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Swine Manure Management (II)

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1. A manure management survey of Minnesota swine producers: effect of farm size on manure application.

Schmitt,-M.A.; Schmidt,-D.R.; Jacobson,-L.D.

Appl-eng-agric. St. Joseph, MI: American Society of Agricultural Engineers, Sept 1996. v. 12 (5) p. 595-599.

NAL Call Number: S671.A66

Descriptors: pig-farming. pig-manure. management, application-to-land. farm-size. regional-surveys. minnesota.

Abstract: There is a national trend for swine enterprises to increase in size due to cost efficiencies associated with economies of scale. This study was performed to evaluate the effect of farm size on manure application management for a survey of 391 swine producers in Minnesota. There was a statistically significant effect of farm size on almost all of the variables evaluated. As farm size increased: a) more manure was handled in the liquid form; b) more farms analytically tested their manure; c) more farms calibrated their application equipment; d) less manure was applied in the summer and winter months; e) broadcast manure applications decreased while injected manure increased; and f) more farms kept records of manure applications. However, while the management practices associated with the larger farms were better correlated to recommended practices, the ratio of animal units to the number of acres owned and available for manure application increased steeply as farm size categories went from small to large.

2. A manure management survey of Minnesota swine producers: summary of responses.

Schmidt,-D.R.; Jacobson,-L.D.; Schmitt,-M.A.

Appl-eng-agric. St. Joseph, MI: American Society of Agricultural Engineers, Sept 1996. v. 12 (5) p. 591-594.

NAL Call Number: S671.A66

Descriptors: pig-farming. pig-manure. collection, management, handling, storage, application-to-land. regional-surveys. minnesota.

Abstract: Manure's impact on the environment is a concern for both livestock producers and the general public. A survey of Minnesota swine producers was conducted to determine current manure handling systems and manure management practices. A questionnaire containing 36 questions was mailed to 699 Minnesota swine producers. Questions focused on manure collection, storage, and application systems, dead pig disposal, and swine housing system. Survey responses indicated: a) most producers market 2,000 pigs per year or fewer; b) most producers handle some manure as a solid; c) the majority of producers are not testing manure, calibrating manure application equipment, or keeping records of manure applications; d) surface application of manure is more common than subsurface injection; e) rendering and burial are the most common means of dead pig disposal.

3. Addition of different sources and levels of amino acids and sugars to broiler litter before deep-stacking.

Wang,-Z.S.; Goetsch,-A.L.; Park,-K.K.; Patil,-A.R.; Kouakou,-B.; Galloway,-D.L.-Sr.; Rossi,-J.E.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. May/June 1996. v. 56 (2/3) p. 157-167.

NAL Call Number: TD930.A32

Descriptors: poultry-manure. broilers, waste-utilization. beef-cattle. steers, ruminants, feeds, maillard-reaction. nutrient-sources. lysine, methionine, soybean-oilmeal. sugars, digestibility, protein-degradation. nitrogen.

Abstract: Different sources and levels of amino acids (soybean meal at 0, 10, 20 or 40% of dry matter; similar quantities of lysine and methionine in synthetic forms) and sugars were mixed with broiler litter and placed in dacron bags embedded in a deep-stack for 3 or 9 weeks to determine changes in concentrations of nitrogen fractions and digestibility in ruminants. Pepsin-insoluble nitrogen concentration after 48 h of ruminal incubation was not changed by deep-stacking for 3 wk and only slightly elevated at 9 wk. Deep-stacking did not markedly alter in situ ruminal disappearance of broiler litter nitrogen. Conversely, in situ ruminal nitrogen disappearance of soybean meal substrates was decreased by deep-stacking; the change was greater for 16 h than for 48 h of ruminal incubation. Sugar addition to soybean meal substrates did not appear to enhance rumen undegradable protein concentration.

4. Adsorption of triallate onto sandy soils and pig slurry.

Loffredo,-E.; D'Orazio,-V.; Senesi,-N.

J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. New York, Marcel Dekker. 1997. v. B32 (1) p. 25-36.

NAL Call Number: TD172.J61

Descriptors: tri-allate, adsorption, soil-organic-matter. sandy-soils. pig-slurry.

5. Aerobic thermophilic composting of piggery solid wastes.

Bhamidimarri,-S.M.R.; Pandey,-S.P.

Water science and technology; v. 33, no. 8.

3rd IAWQ Specialized Conference on Appropriate Waste Management Technologies for Developing Countries held in Nagpur, India, 25-26 February 1995. 1st ed. Oxford ; New York: Pergamon Press, 1996. p. 89-94.

NAL Call Number: TD420.A1P7-v.33-no.8

Descriptors: composting, pig-manure. pig-slurry. sawdust, aerobic-treatment. thermophilic-bacteria. streptococcus, waste-treatment. nutrient-content. nitrogen-content. phosphorus.

