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COD reduction using modifying industrial effluent treatment flow sheet and low cost adsorbent as a part of cleaner production

2012-12-08

Modern environmental legislation is becoming much more internationally coherent and less prescriptive and focused on prevention of pollution through control of hazardous materials and processes as well as on protection of eco-systems. Active pharmaceutical Intermediates from wastewater streams of API companies are emerging contaminants in the aquatic environment, because of their adverse effect on aquatic life and humans. These contaminants are high in COD and difficult to treat biologically. A number of technologies have been developed over the years to remove organic matter from industrial wastewater. The most important technologies include coagulation/flocculation process, membrane filtration and oxidation process. However, these methods are generally expensive, complicated, time consuming and requires skilled personnel. The high cost of coal-based activated carbons has stimulated the search for cheaper alternatives. Low cost and non-conventional adsorbents like activated carbon, Lignite, Fly ash, Neem tree leaves are used as adsorbents for removing COD of Industrial wastewater. A commonly used adsorbent, activated carbon, in sugar refining, chemical and pharmaceutical industries, water and wastewater treatment.

Increasing requirements for clearer and more polished effluent from many processes suggest that, barring the development of new technologies, industrial need for activated carbon will only increase in future. Fly ash has shown quite effective adsorbent capacity for COD reduction from the Industrial wastewater. Though its capacity is lower than that of common grade activated carbon, the low material cost makes it an attractive option for the Industrial wastewater treatment, which contains phenolic compounds. This study aimed to demonstrate that adsorption as the first stage of treatment increases efficiency of the subsequent biological treatment. Experiments were carried out on different wastewater samples from chemical plants on adsorbents such as activated carbon, bentonite and lignite. The effectiveness of adsorbents in the removal of refractory organics by way of reducing COD and colour has been valuated. The results of COD reduction were fitted into different models available in
Adoption of Bt transgenic crops has resulted in reduction in pesticide consumption and increasing crop productivity.

In silico designing of insecticidal small interfering RNA (siRNA) for Helicoverpa armigera control

2012-10-17

Helicoverpa armigera, a polyphagous lepidopteron insect pest causes severe yield loss in cotton, legumes, tomato, okra and other crops. Application of effective chemical pesticides has human health and environmental safety concerns. Moreover, development of resistance against most of the available pesticides is compelling to look for alternative strategies. Adoption of Bt transgenic crops has resulted in reduction in pesticide consumption and increasing crop productivity. However, sustainability of Bt transgenic crops is threatened by the emergence of insect resistance. In this study potential insecticidal siRNA were identified in six Helicoverpa armigera hormonal pathway genes. Out of over 2000 computationally identified siRNA, 16 most promising siRNA were selected that address the biosafety concerns and have high potential of targeted gene silencing. These siRNA will be useful for chemical synthesis, in insect feeding assays and knockdown the target Helicoverpa armigera hormone biosynthesis, consequently obstructing the completion of insect life cycle. This study concluded that siRNA have a great potential of deployment to control Helicoverpa armigera alone as well as with Bt for insect resistance management.

