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Abstracts
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USO AGRÍCOLA DE LODO DE ESGOTO, ESTUDO DE CASO DA REGIÃO METROPOLITANA DE CURITIBA

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Agricultural use of municipal sludge. Case study of the Metropolitan Area of Curitiba, Brazil.

ABSTRACT

The sanitation company of Paraná- Sanepar destinates its sludge, which is produced in sewage treatment plants, to agricultural use, aiming to provide the most correct final disposition in sanitary, environmental and social aspects, improve the soil conditions, increase agricultural productivity and reduce agriculturists' production costs. This destination is the one which suits better to the concept of integrated sustainable development due to it leads the organical matter back to the soil, avoid contamination issues and hydrical resources degradation, and also contributes to food and fiber production. Sanepar has a very strict control which guarantee the sludge quality for agriculturists, regarding odor, heavy metals contamination and pathologic microorganisms. In 2007, adaptation period to the Conama 375/06 e Sema 001/07 resolutions, the sewage treatment plants of Curitiba Metropolitan Region destinated 8.903 tonnes of sewage sludge (average humidity 64%) to application to 295 ha of corn, beans and soy crops, green fertilizing, pos-harvest and implantation of peach orchards. 29 agriculturists were supplied and that generated a R$467,90 per hectare economy, concerning the reduction of chemical fetilizers and calcium carbonate.

Keywords: Sanitation Company Of Paraná – Sanepar; Sewage sludge, Agricultural use, Agricultural and economical benefits.

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CARACTERIZAÇÃO DO LODO GERADO EM ESTAÇÃO DE TRAMENTO DE ESGOTO ETE CHAPECÓ/SC: RESULTADOS PRELIMINARES

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Characterization of sludge generated in station tramento sewage ete chapecó / sc: preliminary results

ABSTRACT

The sewage sludge can be a source of nutrients for diverse cultures; however, the concentrations of heavy metals and pathogens in its constitution can limit its use in agricultural ground. The objective of this work was to characterize the sludge generated in the station of treatment of effluent (ETE) of the city of Chapecó-SC, in order to indicate one reuses appropriate for the same, mainly the agricultural recycling. Until the moment, four samplings had been carried through, being analyzed the following parameters: macronutrients, fertility, metals heavy and agents pathogenic. The analyzed heavy metals had been: Cr, Cu, Mn, Fe, Cd, Pb and Zn; being that the gotten texts of these elements meet well below of the values found in literature, what, the principle, indicates that they will not bring alterations of importance when of its application in the ground. The preliminary results of this study had pointed to the necessity of if carrying through the liming of the sludge of the station, that is, to add to whitewash with respect to correction of pH and reduction of the number of pathogens, therefore in accordance with the microbiological analyses the silt was classified as class B, according to resolution 375/06 of the CONAMA.

Keywords: Sludge. Heavy metals. Recycling.

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AVALIAÇÃO DO PROCESSO DE DIGESTÃO ANAERÓBIA DA ETE ARRUDAS - MG (LODO ATIVADO CONVENCIONAL)

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José Maria de Oliveira Filho [3]

Evaluation of the anaerobic digestion process of arrudas wastewater treatment plant (conventional activated sludge)

ABSTRACT

This research aims at assessing the characteristics and behavior of the anaerobic digestion units, which treat sludge at the Arrudas Wastewater Treatment Plant (2.25 m3/s design flow). The plant is located in Belo Horizonte, Brazil, and operates as conventional activated sludge, with anaerobic digestion of the sludge and further mechanical dewatering by centrifuges. The plant went through three different operational phases in relation to the thickening, thus affecting the following stage of anaerobic digestion: Phase 1: digestion of thickened primary sludge; Phase 2: digestion of thickened mixed sludge; Phase 3: digestion of thickened.secondary sludge and of primary sludge. During the first and second phases, values of removal efficiency of volatile solids of 37% and 36% respectively occurred. In the third phase, the average efficiency of removal of VS was higher (43%). The VS/TS ratio was maintained, in the three phases, around 0.60. The pH values were always within those reported by the literature. The longest hydraulic detention time occurred in the second phase (47 days), while in the first phase it was 35 days, and in the third phase 22 days – a value near that assumed in the design.

Keywords: Sewage, sludge treatment, anaerobic digestion.

