

## Softening and Purifying of Fermented Molasses for Preventing from Closing the Trays of the Stripper Column in Alcohol Plants

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### Abstract

*This process provides a method for prevention of deposit formation over the outer surface of process equipment in alcohol plants from sugar beet molasses and particularly in sugar cane molasses.*

*In this process, the fermented molasses are softened and precipitated before entering the distillation column. Firstly, the pH of the fermented molasses will be increased up to 10-10.5 by sodium carbonate. In other words, the solution is carbonized and then its temperature will be increased up to 50°C and a certain amount of ethanol is added to the mixing solution. After adding some ethanol, the components in molasses (specially carbonized calcium and magnesium cations), are precipitated and deposited quickly. Also, the liquid and deposited phases are separated and liquid phase (free of calcium and magnesium cation) is sent into the distillation column.*

**Keywords:** Carbonation, Stripper Column, Precipitation



## An Overview on the Application of Conducting Polymers in Direct Methanol Fuel Cells to Improve their Performance

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### Abstract

*Direct methanol fuel cells, because of their environmental compatibility and relatively high power density, are promising alternative for future energy needs. However they have some disadvantages such as high methanol cross-over through the cell membrane and low performance in lower humidity conditions that limit their applications. Electrically conducting polymers such as polyaniline and polypyrrole have been used for the modification of membrane and catalyst layer in direct methanol fuel cells. Studies have shown that using of these materials can improve the cell performance by reduction of methanol cross-over through the membrane, improvement of operation at lower humidity conditions and improvement of the mechanical strength and catalyst layer properties. In this paper the studies, made on the application of conducting polymers especially polyaniline and polypyrrole in direct methanol fuel cells have been reviewed.*

**Keywords:** Direct Methanol Fuel Cell, Nafion Membrane, Conducting Polymer, Polyaniline, Polypyrrole

# Novel Extraction Methods of Nutraceuticals from Medicinal Plants: Ultrasound-assisted Extraction, Microwave-assisted Extraction and Accelerated Solvent Extraction

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## Abstract

Extraction forms the first basic step in medicinal plant research because the preparation of crude extracts from plants is the starting point for the isolation and purification of chemical constituents present in plants. Extraction techniques have been widely investigated to obtain such valuable natural compounds from plants. The traditional technique requires longer extraction time and higher solvent consumption. Therefore, there is an increasing demand for new extraction techniques with shortened extraction time, reduced organic solvent consumption, and increased pollution prevention. Novel extraction methods including ultrasound-assisted extraction, microwave-assisted extraction and accelerated solvent extraction are fast and efficient for extracting chemicals from solid plant matrixes. Extraction method could be extracted maximum nutraceuticals with high pure from solid plant materials if it selected correctly. Also, the yield and quality of nutraceuticals should be considered when an extraction method is selected

**Keywords:** Nutraceuticals; Medicinal Plants; Extraction; Ultrasound; Microwave; Accelerated Solvent



## A Review on Theoretical Prediction of Polymeric Membrane Morphology Prepared via Phase Inversion

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## Abstract

This paper is a review on researches considering theoretical prediction of polymeric membrane morphology prepared via phase inversion. Membrane morphology possesses a significant effect on efficiency. Accordingly, the knowledge of membrane morphology and influence on membrane performance is vital. Controlling membrane preparation conditions results in a desired morphology leading to an appropriate performance. In this review paper firstly, current procedures for membrane fabrication via phase inversion were briefly discussed. This was followed by tackling the papers discussing the prediction of membrane morphology on the basis of phase diagram. Finally, Flory – Huggins theory, which is a useful tool for prediction of ternary phase diagrams, was explained. Moreover, the recently published Compressible Regular Solution (CRS) model was mentioned.