Authors: Choudhary, Meenakshi; Sahi, Shakti
Full Source: Indian Journal of Experimental Biology 2011, 49(6), 469-474 (English)
Manganese (Mn) is a well-established neurotoxin associated with specific damage to the basal ganglia in humans. The phenotype associated with Mn neurotoxicity was first described in two workers with occupational exposure to Mn oxide (Couper, 1837). Although the description did not use modern clinical terminology, a parkinsonian illness characterised by slowness of movement (bradykinesia), masked facies, and gait impairment (postural instability) appears to have predominated. Nearly 100 years later an outbreak of an atypical parkinsonian illness in a Chilean Mn mine provided a phenotypic description of a fulminant neurological disorder with parkinsonism, dystonia, and neuropsychiatric symptoms (Rodier, 1955). Exposures associated with this syndrome were massive and an order of magnitude greater than modern exposures (Rodier, 1955; Hobson et al., 2011). The clinical syndrome associated with Mn neurotoxicity has been called Manganism. Modern exposures to Mn occur primarily through occupations in the steel industry and welding and these exposures are often chronic and varied, occurring over decades in the healthy workforce. Although the severe neurological disorder described by Rodier and Couper are no longer seen, several reports have suggested a possible increased risk of neurotoxicity in these workers (Racette et al., 2005b; Bowler et al., 2007; Harris et al., 2011). Based upon limited prior imaging and pathological investigations into the pathophysiology of neurotoxicity in Mn exposed workers (Huang et al., 2003), many investigators have concluded that the syndrome spares the dopamine system distinguishing Manganism from Parkinson disease (PD), the most common cause of parkinsonism in the general population, and a disease with characteristic degenerative changes in the dopaminergic system (Jankovic, 2005). In this symposium it is investigated the recent advances in the understanding of the pathophysiology of Mn associated neurotoxicity from Caenorhabditis elegans to humans. Presentation of Dr. Aschner’s, discussed mechanisms of dopaminergic neuronal toxicity in C. elegans and demonstrated a compelling potential role of Mn in dopaminergic degeneration. Dr. Guilarte’s experimental, non-human primate model of Mn neurotoxicity suggested that Mn decreases dopamine release in the brain without loss of neuronal integrity markers, including dopamine. Dr. Racette’s presentation demonstrated a unique
Technical

Although males and females differ both biological and in their social and power relations throughout their life span, research in environmental and occupational neurotoxicology often ignore sex and/or gender as a characteristic that requires in-depth consideration. The neurotoxicology literature continues to confuse the terms sex (biological attributes) and gender (socially constructed roles and behaviour) and the words are still used interchangeably. Throughout the lifespan, sex and gender are in interaction and both may play a role in influencing exposure and effect. Studies that have examined both males and females, provide evidence for sex differences in toxicokinetics and responses to neurotoxic assault as well as gender differences in exposure patterns, biomarkers of exposure, neurobehavioral performance and social consequences. The author concluded that integrating sex and gender considerations into research in neurotoxicology would not only provide a better understanding of the mechanisms and pathways that lead to toxic assault, but also provide a means to improve preventive intervention strategies.

Author: Mergler, Donna

Full Source: NeuroToxicology 2012, 33(4), 644-651 (English)
Predicting risk of essential hypertension in women by CYP1B1 and eNOS genotyping, and assessing alcohol consumption and occupational psycho-emotional state

A method has been offered for predicting risk of development of essential hypertension using a prognostic regression model based on the genotyping CYP1B1 (cytochrome P 450 1B1) rs1056836 polymorphism and NOS3 (eNOS, endothelial nitric oxide synthase) rs2070744 polymorphism combined with assessing an alcohol consumption pattern and occupational psycho-emotional state. The derived data of genetic and environmental risk factors are used to calculate a precise probability in groups of patients with a low, moderate or high risk of developing essential hypertension. The developed method enables predicting the probability of essential hypertension with accuracy 85-99%. The method is applicable in medical genetic consultation services and health-care facilities for the prediction of an individual risk of the onset of essential hypertension in women.

Authors: Polonikov, A. V.; Ivanov, V. P.; Solodilova, M. A.; Illig, Thomas; Vasil'eva, O. V.; Bulgakova, I. V.

