# A Review on the Effect of Chemical and Physical Mutagens in Increasing Dark Fermentative Hydrogen Production by Enterobacter Strain

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**Abstract**

*Dark fermentative hydrogen production is an elaborated multiproduct process that takes place in the absence of light and oxygen. In present paper effect of chemical and physical mutagens on increasing dark fermentative hydrogen production using Enterobacter strain is reviewed. The hydrogen production rate of mutant compared to the wild strain was increased and other metabolite production was decreased by using both chemical and physical mutagens. The various techniques such as testing sugar utilization efficiency, suicide substrate, suicide protons and Voges–Proskauer was used for screening mutant cells. However, the hydrogen production rate as index for selection the best mutant has been considered. Hydrogen production by using chemical mutagens was higher than physical mutagens.*

**Keywords:** ***Enterobacter*, Ethyl Methanesulphonate, Ethidium Bromide, Dark Fermentation, Plasma, Mutagenesis, UV–Irradition, Biohydrogen.**

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# A Review of Membrane Technology Application in Novel Drug Delivery Systems

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**Abstract**

*The main purpose of this paper is the investigation and study of membrane technology applications in novel drug delivery systems. In recent decades, membrane drug delivery systems have been considered by researchers because of their membrane compatibility with the body, biodegradability, the ability to release the drug at a constant rate and to the amount required for the body. In this research, various types of drug delivery systems using membrane technology including osmotic membrane system, Diffusion controlled membrane systems (implants, patches and pills) and transdermal membrane system (passive diffusion and iontophoresis) were investigated. Moreover, commercial membrane drug delivery systems are presented. Indeed, this research shows the important roles of membrane science and technology in medical applications but also highlights the importance of collaboration of membrane scientists with others (biologists, bioengineers, medical doctors, etc.) in order to address the complicated challenges in this field.*

**Keywords:** **Membrane Technology, Drug Delivery, Osmotic Membrane System, Diffusion Controlled Membrane Systems, Transdermal System.**

# A Study of Nanoparticles Application in Different Oil and Gas Reservoir Rock Types

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**Abstract**

*Applicability of nanoparticle in oil and gas industry has brought much attention, particularly in enhanced oil recovery. Various factors including reservoir type, geological properties, wettability of the surface and fluid distribution influence efficient production from reservoir. Employing nanofluid for wettability alteration has been of great importance and provide favorable wettability state. Wettability alteration of reservoir rock increases production rate and reduces the residual saturation of the fluid in the porous medium. Reservoir rock surface consists of minerals with different adsorption properties that can influence wettability of the rock. In this paper, a fundamental of wettability is explained furthermore, the ability of different nanoparticles in wettability alteration of different rock types are investigated for enhanced recovery from oil and gas reservoirs with certain rock type.*

**Keywords: Enhanced Recovery, Wettability, Rock Type, Oil and Gas Reservoirs, Nanoparticles.**

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# Application of Peppermint Plant Residues for Ions of Copper and Zinc Removal from Aqueous Solutions

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**Abstract**

*Residues mint were used to remove two heavy metal ions, copper and zinc. The adsorbent was washed with nitric acid, hydrochloric acid, sulfuric acid and was reached to neutral pH using distilled water. The adsorbed ions were desorbed from biosorbent with 0.1 M $Na_2S_2O_3$ and then was measured by flame atomic absorption spectrometry. The effective parameters such as pH, type and volume of eluent, and sorption capacity were investigated. The calibration curve was linear in the range of 0.010-5.0 µg $mL^{-1}$ Cu and 0.080-2.0 µg $mL^{-1}$ Zn. Detection limits for Cu (II) and Zn (II) ions were $4.8 \times 10^{-3}$ and $2.6 \times 10^{-3}$ µg $mL^{-1}$, respectively. Seven replicate determinations of a mixture containing 0.5 µg $mL^{-1}$ each of the elements gave a relative standard deviation of ±1.20٪ and ±1.17 %, respectively. To describe the mechanism of copper and zinc ions biosorption, the Langmuir and freundlich isotherm models were tested on the equilibrium data. The maximum adsorption capacity of Cu and Zn on the adsorbent were 16.48 and 12.85 mg $g^{-1}$and the preconcentration factors were 150 and 100, respectively.*

**Keywords: Mint Residue, Solid Phase Extraction, Copper ion, Zinc Ion, Flame Atomic Absorption**.

# Investigation of Modified Nanoclay Effect on Morphological, Rheological and Mechanical Properties of PVC/g-ABS Blend

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## Abstract

*In spite of the benefits of Polyvinylchloride (PVC) such as its capability in producing soft to hard products, it suffers from low impact strength. Incorporation of an elastomer into the PVC matrix can enhance its impact strength but weaken its stiffness. Simultaneous using of an elastomer and nano-filler can improve the PVC properties. In this paper the PVC/g-ABS/nanoclay blends, using an internal mixer, were prepared and tensile strength and impact strength of samples were studied. Also, the effect of feeding order on the blend morphology was investigated. Two types of simultaneous (A) and sequential (B) feeding methods were used. Method (B), showed the proper localization of nano-clay in the PVC matrix as well as in the interface between the matrix and dispersed phases. It seems that in order to enhance the mechanical properties of PVC/g-ABS/nanoclay blend combination of the feeding method and weight percentage of components must be considered.*

**Keywords: PVC, Elastomer, Nano-Filler, Impact Strength.**

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# Separation and Purification of Conjugated Linoleic Acid Isomers from Safflower Oil

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## Abstract

*Attentions of preparation of conjugated linoleic acid (CLA), which is a mixture of positional and geometrical isomers of linoleic acid with conjugated double bonds, are considerable because of its anticarcinogenic and obesity treatment properties. The most biologically active CLA isomers are 9c, 11t-18:2 and 10t, 12c-18:2. The aim of this study is to separate and purify the two essential isomers via enzymatic method by Candida rugosa lipase and optimization of reaction conditions in order to better separation. For enzymatic purification, L-menthol and Lauryl alcohol were used separately. Optimization of reaction conditions by enzyme content, time and the ratio of free fatty acid to L-menthol or Lauryl alcohol was performed by using design-expert, Table Curve curve. Purification by L-menthol obtained these results: 56% 9c,11t and 77% 10t,12c and purification by Lauryl alcohol obtained 58% 9c,11t and 66% 10t,12c.*

**Keywords: Conjugated Linoleic Acid, Safflower Oil, Enzymatic Purification, Lipase.**

# Aerogel-Based Renders and Plasters as New Insulating Materials in Buildings

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## Abstract

*Energy consumption in building section has the most contribution of total energy consumption in many countries. Efficient insulation of building is an attractive way to reduce the heat losses from buildings. In this way aerogel based insulating materials have found promising applications. Various studies have been done to develop the aerogel based plaster and renders and to investigate theirs thermal, acoustic and hygrothermal performance. This paper reviews the investigations on the aerogel-based plasters and renders as attractive insulation materials which can be used on the inner or outer surfaces of walls and presents the performance of these new patented insulating materials in comparison with the convectional renders and plasters. From the viewpoints of investigated performance criteria, various studies have shown superior and more desirable results for aerogel-based coatings rather than convectional renders and plasters.*

**Keywords: Renders, Plasters, Aerogel, Insulation, Building, Performance.**