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REVISTA AIDIS

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AVALIAÇÃO DA EFETIVIDADE DA ESTABILIZAÇÃO DE LODO DE ESGOTO, TÉRMICA E/OU QUÍMICA, OBJETIVANDO A RECICLAGEM AGRÍCOLA

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Evaluation of the effectiveness of the stabilization of sewage sludge, thermal and / or chemistry, aiming at the agricultural recycling

ABSTRACT

The final disposal of sewage sludge is a major environmental problem, mainly in urban centers. There are several alternatives for final disposal of sewage sludge, but in all these the sludge needs to be treated fairly, which includes relevant investments. This study is devoted to assess the efficiency of liming as a method of chemical stabilization, drying method and thermal and physical association of both the search for greater efficiency and lower cost. The goals of quality of the final sewage sludge were based on the requirement for agricultural recycling of the sludge for presenting more restrictive parameters in relation to the sanitary and environmental safety. Tests on plant (scale) accompanied by quality control laboratories of the Department of Quality Control of Companhia Estadual de Águas e Esgotos (CEDAE). The results inform the excellent health and environmental quality of sewage sludge produced in sewage treatment plants (ETE's) of CEDAE, which have low concentration of heavy metals and low density of thermotolerant coliforms. These results together with preliminary assessment of the agronomic potential of the sludge, indicate that the sewage sludge studied have high value for the agricultural recycling. The study of thermal stabilization by drying pointed to the need for the drying temperature in less than 100 ° C for 2 hours. Furthermore, we observed that the use of temperatures below 100 º C can be implemented with the combined use of quicklime.

Keywords: Sewage sluge, Chemical Stabilization, Thermal drying, Agricultural Recycling.

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AVALIAÇÃO DA QUALIDADE DO LODO DE ESGOTO QUANDO SUBMETIDO À SECAGEM/HIGIENIZAÇÃO EM ESTUFA AGRÍCOLA

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Evaluation of the quality of sewage sludge when subjected to drying / cleaning cultivated in greenhouse

ABSTRACT

The intent of this investigation was to evaluate the performance of a greenhouse in drying and higienization of the sludge produced in the Wastewater Treatment Plants by activated-sludge processes and aerobicly digested. The intention was to obtain material with characteristics that makes its utilization in the agriculture in agreement to the standard established by Resolution 375/2006 of the Conama. Therefore, different methodological conditions were studied such as the form of disposing the sludge inside the greenhouse, the revolving period of the sludge and the condition of adding or not alkaline material in the sludge. The monitored parameters were TS, VS, pH, moisture, thermo tolerant coliform, salmonella sp., viable helminth ova and heavy metal. Based on the results obtained it was possible to confirm that the utilization of the greenhouse was satisfactory for the appraised conditions, producing a Class A material, in conformity to the standard used.

Keywords: Sewage sludge, sludge management, sludge higienization, greenhouse.

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REVISTA AIDIS

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UMA POSSÍVEL CLASSIFICAÇÃO DA PERICULOSIDADE DE LODOS DE ESGOTO UTILIZANDO TESTES DE TOXICIDADE RESULTADOS PRELIMINARES

Marcus E. M. da Matta [1]
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A possible classification of hazardous sewage sludge using toxicity tests - preliminary results

ABSTRACT

Toxicity test are used worldwide to identify and assess hazard of chemical products or environmental samples to human and ecological health. The aim of this study was propose a preliminary hazard classification of sewage sludge samples using the acute toxicity tests with Vibrio fisheri, seed germination/root elongation test, cytotoxicity in vitro with cell culture and Salmonella/microssoma mutagenicity test. This classification was applied in the evaluation of two sets of treated sludge samples collected from five different São Paulo State Sewage Treatment Plants (STP). It was possible to observe that the different STP produced sludges with 7 different toxicity levels. The minimum hazard score obtained was 6 and maximum 16 in a range of zero to 40. The results of toxicity tests can provide important information about the hazard of treated sewage sludge, especially when interpreted in an integrated way. This preliminary classification seems to be a promising tool for assessing the degree of hazard of sewage sludge samples, but additional studies are still needed for its improvement.

Keywords: Sewage sludge, hazard classification, toxicity test

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USO DE BIOSSÓLIDOS COMO ESTRATÉGIA DE FERTILIZAÇÃO DA ÁGUA PARA PRODUÇÃO AQÚÍCOLA.