Full Source: Russian RU 10 Aug 2012, 10pp. (Russian)

Leflunomide in monotherapy of rheumatoid arthritis: meta-analysis of randomised trials

Rheumatoid arthritis (RA) is a chronic systemic disease of the connective tissue that leads to progressive joint destruction, disability, withdrawal from occupational activity and premature death. This study evaluated the efficacy and safety of leflunomide compared with placebo, methotrexate and sulfasalazine in monotherapy of RA. A systematic search of databases (MEDLINE, EMBASE, Cochrane CENTRAL) was performed and only randomised blind trials were included into the analysis. The Jadad scale was used to assess the quality of the trials. A quantitative synthesis of the results was performed (meta-analysis). The analysis included 7 trials involving 2861 patients (1432 on leflunomide, 312 on placebo, 922 on methotrexate and 133 on sulfasalazine). Leflunomide, compared with placebo, increased the probability of the American College of Rheumatology 20% improvement (ACR20) response 2-fold (relative risk [RR], 2.02; 95% CI, 1.46-2.80) and the probability of ACR50 response 4-fold (RR,4.36; 95% CI, 2.33-8.17), after 1 year of treatment. Efficacy of
leflunomide did not differ from that of methotrexate with reference to the majority of endpoints. Leflunomide showed partial superiority over methotrexate in the percentage of patients obtaining ACR50 and ACR70 response, doctor's assessment of the disease activity, reduction in C-reactive protein (CRP) levels, and improvement of the quality of life (assessed with the modified health assessment questionnaire [HAQ]). Sulfasalazine showed partial superiority in the reduction of erythrocyte sedimentation rate, while leflunomide was superior to sulfasalazine the ACR20 and ACR50 clinical response, quality of life (assessed with the HAQ), doctor's and patient's assessment of the disease activity and reduction in CRP levels. The authors concluded that there were no significant differences between the effects of treatment with leflunomide and methotrexate or sulfasalazine, but leflunomide monotherapy proved more effective than placebo in relieving symptoms and signs of RA.

Authors: Golicki, Dominik; Niewada, Maciej; Lis, Joanna; Pol, Kaja; Hermanowski, Tomasz; Tlustochowicz, Malgorzata

Full Source: Polskie Archiwum Medycyny Wewnetrznej 2012, 122(1-2), 22-32 (English)

The impact of FANCD2 deficiency on formaldehyde-induced toxicity in human lymphoblastoid cell lines

2012-12-10

Formaldehyde (FA), a major industrial chemical and ubiquitous environmental pollutant, has recently been classified by the International Agency for Research on Cancer as a human leukemogen. The major mode of action of FA is thought to be the formation of DNA-protein cross-links (DPCs). The Fanconi anaemia pathway may mediate repair of DPCs; however, data supporting the involvement of this pathway are limited, particularly in human haematopoietic cells. Therefore, in this study, it assessed the role of FANCD2, a critical component of the Fanconi anaemia pathway, in FA-induced toxicity in human lymphoblast cell models of FANCD2 deficiency (PD20 cells) and FANCD2 sufficiency (PD20-D2 cells). After the cells were treated with 0-150 μM FA for 24 hours, DPCs were increased in a dose-dependent manner in both cell lines, with greater increases in FANCD2-deficient PD20 cells. FA also induced cytotoxicity, micronuclei, chromosome aberrations, and apoptosis in a dose-dependent manner in both cell lines, with greater increases in cytotoxicity and apoptosis in PD20 cells. Increased levels of γ-ATR and γ-H2AX in both cell lines suggested the recognition of FA-induced DNA damage; however, the induction of BRCA2 was compromised in FANCD2-deficient PD20 cells,
In this single-blinded study, the authors investigated the ability of TMA skin testing to identify workers with TMA-serum specific IgE antibodies.

Authors: Bernstein, Jonathan A.; Ghosh, Debajyoti; Sublett, Wesley J.; Wells, Heather; Levin, Linda

Full Source: Journal of Occupational and Environmental Medicine 2011, 53(10), 1122-1127 (Eng)
The real value of diagnostic methods in case of long time of cessation of occupational exposure to diisocyanates among patients diagnosed in the Institute of Occupational Medicine in Lodz