**Keywords:** Morphology, Membrane, Prediction, phase Diagram

## A Review on the Synthesis Methods of Nano Zero Valent Iron (NZVI)

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### Abstract

Recently nano zero valent iron (NZVI) because of its unique electrical, magnetic, optical and catalytic properties and also because of its high surface area and activity, resulted from its small size, has been lionized. Rapid development in nanotechnology has caused increased number of research works about NZVI applications especially for environmental purposes. The synthesis method of nanoparticles is determinant parameter of their size and structure. Researchers have used various methods for NZVI synthesis. These methods are divided to chemical and physical categories. In the present study we review the synthesis methods of NZVI.

**Keywords:** Zero Valent Iron (ZVI), Nanotechnology, Nanoparticles Preparation, Metal Nanoparticles, Nanoparticles Stabilization



## Simulation and Optimization of “Kellogg” Ammonia Production Process

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### Abstract

Ammonia is one of the most important petrochemical products, which is produced extensively in the world and play a great role in manufacturing of other chemical products.  $H_2$  and  $N_2$  are the main feedstock for synthesis of ammonia. Usually,  $H_2$  is produced through steam reforming of light hydrocarbons (natural gas) and  $N_2$  comes from Air. In this paper, ammonia process based on Kellogg, in steady state condition, was simulated using HYSYS simulation software. Finally, the results was compared with practical process data. Finally, simulation was utilized for optimizing process in order to produce more ammonia.

**Keywords:** Ammonia, Kellogg, Simulation, Steady State, HYSYS

# Mathematical Modeling and Parametric Study of an Indirect-type Solar Dryer

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## Abstract

*This study aims to present a comprehensive mathematical model for study of an indirect-type solar dryer. For this purpose, using the conservation laws of heat and mass and the physical principles of the performance of such systems, the governing equations related to the solar collector and the fixed-bed dryer are developed in the unsteady state condition. The governing equations are solved numerically. The effect of some structural and operating parameters of the solar dryer is studied on its performance. Furthermore, the drying efficiency of the dryer is determined in various conditions. The obtained results are well adapted with the expectations of the conservation laws and the physical principles of such systems.*

**Keywords:** Solar Dryer, Solar Energy, Solar Collector, Mathematical Modeling



# Laccase: Recent Progresses and its Nano-Biotechnological Importance

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## Abstract

*Laccase is an enzyme belonging to oxidase group, known as blue multi-copper oxidase that is produced by microorganisms especially fungi and plants. Laccase uses molecular oxygen as electron acceptor for biological oxidation while hydrogen peroxide is the electron acceptor in peroxidases. Application of this enzyme includes a wide range of chemical processes and industries such as bleaching in the textile industry, pulp bleaching, effluent detoxification, bioremediation, food industries, production of organic materials from phenolic and amine substrates, fuel cells and nanobiotechnology. Although filamentous fungi produce considerable amount of laccase, but industrial scale production of this enzyme is still faced with various problems such as uncontrolled fungal growth, the formation of polysaccharides around mycelia and the secretion of certain compounds such as inactivating proteases. The recent researches on laccase focused on increasing efficiency and decreasing the final production cost with finding suitable microorganisms and improving the production process and purification. This article reviews an introduction on laccase, characteristics, manufacturing processes, and the effect of various factors on its stability and activity and other applications in various industries.*

**Keywords:** Oxidase, Bioxidation, Biosensors, Bleaching, Laccase, Microorganism

# Cleaning Heat Exchanger During Operation

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## Abstract

*Desediment of heat exchanger is common in industry and lot's of efforts have been done.*

*In this article (essay) it has been studied about decreasing of sediment on-line way and it's advantage in compare to off-line way. and also if has been studied about ammonia units air compressor problem in petrochemical co in khorasan that is resulted from sediment of heat exchanger of third stage , with usage of coloridric asid %5 and flomate matter %2 on line by preventing from stop of ammonia units and also urah units chemical washing of E-2143 exchanger activity , caused decreasing of compressor vibration ,decreasing of exchanger's water's temperature , decreasing of air outlet air temperature of exchanger, increasing of cool water flowing and deduction and cost saving, and is finished successfully.*

**Keywords:** Washing of Heating Exchanger, On-line Washing, Chemical Control, Rub off Sediment