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Use of biosolids as a strategy for fertilization of water for aquaculture

ABSTRACT

The use of biosolids (BS) was tested, comparatively to dicalcium phosphate (DP), and quail manure (QM), for water fertilization and the production of zooplankton and phytoplankton in experimental tanks. The experiments also included a control tank, without fertilization (WF). The control parameters were: Daphnia sp. biomass, chlorophyll a, water electrical conductivity (EC), pH, dissolved oxygen (DO), temperature, ammonia, organic nitrogen, total phosphorus, calcium and magnesium. The highest weight of Daphnia sp. biomass was found in the tanks fertilized with QM (35.98 g), followed by those with BS (16.80 g), WF (6.75 g) e DP (5.24 g). In general, the results consistently reflected the composition of the fertilizers used and the water quality dynamics in the respective tanks (regarding, mainly, the nutrients' contents). Chlorophyll a concentrations and Daphnia sp. biomass were apparently correlated, probably reflecting the interactions between the phytoplankton and zooplankton communities. The results suggest that biosolids can be successfully used as water fertilizer for the production of phytoplankton and, consequently, zooplankton.

Keywords: Biosolids, chlorophyll a; Daphnia sp., dicalcium phosphate, quail manure

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USO DE LODO DE ESGOTO NA RECUPERAÇÃO DE ÁREA DEGRADADA NO DISTRITO FEDERAL

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Use of sewage sludge in the recovery of degraded areas in the federal district

ABSTRACT

The high volume of sewage sludge (biosolid) produced at Distrito Federal needs efficient and correct destination. Degraded areas by mine activities can cause erosion process at nearby sites or can be used for illegal waste deposits. Therefore, these relevant problems can be solved by the use of biosolid to recover those degraded areas. The objective of this paper was to present the partial results of the use of biosolid on the reclamation process of a degraded area in Distrito Federal. The surface of the area was planned and terraces were constructed. Afterwards, it was realized a mechanized distribution and incorporation of approximately 10 thousand tons of biosolid, humid basis, between March and May 2007. It wasn't planted any vegetal species. Costs of the process were evaluated, as well as visual response of the revegetated area. It was spent almost R$39/ton of biosolid, humid basis, of which an amount of 60% represents the transport only. A significant and spontaneous development of plants were identified, both in visual and spectral responses. Biosolid may have significantly contributed to the natural, spontaneous and fast process of revegetation. Thereby, this alternative of use of biosolid has shown its efficiency and economic vantage against other destination, although, further researches might be done.

Keywords: Wastewater treatment plants, biosolid, Land Reclamation Plans.

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DURAÇÃO DA FASE TERMÓFILA NA COMPOSTAGEM DO LODO DE ESGOTO E RESÍDUOS VEGETAIS EM FUNÇÃO DE TRÊS DIFERENTES TECNOLOGIAS

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Duration of the thermophilic composting of sewage sludge and vegetable waste in terms of three different technologies

ABSTRACT

Thermophilic stage during composting process is characterized by natural rise of temperature and high rate of organic matter biodegradation, due to high rate of microbial activity. This stage is very important for elimination of pathogenic microorganisms and is characterized by high rate of oxygen demand. After this stage, starts ripening stage, a period of low microbial activity and low need of aeration. So, the period of thermophilic stage has consequences in the size of composting facilities and biological reactors which has direct relation with total coast of the process. This paper presents results of monitoring of similar mixtures of sewage sludge and plant residues during composting process using the windrow system, static pile system and biological reactor system, and period of each thermophilic stage. In windrow system thermophilic stage had around 90 days of duration , and in the static pile (aerated) the thermophilic stage was 20 days and around 8 days in the biological reator.

Keywords: Compostagem , lodo de esgoto, fase termófila

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PRODUCTION OF EXCEPTIONAL QUALITY BIOSOLIDS (CLASS A +) AT CITY OF LOS ANGELES 'S WASTEWATER PLANTS

Reza. Iranpour
Hubertus H.J. Cox

Production of exceptional quality biosolids (class a +) at City of los Angeles's wastewater plants

ABSTRACT

This paper is in two parts. Part I discusses how the Hyperion Wastewater Treatment Plant (HTP) produced Exceptional Quality (EQ) Biosolids after 5 phases of full-scale studies from 1999 to 2003, trying several alternatives from 40 CFR Part 503. HTP got certification (permit) to operate Class A EQ since 2003 and has continued operations and land application of Class A EQ till present. Part II discusses how the Terminal Island Water Reclamation Treatment Plant (TITP) achieved similar biosolids in 3 phases between 1999 and 2004, trying Alternative 1 od 40 CFR Part 503. This plant has continued producing land applied Class A biosolids till present. During the presentation, we will discuss Class A EQ data for both plant up to the present. Research, operational and maintenance issues and future plans will also be discussed.