6. Ammonia volatilization following surface-applied pig and cattle slurry in France.

Moal,-J.F.; Martinez,-J.; Guiziou,-F.; Coste,-C.M.

J-agric-sci. Cambridge: Cambridge University Press. Oct 1995. v. 125 (pt.2) p. 245-252.

NAL Call Number: 10-J822

Descriptors: pig-slurry. cattle-slurry. agricultural-wastes. waste-utilization. ammonia, volatilization, measurement, physicochemical-properties. environmental-factors. seasonal-variation. application-rates. france.

7. Anaerobic decomposition of swine manure and ammonia generation in a deep pit.

Zhang,-R.H.; Day,-D.L.

Trans-ASAE. St. Joseph, MI: American Society of Agricultural Engineers 1958, Sept/Oct 1996. v. 39 (5) p. 1811-1815.

NAL Call Number: 290.9-Am32T

Descriptors: pig-manure. decomposition, pits, anaerobic-treatment. ammonia, odor-emission. prediction, accuracy, ph, organic-matter. temperature, density, ammonium-nitrogen. equations.

Abstract: This article reports a laboratory study of swine manure decomposition in a deep pit. Distributions of solids, organic matter, pH, and ammonia in fresh swine manure after 12 h settling in a 1.2 m column were characterized, and solids reduction and ammonia generation rate during 28 d anaerobic decomposition were determined by using the manure initially having 1.8% and 3.3% total solids content (TS). In the settled manure, the pH became lower toward the bottom of the pit where manure solids and organic matter became concentrated, and the pH of bottom manure layer was 0.5 and 0.9 unit lower than the pH of top manure layer for the manure initially having 1.8% and 3.3% TS, respectively. Ammonia distribution in the manure was relatively uniform. The manure started to decompose rapidly after excretion from pigs. During the 28 d decomposition period, the solids contents of bottom manure layers were reduced linearly with time, and ammonia increased logarithmically with time. Higher temperature resulted in higher solids reduction and ammonia generation rate in the manure. The TS of bottom layer manure was reduced by 15% at 20 degrees C and 27% at 30 degrees C by the end of the 28 d period.

8. Anaerobic expanded-bed laboratory digester for the treatment of swine slurries. COD removal and methane generation.

Ranalli,-G.; Balsari,-P.; Colombo,-M.; Sorlimi,-C.

J-environ-sci-health,-Part-A,-Environ-sci-eng. Monticello, NY: Marcel Dekker Inc. 1995. v. A30 (7) p. 1397-1409.

NAL Call Number: TD172.J6

Descriptors: pig-slurry. anaerobic-digestion. anaerobic-digesters. chemical-oxygen-demand. methane-production. ph, waste-treatment.

9. Anaerobic treatment of swine waste by the anaerobic sequencing batch reactor.

Zhang,-R.; Yin,-Y.; Sung,-S.; Dague,-R.R.

Proc-Ind-Waste-Conf. Chelsea, MI: Lewis Publishers. 1997. (51st) p. 315-321.
NAL Call Number: TP995.A115

Descriptors: pig-manure. waste-treatment.

10. Application of nitrogen from swine lagoon effluent to bermudagrass pastures: seasonal changes in forage nitrogenous constituents and effects of energy and escape protein supplementation on beef cattle performance.

Rogers,-J.R.; Harvey,-R.W.; Poore,-M.H.; Mueller,-J.P.; Barker,-J.C.

J-anim-sci. Champaign, IL: American Society of Animal Science. May 1996. v. 74 (5) p. 1126-1133.

NAL Call Number: 49-J82

Descriptors: steers, grazing, feed-supplements. protected-protein. cutting-date. nitrogen-fertilizers. application-rates. application-to-land. crude-protein. forage, lagoons, piggery-effluent. nitrogen-retention. nonprotein-nitrogen. cynodon-dact ylon. maize, feather-meal. blood-meal.

Abstract: A 2-yr study was conducted to evaluate 1) the effects of nitrogen level from swine lagoon effluent on forage composition and animal performance and 2) the effects of supplemental escape protein (EP) on performance by steers grazing pastures fertilized with swine lagoon effluent. Bermudagrass (*Cynodon dactylon*) pastures were fertilized via sprinkler irrigation with either 448 or 896 kg/ha of N from swine lagoon effluent (two pasture replications/treatment). Within each pasture, four supplement treatments were evaluated using electronic Calan gates (8 steers.pasture-1.yr-1). The treatments were 1) negative control (pasture only); 2) energy control, which supplied 79.9 g of EP.hd-1.d-1; 3) 159 g of EP.hd-1.d-1, and 4) 239 g of EP.hd-1.d-1. Gains were increased ($P < .05$) an average of .15 kg/d by supplementation, with no differences in gain among supplements. Forage samples representative of that grazed by steers (CONSUM) and representative of all available forage (AVAIL) were obtained at 14-d intervals.

11. Application of unsupervised clustering methods to the assessment of malodour in agriculture using an array of conducting polymer odour sensors.

