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Effect of Treated Filter Cake on Yield and its Components of Sugar Beet under Saline Soil Condition

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Abstract

Sugar beet, the first sugar crop in Egypt, is one of the most salt tolerant crops. Tremendous amounts of sugar beet industrial byproducts, including filter cake, are annually produced from beet sugar factories causing environmental problems. A field experiment was conducted at the Research Farm of Delta Sugar Company, Kafr El-Sheikh during the two successive seasons of 2017/2018 and 2018/2019 aiming to the response of sugar beet to application of sulphuric and phosphoric acids-treated filter cake under saline soil condition in terms of growth, yield and quality.

Application of 1 ton/fed. of treated filter cake significantly enhanced root length, diameter and leaf area in both growing seasons. The highest values of root length and diameter, leaf area, root and top yields were obtained from the application of either 1 or 2 tons/fed. of treated filter cake. Molasses application led to significant enhancement of root length and diameter and leaf area as well. Application of molasses at the rate of 50 L/fed. significantly increased root and top yields.

Keywords: Sugar beet; Soil amendments; Filter cake; Molasses; Soil salinity.

(2)

Isolation and Genetic Identification of Phenol Degrading Bacterium from Wastewater of Assiut University Hospitals

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Abstract

Phenol and phenolic compounds are the most common pollutants in hospital wastewater. Their carcinogenic and toxic effects have been recorded on human being. Identification of the key microorganisms that play a role in pollutant degradation processes is relevant to the development of optimal in situ bioremediation strategies. In the current study, a bacterium strain designated as AUN-AS01 was isolated from wastewater of Assiut University hospitals by enrichment technique in mineral basal salts (MBS) medium supplemented with phenol as a sole carbon and energy source. The strain AUN-AS01 was identified using PCR amplification of 16S rRNA gene and sequence analysis. The comparison of the alignment results and phylogenetic analysis of the sequences of the isolated strain to published rRNA gene sequences in Gen Bank, confirmed the identification of the isolate as *Paenibacillus mucilaginosus* AUN-AS01. The strain was able to grow and had a tolerance of phenol concentration up to 1600 mg/L⁻¹. It was observed that temperature, pH and initial concentration of phenol play key roles in determining the rate of phenol degradation by the isolated strain AUN-AS01. Results showed that, the strain was efficient in removing 92.26±0.05% of the initial 800 mg/l phenol within 48 h with optimal conditions, at 30 °C and had a pH of 7.0. Our results demonstrate that, strain *Paenibacillus mucilaginosus* AUN-AS01 could be used to remove the phenol from the environment. These findings may lead to new

biotechnological applications for the degradation of phenol, related to hospitals wastewater.

Keywords: Bacteria; Isolation; Biodegradation; Phenol pollutant; 16S rRNA gene sequencing; Phylogenetic analysis.

(3)

Quality of Affined Sugar at Different Temperatures

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Abstract

The study is done to evaluate the quality of the sugar produced from the affination processes after applying different temperature 60 °C, 70° C and 80°C, and study the chemical and physical properties of affined sugar .From the results it is clear that the appropriate temperature at 70°C. Atthis temperature, it gives highest de colorization and polarization, less in polysaccharides content (dextran), reducing sugar and ash ratio.

Keywords: Raw sugar, Affination, Temperature, Dextran, Decolorization.

Noise Pollution; Assessing and Control in the Beet Sugar Industry

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Abstract

Protection of the expertise workers in the Sugar production is essential for the sustainability and development of this strategic national industry. Noise pollution is a physical factor that may have negative effects on the employees. In this study, noise levels and control methods are studied in the beet sugar industry in the Dakahlia plants. Inspection of the studied plants presented that noise is emitting from several sources such as beet lab reception, beat washing and slicers, vacuum pump area, centrifugal mixer station, power station and boiler house. Sound Pressure Levels (SPL) of the sources are measured according to ISO recommendation, while noise exposure levels are carried out using equivalent noise level. The results proved that sound pressure level exceeded the national limits assigned by the Egyptian Environmental Law No 4/94. The maximum and minimum values of SPL at boiler soot blower were 110 and 78dBA respectively. In the old Belqase sugar factory, it has been found that the maximum SPL reached to 112 dBA at boiler soot blower and the minimum value was 83 dBA in the air composer. Noise exposure also is assessed to protect the employees in the old and new sugar plants. As the working shift is 12 hours in the investigated plant, a model is used to estimate the equivalent noise dose according to 8 hours exposure. The results revealed that the workers in the old sugar plant are suffering in the high emitted noise levels. Control measures are essential to reduce the noise especially from the old sugar plant.

Keywords: Sugar Industry, Exposure Limits, Noise Sources, Noise Exposure.