2012-11-27

The aim of the present study was to analyse the data obtained during the diagnostic process and their real values in the final diagnosis of patients exposed to diisocyanates and suspected of occupational allergic disease of the respiratory system. The patients have been hospitalised in the Nofer Institute of Occupational Medicine over 11 years. In 1999-2009 37 patients exposed to diisocyanates and suspected of occupational asthma were hospitalised. The test results from the 37 patients were analysed and then the patients were divided into three groups of those with diagnosed occupational asthma, with diagnosed non-occupational asthma and those without any allergic airway disease. Forty percent of the patients with occupational asthma, 64.3% of the patients with non-occupational asthma and 15.4% of the patients that did not show any allergic disease were sensitised to at least one of common allergens. the authors did not detect any specific IgE to diisocyanates. Specific challenge tests were performed in all the 37 subjects. Positive results of SIT with diisocyanates were observed in 10 patients. The authors concluded that only specific challenge test with diisocyanates showed the real diagnostic value in case of a 7.5-yr cessation of exposure. Detection of serum specific IgE to diisocyanates does not seem to be of clinical value in the diagnosis of diisocyanate-induced asthma in case of a 7.5 yr cessation of exposure. Atopy is not the risk factor in diisocyanate-induced asthma.

Authors: Swierczynska-Machura, Dominika; Walusiak-Skorupa, Jolanta; Wiszniewska, Marta; Lipinska-Ojrzanowska, Agnieszka; Wittczak, Tomasz; Dudek, Wojciech; Palczynski, Cezary

Full Source: Medycyna Pracy 2011, 62(6), 567-577 (Pol)

Factors Associated with Self-reported Symptoms of Acute Pesticide Poisoning among Farmers in Northwestern Jamaica

2012-11-27

Pesticide poisoning is a major public health concern in developing countries. The authors conducted a population survey among farmers in 3 parishes of northwestern Jamaica to determine the occurrence...
3,7-Dimethyl-2,6-octadienal (Citral) is a naturally aliphatic aldehyde of the terpene series and is an isomeric mixture of geranial and neral. It is the main component of lemon grass oil, which is found in all citrus fruits and used extensively in the food, cosmetic, and detergent industries. Citral is extracted from lemon grass oil by fractional distillation and also synthesised by oxidation of geraniol, nerol, or linalool. It is a mobile, pale yellow liquid with a strong lemon odour. In the available literature there are no data on toxicity in humans. Citral is such a common allergen in hand eczema patients due to the combined effects of allergic and irritant properties. Acute toxicity of citral is low in rodents because the oral or dermal LD50 values are over 1000 mg/kg. Seven bacterial reverse mutation studies indicate negative results with and without metabolic activation. An NTP study shows that there was no evidence of carcinogenic activity in male/female rats and male mice but some evidence of malignant lymphoma in female mice. Citral is absorbed orally and fairly well absorbed dermally, considering its volatility. Citral is rapidly metabolised and excreted, with urine as the major route of elimination of citral-derived radioactivity. The value of NOAEL is 217 mg/m3, based on the results of experiments on rats. Based on these data the authors of this study propose the MAC (TWA) value for citral of 27 mg/m3, MAC (STEL)
Bis-(2-methoxyethyl) ether. Documentation of permissible occupational exposure values