Byun,-H.G.; Persaud,-K.C.; Khaffat,-S.M.; Hobbs,-P.J.; Misselbrook,-T.H.

Comput-electron-agric. Amsterdam: Elsevier, May 1997. v. 17 (2) p. 233-247.

NAL Call Number: S494.5.D3C652

Descriptors: pig-slurry. odors, measurement, automation, sensors, polymers, cluster-analysis. principal-component-analysis. data-processing. algorithms.

12. Availability of residual phosphorus in manured soils.

Sharpley,-A.N.

Soil-Sci-Soc-Am-j. [Madison, Wis.] Soil Science Society of America. Sept/Oct 1996. v. 60 (5) p. 1459-1466.

NAL Call Number: 56.9-So3

Descriptors: ultisols, alfisols, pig-manure. poultry-manure. cattle, manures, application-to-land. soil-fertility. phosphorus, nutrient-availability. residual-effects. release, determination, extraction, iron-oxides. losses-from-soil. runoff, eutrophication, environmental-protection. fertilizer-requirement-determination. optimization, water-quality. pollution-control.

Abstract: In many areas with confined animal operations, continual manure application has increased soil P above amounts sufficient for optimum crop yields. In these areas, it is of economic and environmental importance to determine how long high-P soils will remain above crop sufficiency and identify soils where P contents would decrease most rapidly under similar management conditions. Thus, the surface 5 cm of 23 high-P soils (85-419 mg kg⁻¹ Mehlich-3 P) in Oklahoma and Texas, which had received beef feedlot, poultry, or swine manure (90-1880 kg P ha⁻¹ yr⁻¹ for up to 35 yr) were successively extracted with Fe-oxide-impregnated paper strips to investigate residual soil P availability. A decrease in strip P with successive extractions followed the equation: Strip P = a(extraction number)-b (r² of 0.88-0.98). The rate of P release to strips (exponent b) decreased more rapidly as soil P sorption saturation increased (R² of 0.79). Phosphorus saturation also accounted for 85% of the variation in the total amount of P released to strips from manured soils in 15 successive extractions (51-572 mg kg⁻¹). Fractionation of soil P before and after strip extraction showed bicarbonate inorganic P contributed most of the P released to strips (46%). The above equation also described soil P release in several published field studies (r² of 0.77-0.98). Thus, successive strip extraction of soil has the potential to describe soil factors controlling the availability of residual P and identify soils where high P contents may be less buffered and, thus, decrease more rapidly than others under similar management conditions.

13. Carbon and nitrogen transformation during composting of sweet sorghum bagasse.

Bernal,-M.P.; Navarro,-A.F.; Roig,-A.; Cegarra,-J.; Garcia,-D.

Biol-fertil-soils. Berlin, Germany: Springer-Verlag. 1996. v. 22 (1/2) p. 141-148.

NAL Call Number: QH84.8.B46

Descriptors: composting. bagasse. sorghum. sewage-sludge. pig-slurry. pig-manure. mixtures, carbon. nitrogen, transformation, microbial-degradation. organic-matter. kinetics, carbon-nitrogen-ratio. mineralization, humification, cation-exchange-capacity. stability.

Abstract: Two types of compost, consisting of sweet sorghum bagasse with either sewage sludge or a mixture of pig slurry and poultry manure, were studied in a pilot plant using the Rutgers system. The total degradation of the piles as determined by the weight loss of organic matter during the bio-oxidative and maturation phases accounted for 64% of the organic matter applied and followed a first-order kinetic function. Concentrations of total and organic N increased

during the composting process as the degradation of organic C compounds reduced the compost weight. Losses of N through NH₃ volatilization were low, C:N ratio in the two composts decreased from 24.0 and 15.4 to values between 12 and 10. The humification index, the C:N ratio, fulvic:humic acid-like C, and cation exchange capacity proved to be the most suitable parameters for assessing the maturity of these composts.

14. Chemical composition of cyanobacteria grown in diluted, aerated swine wastewater.

Canizares-Villanueva,-R.O.; Dominguez,-A.R.; Cruz,-M.S.; Rios-Leal,-E.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 51 (2/3) p. 111-116.

NAL Call Number: TD930.A32

Descriptors: phormidium, spirulina, cell-culture. waste-water. pig-manure. waste-water-treatment. biological-treatment. aerobic-treatment. algal-protein. biomass, chemical-composition.

Abstract: The chemical composition of *Spirulina maxima* and *Phormidium* sp. biomasses grown on pretreated and diluted swine wastewater was determined. Analyses were carried out on lyophilized samples and compared with data from mineral media (controls). Analyses of *Phormidium* grown on aeration-stabilized wastewater (ASSW) were: protein (Nx 625) 62%, lipids 11%, carbohydrates (calculated by difference) 16%. For *Spirulina* in the same effluent, data were: protein 36%, lipids 6% and carbohydrates 44%. No crude fiber was found in any of the samples. The results suggest that *Phormidium* and *Spirulina* biomasses could be used as dietary supplements in animal feed, but further studies are needed to determine the nutritional value of the product.