Keywords: Treatment Plant, Class A biosolids.

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DIGESTÃO ANAERÓBIA OU ESTABILIZAÇÃO QUÍMICA COMO DECIDIR?

Manuel Osvaldo
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Anaerobic digestion or chemical stabilization how to select?

ABSTRACT

Sewage Treatment Plant (STP) Sludges need stabilization before final disposal. The present paper compares two sludge treatment processes: Anaerobic digestion and chemical stabilization using lime. Features such as initial investments, energy costs, operating personnel, sludge disposal, maintenance and chemicals were compared for the sludge output of a 3.300 L/s. Conventional Activated Sludge Treatment Plant treating domestic sewage flow. Careful consideration has been given to the following items before process selection:

Initial investment costs
Treatment process characteristics
Daily quantities of sludge to be treated

Keywords: Chemical stabilization, anaerobic digestion.

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POTENCIAL DE GERAÇÃO DE ENERGIA A PARTIR DO LODO DE SISTEMAS DE TRATAMENTO DE ESGOTO

Adrianus van Haandel [1]

Potential power generation from sludge systems for wastewater treatment

ABSTRACT

All waste water treatment systems generate sludge, composed mainly of organic material. The amount of generated sludge per unit mass of organic material depends on the nature of the treatment system (aerobic or anaerobic), on the composition of the organic material in the influent and on the operational conditions. In order to convert the chemical energy of sludge into useful forms of energy there are basically two ways: (1) anaerobic digestion and use of the biogas or (2) thermal processes: direct combustion, pyrolysis or gasification. Na analysis shows that anaerobic digestion is preferable to thermal processes when the objective is generation of electrical power. The energy that can be generated from excess sludge in aerobic processes is clearly insufficient to cover the demand of energy for aeration and heat to evaporate the water of sludge cake before application of thermal processes. In anaerobic systems the potential of energy generation is higher and the demand is lower. Atleast in theory anaerobic system can be self sufficient in trms of energy by using the sludge. The contribution of thermal processes is relatively inexpressive and its application is only justified when it is necessary to reduce the mass of produced sludge to make transport and final destination feasible.

Keywords: Biological sludge, energy generation, anaerobic digestion, incineration, pyrolysis, gasification

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ANÁLISE CRÍTICA DA LEGISLAÇÃO BRASILEIRA PARA USO AGRÍCOLA DE LODOS DE ESGOTOS NA PERSPECTIVA DA AVALIAÇÃO QUANTITATIVA DE RISCO MICROBIOLÓGICO

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Critical analysis of the Brazilian legislation for agricultural use of sewage sludge to the assessment of quantitative microbiological risk

ABSTRACT

This paper discusses, under the perspective of Quantitative Microbial Risk analysis (QMRA), the standards established in the Brazilian legislation for the agricultural use of biosolids. Two exposure scenarios were investigated for application of classes A and B biosolids: (i) consumer's risk, arising from the consumption of leaf and root crops eaten raw; (ii) worker's risk, arising from the involuntary ingestion of particles of biosolids and biosolids amended soil. The results suggest that higher risks were associated with occupational risk (worker's risk) rather than consumer's risk, and regarding the considered pathogens, with the transmission of virus, followed by helminths, protozoa, and bacteria. It is speculated that the current version of the Brazilian legislation may be too strict for Class A biosolids, regarding both the microbial standards and applications' restrictions; moreover, just 'banning' the use of Class B biosolids may be too a stringent measure. It is also suggested that Class A helminth standard sounds too strict, but, on the other hand, Class B standard seems to be too lax. This work demonstrates the great potential of using QMRA for the assessment of risks related to agricultural use of biosolids. However, it is emphasized that better data on the occurrence and removal of pathogens in sewage sludge / biosolids, as well as about soil and crop contamination, are needed, so that more sound exposure scenarios, reflecting the Brazilian context, can be elaborated.

Keywords: Biosolids, consumers risk, pathogens, Resolução Conama 357/2006, workers risk.

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