2012-11-27

Bis(2-methoxyethyl) ether (diglyme) is a colourless liquid with a slight, pleasant odour. Diglyme is used mainly as a solvent in water-based paints that are used in the industry (e.g., in spraying cars, metal furniture, household appliances, and machines), as an inert reaction medium in chemical synthesis, in manufacturing integrated circuit boards, primarily as a solvent for photoresists. This substance is included in the European Inventory of Cosmetics Ingredients in the solvent category. The acute toxicity of diglyme is low after oral exposure or inhalation. Diglyme is slightly irritating to the skin and eyes. No investigations are available on the sensitising effects of diglyme. The main targets in male animals after repeated intake of diglyme are the reproductive organs. Bis(2-methoxyethyl) ether is a strong teratogen. Diglyme liquid or vapour is readily absorbed by any route of exposure, metabolised, and excreted mainly in the urine. The main metabolite is 2-methoxyethoxyacetic acid. Several Ames tests as well as an unscheduled DNA synthesis test did not reveal a genotoxic potential of bis(2-methoxyethyl) ether in vitro. Further, the number of chromosomal aberrations was not increased in bone marrow cells in vivo. The positive results of a dominant lethal test may be due to the effects of diglyme on fertility. In 2-wk inhalation studies in male rats, dose-dependent decreases in weight of testes, epididymides, prostate, and seminal vesicles were observed. The testes were atrophic, and damage of the spermatocytes was observed. The no-observed-adverse-effect level (NOAEL) in these studies was 30 ppm (167 mg/m3); the lowest-observed-adverse-effect level (LOAEL) was 100 ppm (558 mg/m3). The authors concluded that on the basis of this experiment MAC value of 10 mg/m3 was proposed. STEL was not established. Notations “Ft”-
Very early studies on manganese (Mn) exposure have shown that this transition metal affects dopamine neurotransmission. Dopamine serves as a tonic inhibitor of prolactin release in the anterior hypophysis, thus the serum prolactin levels in occupationally Mn exposed workers have been found increased. However, little is known about environmental Mn exposure effect on this hormone. In the present study, the authors assessed serum prolactin in environmentally (mainly through air) exposed children living in the proximity of a rich Mn zone in Mexico and a control group with similar socioeconomic and ethnic characteristics. In addition, the authors detected Mn levels in blood and hair, Hb and anthropometric variables. Children between 7 and 11 years old were included (77 from Mn exposed and 93 from control communities). Blood Mn was higher in exposed children (median 9.5 ßg/L, rank [5.5, 18]) as compared to the control group (median 8 ßg/L, rank [5, 14]) (p<0.05, Mann-Whitney). Hair Mn was also increased in the exposed group (median 13.2 ßg/g, rank [4.2, 48]) in comparison to the control group (median 0.6 ßg/g rank [0.06, 3.6]). Prolactin was found increased in the exposed children (median 12.35 ng/mL, rank [2.90, 33.70]) versus controls (median 7.77 ng/mL, rank [2.7, 23.6]). Positive correlations were found between prolactin and both blood Mn and hair Mn (Rho)0.217 and 0.250, respectively, p<0.05). A linear regression, with prolactin as the dependent variable, showed hair Mn as the determinant variable after adjusting by age, Hb and sex. After a stratification of hair and blood Mn into low, medium and high content, significant associations were also found, confirming the relationship between prolactin and hair Mn. The authors concluded that
the results suggest that children from these Mn environmentally exposed communities could be at risk of endocrine alterations.


Full Source: Environmental Research 2011, 111(8), 1302-1308 (Eng)

**Proliferation potential of human amniotic fluid stem cells differently responds to mercury and lead exposure**

2012-11-27

There are considerable gaps in our knowledge on cell biology effects induced by the heavy metals Hg and Pb. In the present study, the authors aimed to explore the effects of these toxicants on proliferation and cell size of primary human amniotic fluid stem (AFS) cells. Monoclonal human AFS cells were incubated with 3 dosages of Hg and Pb (single and combined treatment; ranging from physiological to cytotoxic concentrations) and the intracellular Hg and Pb concentrations were analysed, respectively. At different days of incubation the effects of Hg and Pb on proliferation, cell size, apoptosis, and expression of cyclins and the cyclin-dependent kinase inhibitor p27 were investigated. The results showed Hg triggered pronounced effects on proliferation of human AFS cells already at low concentrations, anti-proliferative effects of Pb could only be detected at high concentrations. Exposure to high dose of Hg induced pronounced downregulation of cyclin A confirming the anti-proliferative effects observed for Hg. Co-exposure to Hg and Pb did not cause additive effects on proliferation and size of AFS cells, and on cyclin A expression. The authors concluded that the data provides evidence that the different toxicological effects of Pb and Hg on primary human stem cells are due to different intracellular accumulation levels of these 2 toxicants. These findings allow new insights into the functional consequences of Pb and Hg for mammalian stem cells and into the cell biological behaviour of AFS cells in response to toxicants.