15. Comparison of methods to evaluate heavy metals in organic wastes.

Abreu,-M.F.-de; Berton,-R.S.; Andrade,-J.C.-de.

Commun-soil-sci-plant-anal. Monticello, N.Y.: Marcel Dekker Inc. 1996. v. 27 (5/8) p. 1125-1135.

NAL Call Number: S590.C63

Descriptors: organic-wastes. sewage-sludge. refuse, composts, cattle-manure. pig-manure. chemical-analysis. heavy-metals. chemical-composition. analytical-methods. extraction, extractants, comparisons, microwave-treatment.

Abstract: The conventional method for the digestion of residues using a mixture of nitric and perchloric acids was compared with the microwave procedure using both aqua regia and nitric acid as extractants, in order to determine which method fits better the routine measurements using inductively coupled plasma emission spectrometry (ICP-AES). Urban domestic wastes, swine and dairy manure and NIES pond sediment certified reference material were used as samples. Microwave extraction with aqua regia extracted higher amounts of metals from the certified pond sediment reference material than the USEPA-SW 846-method 3051(nitric acid) and the conventional nitric-perchloric procedure, with a recovery greater than 90% for Fe, Mn,

Zn, Cu, Pb and Cd; 76% for Ni and 61% for Cr. The extraction procedure with aqua regia method also presented statistically higher amounts of Fe, Mn, Zn, and Cr.

16. Composting solid swine manure and lignite mixtures with selected plant residues.

Georgacakis,-D.; Tsavdaris,-A.; Bakouli,-J.; Symeonidis,-S.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. May/June 1996. v. 56 (2/3) p. 195-200.
NAL Call Number: TD930.A32

Descriptors: composting, composts, mixtures, pig-manure. lignite, cotton, rice-husks. residues, bulking-agents. odor-abatement. temperature, chemical-composition. carbon-nitrogen-ratio. physicochemical-properties.

Abstract: A study was undertaken to investigate the composting of mechanically separated solid swine manure and ground lignite residues mixtures enriched with rice seed peels and ginned cotton residues. A set of odor-free compost piles, due to lignite addition, was installed, on site, at AFI KARAPATIS SA organic fertilizer factory at Zeli in central Greece. The findings of this study indicated that co-composting of solid swine manure and ground lignite (mixed at a ratio of 1:1 by volume) together with ginned cotton residues and rice seed peels resulted in improved composting and chemical composition characteristics compared to the mixture of solid swine manure and ground lignite alone or enriched with either ginned cotton residues or rice seed peels. Ground lignite allowed for the successful incorporation of the wet and malodorous swine manure into the compost process. Ginned cotton residues (at a 1:1 mixing ratio by volume) proved to be a bulking agent with excellent 'insulating behavior' but with lower composting rates and increased EC and Na values in the final product.

17. Conference proceedings, International Conference on Air Pollution from Agricultural

Operations: Westin Crown Center, Kansas City, Missouri, February 7-9, 1996.

Ames, Iowa: Midwest Plan Service, Iowa State University, 1996. 488 p.: ill.

NAL Call Number: TD195.A34I57--1996

Descriptors: Odors-Congresses. Animal-waste-Congresses. Dust-Congresses. Agricultural-pollution-Congresses. Swine-Congresses.

18. Constructed wetland treatment of animal waste in Indiana: management implications.

Reaves,-R.P.; DuBow,-P.J.; Jones,-D.D.; Sutton,-A.L.

Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri . St. Joseph, MI: ASAE, c1995. v. 2 p. 179-182.

NAL Call Number: TD365.C54-1995

Descriptors: wetlands, aquatic-plants. waste-water-treatment. waste-treatment. dairy-effluent. piggery-effluent. lagoons, indiana,

19. Continuous farm scale aeration plant for reducing offensive odours from piggery slurry: control and optimization of the process.

Burton,-C.H.; Sneath,-R.W.

J-agric-eng-res. London ; Orlando: Academic Press, Apr 1995. v. 60 (4) p. 271-279.

NAL Call Number: 58.8-J82

Descriptors: pig-slurry. odors, odor-abatement. aeration, treatment, optimization, economic-analysis. farm-equipment. uk.

20. A description of hydrolysis kinetics in anaerobic degradation of particulate organic matter.

Vavilin,-V.A.; Rytov,-S.V.; Lokshina,-L.Y.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. May/June 1996. v. 56 (2/3) p. 229-237.

NAL Call Number: TD930.A32

Descriptors: cattle-manure. pigs, animal-wastes. cellulose, sewage-sludge. organic-matter. particles, particle-size. particle-shape. surfaces, anaerobic-digestion. colonization, microbial-degradation. hydrolysis. kinetics, simulation, simulation- models. mathematical-models.

