sewage sludge using solid state fermentation technique, fluidized bed reactor for anaerobic treatment, emulsion liquid membrane extraction of silver, hydrogen recovery in refineries, low cost transition metals doping catalyst, removal the hydrocarbons from contaminated soil by the micro organisms, biosorption of nickel ions from aqueous solution using a green seaweed *Ulva reticulata*, use of advanced oxidation processes in the degradation of trans-chlordane in water, removal of Zn and Cu from wastewater by sorption on oil palm tree-derived biomasses, fixed-film reactor treating palm oil mill effluent, aluminum recovery from e-waste and biodegradable moulded articles from radiation modified sago-blends.

Novel carbon nanotubes by manganese oxide with wet chemical method was presented in a study. A series of contributions include: pure silica zeolite beta membrane for microprocessor application, polypropylene composites reinforced with palm oil empty fruit bunch cellulose, enzymatic membrane reactor for cyclodextrins production, unsupported composite alumina sol/poly(vinyl alcohol) membranes for glucose oxidase immobilization, polyethersulfone nanofiltration membrane in monovalent and divalent ions separation, poly(lactide-co-glycolide) copolymers for drug delivery applications, nanocrystalline of mechanochemical treated chromium promoted vanadyl pyrophosphate catalyst for n-butane oxidation, corrosion

behavior of polyaniline and its substituted copolymers on mild steel, fouling mechanisms in enzymatic membrane reactor for cyclodextrins production based on resistance-in-series model and surface modification of fumed nanosilica with epoxy molecule.

FUTURE TRENDS

The last decade has seen an explosive development of bioprocesses for production of low and high value added products, particularly in phytochemicals recovery and application. There is a large research effort in various regions of world on chemical and bioprocess engineering. However, the emphasis is on basic principles, technology and sustainable chemical processes. The latest trend of returning to the natural sources for health and medicine has created a lot of development in the recovery of phytochemicals from plants based on chemical and bioprocess engineering principles. A controlled drug delivery has potential to achieve more effective therapies while eliminating the both under and overdosing. In the recent years, there is an investigation on reactive oxygen species (ROS) technology. The infusion of this new technology is apparent with the antioxidants application in the plants growth. The latest work on membrane technology is becoming increasingly important for selective separation of the components at molecular level. The isolation of the molecules depends on the properties such as affinity, solubility, molecular weight size, charges and etc. The different properties of two environments separated by the specific properties of the membrane allowed only certain molecule to pass over the membrane and the choice of membrane is an attractive option for future research.

ACKNOWLEDGMENTS

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