Authors: Gundacker, C.; Scheinast, M.; Damjanovic, L.; Fuchs, C.; Rosner, M.; Hengstschlaeger, M.

Full Source: Amino Acids [online computer file] 2012, 43(2), 937-949 (Eng)
Maternal prenatal and child organophosphate pesticide exposures and children’s autonomic function

2012-11-27

Organophosphate pesticides (OP), because of their effects on cholinergic fibres, may interfere with the functions of the autonomic nervous system (ANS). During this study, the authors assessed the relation of in utero and child OP pesticide exposures and children’s autonomic nervous system (ANS) dysregulation under resting and challenge conditions. The authors hypothesised that children with high OP levels would show parasympathetic activation and no sympathetic activation during rest and concomitant parasympathetic and sympathetic activation during challenging conditions. OP exposures were assessed by measuring urinary dialkylphosphate metabolites (DAPs, total diethyls-DEs, and total dimethyls-DMs) in maternal and children's spot urine samples. ANS regulation was examined in relation to maternal and child DAPs in 149 children at 6 months and 1 year, 97 at 3 1/2 years and 274 at 5 years. The authors also assessed resting and reactivity (i.e., challenge minus rest) measures using heart rate (HR), respiratory sinus arrhythmia (RSA), and pre-ejection period (PEP) during the administration of a standardised protocol. Cross-sectional (at each age) and longitudinal regression models were conducted to assess OP and ANS associations. To estimate cumulative exposure at 5 years, an area-under-the-concentration-time-curve (AUC) methodology was used. In addition, the authors evaluated whether children with consistently high versus low DAP concentrations had significantly different mean ANS scores at 5 years. The results showed that child DMs and DAPs were significantly negatively associated with resting RSA at 6 months and maternal DMs and child DEs were significantly positively associated with resting PEP at 1 year. No associations with resting were observed in 3 1/2- or 5-yr-old children nor with reactivity at any age. There was no significant relationship between the reactivity profiles and maternal or child DAPs. Cumulative maternal total DEs were associated with low HR (-3.19 bpm decrease; 95% CI: -6.29 to -0.09, p < 0.04) only at 5 years. In addition, there were no significant differences in ANS measures for 5-yr-olds with consistently high versus low DAPs. The authors concluded that although some evidence of ANS dysregulation in infancy was observed, no consistent associations of maternal and child OP pesticide exposure were reported, as measured...
by urinary DAPs, on children’s ANS (HR, RSA, and PEP) regulation during resting and challenging conditions up to age 5 years.

Authors: Quiros-Alcala, Lesliam; Alkon, Abbey D.; Boyce, W. Thomas; Lippert, Suzanne; Davis, Nicole V.; Bradman, Asa; Barr, Dana Boyd; Eskenazi, Brenda

Full Source: NeuroToxicology 2011, 32(5), 646-655 (Eng)

Abnormally high urinary bisphenol - a levels in humans from canned soup intake. What is it suggestive of?

2012-11-27

Bisphenol-A (BPA) is usually associated with plastics leaching and most of the research has been primarily focused on identifying ways and means to prevent the same. However, there are new indications from recent studies that consumption of canned products especially soups can increase the urinary BPA levels in humans by more than 1000%. The potential health effects of BPA on the human body are still under debate in scientific communities at this point. As Benjamin Franklin rightly said “An oz of prevention is better than a pound of cure,” so as a precaution for human health & development, it is highly advisable to regulate the use of Bisphenol-A in metal food containers which is finding its way directly into our homes, onto our dining tables through canned food products like fish, beans, corn, soups, dry milk and others, especially when such products are widely available for consumption by communities of all ages and wellbeing including healthy, sick, pregnant, at-risk and hospital communities at large. It is time that the options for BPA-free canned food packaging be considered.