Abstract: Four types of hydrolysis kinetics were tested for anaerobic degradation of complex organic matter using the generalized simulation model described earlier. The simulation dynamics from all types of hydrolysis kinetics of swine waste, sewage sludge and cattle manure for continuous-flow reactors at a defined SRT fitted the experimental data comparatively well. However, differences were found for particulate organic matter degradation over a wide range of SRT values.

21. Designing riparian buffer systems for utilization and treatment of effluent.

Hubbard,-R.K.; Davis,-J.G.; Lowrance,-R.R.; Newton,-G.L.; Vellidis,-G.; Dove,-R.

Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri . St. Joseph, MI: ASAE, c1995. v. 2 p. 75-77.

NAL Call Number: TD365.C54-1995

Descriptors: riparian-forests. riparian-vegetation. grasses, grass-strips. panicum, waste-treatment. piggery-effluent. application-to-land. nutrient-uptake. ammonium-nitrogen. nitrate-nitrogen. water-quality. groundwater, groundwater-pollution. georgia.

22. Detection and characterization of broad-host-range plasmids in environmental bacteria by PCR.

Gotz,-A.; Pukall,-R.; Smit,-E.; Tietze,-E.; Prager,-R.; Tschape,-H.; Elsas,-J.D.-van.; Smalla,-K. Appl-environ-microbiol. Washington: American Society for Microbiology. July 1996. v. 62 (7) p. 2621-2628.

NAL Call Number: 448.3-Ap5

Descriptors: soil-bacteria. pig-slurry. pig-manure. plasmids, detection, polymerase-chain-reaction. dna, dna-hybridization. southern-blotting.

Abstract: Primer systems for PCR amplification of different replicon-specific DNA regions were designed on the basis of published sequences for plasmids belonging to the incompatibility (Inc) groups IncP, IncN, IncW, and IncQ. The specificities of these primer systems for the respective Inc groups were tested with a collection of reference plasmids belonging to 21 different Inc groups. Almost all primer systems were found to be highly specific for the reference plasmid for which they were designed. In addition, the primers were tested with plasmids which had previously been grouped by traditional incompatibility testing to the IncN, IncW, IncP, or IncQ group. All IncQ plasmids gave PCR products with the IncQ primer systems tested. The results indicated that plasmids assigned to the same Inc group by traditional methods might be partially or completely different from their respective reference plasmids at the DNA level.

23. Development of guidelines for and demonstration of efficient treatment of swine lagoon wastewater by constructed wetlands.

McCaskey,-T.A.

Sustainable Agriculture Research and Education SARE research projects Southern Region. 1995. 34 p.

NAL Call Number: S441.S8552

Descriptors: pig-slurry. waste-water-treatment. nitrogen-content. ammonia, nitrate, nitrogen, biochemical-oxygen-demand. chemical-oxygen-demand. phosphorus, streptococcus, water-quality. wetlands, bioremediation, water-pollution. pollution-control. guidelines, alabama.

24. Direct molecular biological analysis of ammonia oxidising bacteria populations in cultivated soil plots treated with swine manure.

Hastings,-R.C.; Ceccherini,-M.T.; Miclaus,-N.; Saunders,-J.R.; Bazzicalupo,-M.; McCarthy,-A.J. FEMS-microbiol-ecol. Amsterdam, The Netherlands: Elsevier Science B.V. May 1997. v. 23 (1) p. 45-54.

NAL Call Number: QR100.F45

Descriptors: pig-slurry. soil-amendments. ammonia, oxidation, nitrification, nitrosomonas, soil-bacteria. ribosomal-dna. oxygenases, structural-genes. dna-probes. polymerase-chain-reaction. agricultural-soils.

Abstract: The application of pig slurry, high in ammonia-nitrogen concentration, to agricultural land is a practice whose effect on soil microbial communities is poorly understood. The autotrophic ammonia-oxidising bacteria are an integral component of the nitrogen cycle in soil and their activity will be affected by addition of nitrogenous fertilizer. Members of the genus *Nitrosospira* were shown by 16S rDNA-directed PCR to be present in both unamended and amended soils, regardless of the quantity of pig slurry applied. In contrast, members of the genus *Nitrosomonas* were detected by the same approach only in those soil plots that had received high loadings of slurry. These data support the view that nitrosospiras are ubiquitous as important members of nitrifying populations in the environment. The direct detection of nitrosomonad DNA only in amended soils supports the hypothesis that these nitrosomonads become highly competitive under conditions analogous to laboratory enrichment cultures.

25. Edge-of-field losses of surface-applied animal manure.

Daniel,-T.C.; Edwards,-D.R.; Nichols,-D.J.

Animal waste and the land-water interface. Boca Raton: Lewis Publishers, c1995. p. 89-98.

NAL Call Number: TD930.A55-1995

Descriptors: poultry-manure. pig-slurry. application-rates. application-to-land. pastures, festuca-arundinacea. rain, runoff, nitrogen-content. ammonia, nitrate-nitrogen. phosphorus, phosphates, chemical-oxygen-demand. water-pollution. pollution-control. arkansas.