Investigation of Noise Pollution Levels in Some Beet Sugar Factories in Egypt

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Abstract

There are twelfth sources noise pollutants that have been resulting from sugar beet factories such as an including beet lab reception, beet washing and slicers, vacuum pump area, centrifugal mixer station ,power station ,boiler house ,boiler water treatment ,boiler house (soot blower),cooling tower pump station ,pulp dryer station ,lime kiln area ,air compressor area . The evaluation depends on measuring of sound pressure level released from these sources. Data of sound pressure level are collected through seasons 2017 and 2018.This study research aims to evaluate the noise pollution problems resulting from sugar beet industry. Also, to establish noise pollution control methods. Sound Pressure Levels (SPL) of the sources are measured according to ISO recommendation, while noise exposure levels are carried out using equivalent noise level. The results proved that sound pressure level exceeded the national limits assigned by Egyptian Environmental Law No 4/94. The maximum SPL and the minimum values of SPL at boiler soot blower and cooling tower pump station 110 dBA and 78 dBA respectively . In the old Belqase sugar factory, it has been found that the maximum SPL reached to 112 dBA at boiler soot blower and the minimum value was 83 dBA in the air composer. In the Nile sugar factory, the maximum and minimum values of SPL at power station, processing levels and products storage 86 dBA and 60.1dBA respectively. In the Alexandria sugar factory, the maximum and minimum values of SPL at air compressors and lime kiln area 88.7and 74.2dBA respectively. Noise exposure also is assessed to protect the employees in the old and new Sugar plants. As the working shift is 12 hours in our investigated plant, a model is used to estimate the equivalent noise dose according to 8 hours exposure. The results presented that the

workers in the old Sugar plant are suffering from the high emitted noise levels. Control measures are essential to reduce the noise especially from the old sugar plant.

Keywords: Sugar Industry, Exposure Limits, Noise Sources, Noise Exposure.

(6)

A novel Method for Brix Measuring in raw Sugar Solution

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Abstract

In Sugar Industry, the Brix value is an important factor in extraction processes. Brix is the amount of sucrose contents presents in the raw sugar solution. Degree Brix (symbol °Bx) measures the concentration of dissolved solids in the solution. One-degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as percentage by mass. Based on the brix value in solution, the operators can measure and take decisions in sugar industrial process.

The aim of the present paper is suggesting method to measure the brix value in a raw sugar solution using several electronic sensors that have been installed and connected to microcontroller to perform several calculations to calculate brix. This proposed method is a low price with high accuracy in reading Brix in raw sugar solutions in industrial processes.

This method depends on the physical properties of the sugar solution. Electronic sensors can directly measure the mass, and temperature of the solution to express the brix and give the result on the screen. Also, the results can be sent directly to the central control room. Moreover, it can be used manually on the production line and in various food industries.

The suggested method can be applied directly in the industrial process during extracting sugar such as juice and syrup to determine their concentration. Whereupon the efficiency of industrial process is improved.

The proposed method for the first-time sheds light on the possibility to make an electronic hydrometer capable of reading the physical properties of liquid solutions using a group of electronics and judging its efficiency, accuracy, scope of work and the factors affecting the results.

Keywords: Brix, Hydrometer, Calculate Specific Density, Temperature Corrections

(7)

Optimal Design of Shunt Active Power Filter for Power Quality Improvement Based on Virtual Experimental Filter Technique

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Abstract

Nowadays active power filter (APF) is well known technique for improving the power quality .It mitigates the level of harmonics to acceptable ratio, also it overcomes voltage sag and improves power factor. There are different types of APF according to its application. This paper will introduce a detailed design of a Shunt Active Power filter (SAPF). Firstly trial and error method will be used to select acceptable value for conventional filter PI controller parameters, Secondly particle swarm optimization (PSO) technique is used for tuning the filter PI controller by optimizing the optimal controller gains. The presented design is modeled and simulated by using MATLAB-SIMULINK toolbox. Many contributions such as design and simulation of SAPF, besides practical modeling of a nonlinear load for studying the effect of SAPF on the integrated system. A practical verification is done and compared to the proposed simulated system. It is found that a good agreement between the experimental result and the modeled one. A costless method based on Virtual experimental technique is also used and applied to large scale systems for obtaining predesign system with acceptable accuracy. The proposed filter can be adapted for any other loads with acceptable total harmonic distortion (THD) under the norms of IEEE (519-1992).

Keywords: Shunt Active Harmonic Filter, PI controller, PSO and THD

(8)

Efficient synthesis and Biological Activities of New Pyridine and Pyrimidine Thioglycosides as Potential Antimicrobial and Anti-inflammatory Agents

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Abstract

Glycosylation of small molecules based heterocycles can improve the biological importance of the parent scaffold. In the current study, various new substituted pyridine and substituted pyrimidine thioglycosides were synthesized via the reaction of substituted pyridine and pyrimidine thiols with 2,3,4,6-tetra-O-acetyl- α -D-glucopyranosyl bromide in presence of sodium acetate and ethanol. The chemical structures of the synthesized compounds were confirmed by elemental and spectral techniques including FT-IR, ^1H NMR In addition to ^{13}C NMR and mass spectroscopy for some of them. Alternatively, some of the synthesized compounds revealed significant antibacterial and antifungal activities. Also, most of these compounds exhibited highly promising anti-inflammatory activities compared with indomethacin.

Keywords: S-glycoside; Pyridine; Pyrimidine; Synthesis; Antimicrobial activity; Anti-inflammatory activity