Author: Batra, Tarun

Full Source: Carpathian Journal of Food Science and Technology [online computer file] 2011, 3(2), 58-65 (Eng)

Determination of cadmium in Saudi Arabian imported green tea samples by ICP-MS

2012-11-27

Cadmium (Cd) in nine different Saudi Arabian imported green tea samples originated from China has been detected using inductively coupled plasma mass spectrometry (ICP-MS). Tea infusion and microwave acid digestion procedures are used for sample pre-treatment. Infusion is prepared from 2.0 g of tea samples in 100 mL boiled distilled and de-
ionised water, digestion is performed with 25% (vol./vol.) nitric acid. Samples are diluted 50 times with 1.0% (vol./vol.) nitric acid solution, which contain rhodium as an internal standard before aspiration into ICP-MS. The method showed, limit of quantification of 0.001 mg/L, 0.001 - 0.200 mg/L linearity range (r ) 0.9999) and relative standard deviation (% RSD) value for reproducibility (inter-day precision) of 19%. The concentrations range of cadmium (total) in the analysed green tea samples is 0.081 - 34.295 mg/kg. The total concentration of cadmium released 2% - 20% into tea infusions with boiling water. The authors concluded that the calculated average daily intakes of cadmium in tea infusions was low and within the bounds of safety (< 0.001 mg/kg/day).

Authors: Al-Ansi, Seham A.; Othman, Ahmed A.; Al-Tufail, Mohammed A.

Full Source: International Journal of Chemical Sciences 2011, 9(3), 953-959 (Eng)

SAFETY

Method for in-situ regenerating activated carbon fibre for treating gas pollutants

2012-12-10

This study described the method for in-situ regenerating activated carbon fibre for treating gas pollutants. The title method comprises: (1) setting corona electrode and grounding electrode in the adsorption device, and putting activated carbon fibre between the corona electrode and grounding electrode, (2) connecting the corona electrode with A. C. power supply, wherein the electric field between the corona electrode and grounding electrode makes the adsorption device generate plasma, (3) vibrating or blowing the adsorbents for falling off from the activated carbon fibre under the action of plasma oscillation and electric wind, (4) further decomposing the desorbed gas pollutants to obtain harmless gas, and (5) switching off the corona electrode and A. C. power supply when reaching regeneration time and terminating the regeneration, wherein the A. C. power supply frequency is 150 Hz, the electric field strength between the corona electrode and grounding electrode is 6 kV/cm, and the regeneration time is 4 minute. The author concluded that this invention
Four-stage dust separation apparatus with high dust separation efficiency

In this study, the author describes a four stage dust apparatus with high dust separation efficiency. The title apparatus comprises a dust/air inlet, an induced draft fan, a separator with an air inlet, a fourth-stage water spray purification tank, a blast pipe, a primary separation chamber with an air outlet, a tertiary separation chamber with an air outlet and a separation net, and a dust collection port. The dust separation apparatus has the advantages of high-induced draft efficiency, low air exhaust resistance, good dust separation effect, low cost, low energy consumption, good environment-friendly property, good durability, high convenience, and high dust separation efficiency.

Author: Luan, Xiao jian

Full Source: Application 10,552,982, 22 Nov 2010; 5pp.(Chinese)

Exhaust gas treatment system for mirabilite packaging site

In the present study, the authors discuss the exhaust gas treatment system for the mirabilite packaging site. The title exhaust gas treatment system comprises a vacuum pipeline, an evaporation kettle, a cyclone dust collector, a pulse dust collector, an induced draft fan, an exhaust gas absorption tower with an alkali spray mechanism, and a transfer pipeline. The exhaust gas treatment system can neutralise formic acid in the exhaust gas by spraying NaOH as well as recycle sodium formate. It has the advantages of low labour intensity, low pollution, low production cost, and high recycling rate.

Authors: Wang, Aiguo; Xiao, Lin

Full Source: Application 20,365,845, 29 Sep 2011; 5pp. (Chinese)