26. The effect of animal manure applications on the forms of soil phosphorus.

Robinson,-J.S.; Sharpley,-A.N.; Smith,-S.J.

Animal waste and the land-water interface . Boca Raton: Lewis Publishers, c1995. p. 43-48.

NAL Call Number: TD930.A55-1995

Descriptors: cattle-manure. poultry-manure. pig-slurry. application-to-land. phosphorus, availability, soil-ph. spatial-distribution. soil-fertility. texas, oklahoma.

27. Effect of fermented swine wastes on biological nutrient removal in sequencing batch reactors.

Lee,-S.I.; Park,-J.H.; Ko,-K.B.; Koopman,-B.

Water-res. Oxford, U.K.: Elsevier Science Ltd. July 1997. v. 31 (7) p. 1807-1812.

NAL Call Number: TD420.W3

Descriptors: pig-slurry. fermentation, waste-water. organic-matter. acetic-acid. supplements, bioreactors, phosphorus, biological-treatment. diurnal-variation.

28. Effect of intermittent-cycle extended-aeration treatment on the fate of carbonaceous material in pig slurry.

Bicudo,-J.R.; Svoboda,-I.F.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 54 (1) p. 53-62.

NAL Call Number: TD930.A32

Descriptors: pig-slurry. aeration, aerobic-treatment. carbon, pollution, characteristics, physicochemical-properties.

Abstract: A farm-scale treatment plant was studied during a year. Four different aeration cycles were tested in order to observe their effects on the removal of carbon material from pig slurry. The treatment plant performance was not significantly affected by a 60% induction of aeration times, from almost 20 h per day to 12 h per day. The high removal rates observed (over 95% in terms of BOD5) appeared to be related to the low aeration rates achieved through the intermittent operation of the aerator. The removal of solid material was more variable. Percentage removals of total solids from the liquid were between 10 and 70%. Treatment of slurry consumed from over 150 kWh/day for 19.5 h of aeration per day to about 90 kWh/day for 12 h aeration per day. Aerobic slurry treatment cost US\$2.50 per pig produced.

29. Effect of long-term application of animal slurries to grassland on silage quality assessed in laboratory silos.

Anderson,-R.; Christie,-P.

J-sci-food-agric. Sussex: John Wiley & Sons Ltd. Feb 1995. v. 67 (2) p. 205-213.

NAL Call Number: 382-So12

Descriptors: grass-silage. silage, silage-quality. cattle-slurry. pig-slurry. silos, ammonium-nitrogen. lactic-acid. volatile-fatty-acids. inoculum, fermentation, application-rates. bacterial-count. feed-composition-tables. chemical-composition. lactobacillus, clostridium, fertilizers, comparisons.

Abstract: The effect on silage quality of slurry type (pig or cow), rate of application of slurry (50, 100 or 200 m³ ha⁻¹ year⁻¹) and use of a bacterial silage inoculant, was assessed on grass from a long-term slurry experiment ensiled in laboratory silos. There was no significant effect of slurry type on the quality of silage made from grass regrowths. However, on the basis of ammonia-N, lactate and volatile fatty acid contents, spring (first cut) grass treated with cow slurry in both years of the study produced significantly poorer fermentation ($P < 0.001$) than silage from grass treated with pig slurry. Although increasing the rate of slurry application was shown to reduce fermentation quality in most treatments, this was seen as an effect of increasing the total-N content of the herbage rather than of slurry application per se. It was also observed that slurry

application had little impact on either the composition or diversity of herbage enterobacteria at harvest, and therefore probably upon subsequent fermentation.

30. Effects of application technique and anaerobic digestion on gaseous nitrogen loss from animal slurry applied to ryegrass (*Lolium perenne*).

Rubaek,-G.H.; Henriksen,-K.; Petersen,-J.; Rasmussen,-B.; Sommer,-S.G.

J-agric-sci. Cambridge: Cambridge University Press. June 1996. v. 126 (pt.4) p. 481-492.

NAL Call Number: 10-J822

Descriptors: cattle-slurry. pig-slurry. food-wastes. waste-utilization. lolium-perenne. grasslands, grassland-management. crop-yield. growth, soil-chemistry. ammonia, volatilization, denitrification, losses, quantitative-analysis. application-methods. climatic-factors. nitrogen, nutrient-uptake. denmark.

31. Effects of bacterial inoculum and moisture adjustment on composting of pig manure.

Tiquia,-S.M.; Tam,-N.F.Y.; Hodgkiss,-I.J.

Environ-pollut. Kidlington, Oxford, UK: Elsevier Science Ltd. 1997. v. 96 (2) p. 161-171.

NAL Call Number: QH545.A1E52

Descriptors: pig-manure. composting, inoculum, decomposition, moisture-content. environmental-factors.

32. Effects of composting on phytotoxicity of spent pig-manure sawdust litter.

Tiquia,-S.M.; Tam,-N.F.Y.; Hodgkiss,-I.J.

Environ-pollut. Oxford, UK: Elsevier Science Ltd. 1996. v. 93 (3) p. 249-256.

NAL Call Number: QH545.A1E52

Descriptors: pig-manure. composting, moisture-content. phytotoxicity, brassica-alboglabra. brassica-parachinensis. allium-sativum. cucumis-sativus. amaranthus, lycopersicon-esculentum.

33. Effects of fertilizer on insecticides adsorption and biodegradation in crop soils.

Rouchard,-J.; Thirion,-A.; Wauters,-A.; Steene,-F.-van-de.; Benoit,-F.; Ceustermans,-N.; Gillet,-J.; Marchand,-S.; Vanparys,-L.

Arch-environ-contam-toxicol. New York, Springer-Verlag. July 1996. v. 31 (1) p. 98-106.

NAL Call Number: TD172.A7

Descriptors: cattle-manure. pig-slurry. green-manures. crop-residues. composts, aldicarb, thiofanox, insecticides, adsorption, persistence, half-life. soil-organic-matter. beta-vulgaris. beta-vulgaris-var.-saccharifera. belgium.

34. Effects of intermittent-cycle extended-aeration treatment on the fate of nutrients, metals and bacterial indicators in pig slurry.

Bicudo,-J.R.; Svoboda,-I.F.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 54 (1) p. 63-72.

NAL Call Number: TD930.A32

Descriptors: pig-slurry. activated-sludge. separation, aeration, aerobic-treatment. waste-treatment. nutrients, nitrogen, heavy-metals. fecal-coliforms. streptococcus.

Abstract: A farm-scale activated sludge treatment plant for separated pig slurry was operated with four different aeration cycles during a year, with the objective of optimising the process and producing an effluent with low nutrient and pathogen concentrations. The high nitrogen-removals observed (over 95%) appeared to be related to the denitrification achieved through the intermittent operation of the aerator. It was necessary to supply, on average, about 120 kWh/day (i.e. 10 kWh/pig) in order to obtain a treated effluent with mean concentrations of 31.6 mg N-NH₄/l and 77.6 mg NO₃(-)/l. The removal of phosphorus ranged from 20 to 90%. Concentrations between 25 and 60 mg PO₄-P/l were obtained in the treated effluent. Mean percentage removals of metals were about 90% for Cu and 85% for Zn.

35. Effects of slurry application on grass/clover swards.

Wightman,-P.S.

Soil-use-manage. Oxford: CAB International. Sept 1995. v. 11 (3) p. 149-150.

NAL Call Number: S590.S68

Descriptors: lolium-perenne. trifolium-repens. mixtures, grassland-soils. pig-slurry. cattle-slurry. application-to-land. rain, plant-height. timing, botanical-composition. dry-matter-accumulation. yield-components. scorch, crop-damage.

36. Electrolytic treatment of swine liquid manure in a full scale experiment.

Ranalli,-G.; Chiumenti,-R.; Donantoni,-L.; Sorlini,-C.

J-environ-sci-health-Part-A,-Environ-sci-eng-toxic-hazard-substance-control. Monticello, NY: Marcel Dekker, Inc. 1996. v. A31 (7) p. 1705-1721.

NAL Call Number: TD172.J6

Descriptors: pig-slurry. electrical-treatment. electrolytes, atp, odor-abatement. pollution-control.

37. Emissions of malodorous compounds and greenhouse gases from composting swine feces.

Kuroda,-K.; Osada,-T.; Yonaga,-M.; Kanematu,-A.; Nitta,-T.; Mouri,-S.; Kojima,-T.
Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. May/June 1996. v. 56 (2/3) p. 265-271.
NAL Call Number: TD930.A32

Descriptors: pig-manure. composting, aeration, odor-emission. methane, nitrous-oxide.
ammonia, thiols, methyl-sulfide. hydrogen-sulfide. sulfur, processing-losses.

Abstract: Emissions of harmful gases, malodorous compounds and greenhouse gases emitted during composting of swine feces under continuous aeration were studied using a laboratory-scale composting apparatus. Concentrations of ammonia and sulfur compounds in the exhaust gas rose remarkably after starting and at every turning, and their changes reflected the odor concentrations calculated from sensory tests. Volatile fatty acids, in high concentrations at the start, were rapidly reduced within several hours from starting and did not rise again. Methane emission was observed within only 1 day from starting. Nitrous oxide repeatedly rose and fell after every turning, as did ammonia. From the viewpoint of nitrogen loss during composting, however, the total amount of nitrous oxide emission seemed quite small compared with that of ammonia.

38. Energy accounting on farms.

Bergen,-J.A.M.-van
Stud-environ-sci. Amsterdam ; New York, Elsevier Scientific Publishing Co. 1995. (65B) p.
1123-1126.
NAL Call Number: QH540.S8

Descriptors: dairy-farms. farms, pigs, energy-consumption. emission, carbon-dioxide. methane,
nitrous-oxide. methane-production. peat-soils. mineralization, decomposition, rumen-
fermentation. cattle-slurry. pig-slurry.

39. The environmental impact of intensive systems of animal production in the lowlands.

Atkinson,-D.; Watson,-C.A.
Anim-sci. Penicuik, [Scotland]: British Society of Animal Science, 1995, Dec 1996. v. 63 (pt.3)
p. 353-361.
NAL Call Number: SF1.A56

Descriptors: animal-production. poultry-farming. pig-farming. dairy-farming. intensive-
livestock-farming. animal-husbandry. environmental-impact. lowland-areas. choice-of-species.
animal-wastes. waste-utilization. recycling, nitrogen-cycle. farming-systems. integration,
biodiversity.

40. Environmental policy and swine manure management: waste not or want not.

Hoag,-D.L.; Roka,-F.M.

Am-J-altern-agric. Greenbelt, MD: Henry A. Wallace Institute for Alternative Agriculture. Fall 1995. v. 10 (4) p. 163-166.

NAL Call Number: S605.5.A43

Descriptors: pig-manure. handling, waste-utilization. application-to-land. farm-management. decision-making. farmers'-attitudes. environmental-policy. north-carolina. iowa.

Abstract: Livestock production and manure handling decisions often have been treated in the literature as separate enterprises. Policymakers, too, have ignored the interactive nature of manure management by focusing on land application for nutrient disposal. This study outlines a systems approach to describe the interrelated decisions producers face, using examples from North Carolina and Iowa that show how producers' attitudes toward manure management lead them to handle manure differently in different regions.

41. Environmental quality and hog production.

Abbozzo,-P.; Boggia,-A.; Brunetti,-M.

Environ-monit-assess. Dordrecht: Kluwer Academic Publishers. June 1996. v. 41 (2) p. 171-182.

NAL Call Number: TD194.E5

Descriptors: pigs, animal-production. animal-breeding. environmental-impact. pig-manure. waste-disposal. water-pollution. watersheds, watershed-management. umbria.

42. Estimated seepage losses from established swine waste lagoons in the lower coastal plain of North Carolina.

Huffman,-R.L.; Westerman,-P.W.

Trans-ASAE. St. Joseph, MI: American Society of Agricultural Engineers. Mar/Apr 1995. v. 38 (2) p. 449-453.

NAL Call Number: 290.9-Am32T

Descriptors: pigs, lagoons, waste-water. seepage, coastal-plains. groundwater, water-pollution. north-carolina.

Abstract: Eleven well-established, swine waste lagoon systems in the lower coastal plain of North Carolina were examined for evidence of seepage losses to the superficial aquifer. The sites were selected to represent three major soil systems in the areas of North Carolina with the highest swine populations. Elevated ammonium concentration was the strongest indicator of seepage. Estimated seepage losses were small on 45% of the systems studied. There was no

apparent relationship between seepage loss rates and major soil system or style of construction. Rather, the dominant factor appeared to be the soil materials used in construction.

43. Estimating nutrient content of animal slurries using electrical conductivity.

Stevens,-R.J.; O'Brien,-C.J.; Carton,-O.T.

J-agric-sci. Cambridge: Cambridge University Press. Oct 1995. v. 125 (pt.2) p. 233-238.

NAL Call Number: 10-J822

Descriptors: cattle-slurry. pig-slurry. chemical-analysis. physicochemical-properties. ion-balance. electrical-conductivity. nutrient-content. mathematical-models. equations.

44. Evaluation of an integrated system for pig slurry treatment.

Font,-X.; Adroer,-N.; Poch,-M.; Vicent,-T.

J-chem-technol-biotechnol. Chichester, West Sussex, England: John Wiley & Sons, Ltd. Jan 1997. v. 68 (1) p. 75-81.

NAL Call Number: TP1.J686

Descriptors: anaerobic-digestion.

45. Evaluation of overland flow treatment for swine lagoon effluent.

Hawkins,-G.L.; Hill,-D.T.; Rochester,-E.W.; Wood,-C.W.

Trans-ASAE. St. Joseph, MI: American Society of Agricultural Engineers. Mar/Apr 1995. v. 38 (2) p. 397-402.

NAL Call Number: 290.9-Am32T

Descriptors: pigs, lagoons, effluents, waste-water-treatment. overland-flow. application-to-land. slopes, runoff, percolation, leaching, usa.

Abstract: Overland flow, on slopes of 5 and 11%, was used as a means of treating wastewater effluent from the second cell of a swine waste anaerobic lagoon system. Wastewater samples from both surface runoff and soil percolate (depths of 0.3, 0.9, and 1.5 m) were collected and analyzed for TKN-N, NH₄-N, ON-N, NO₃-N, pH, COD, K, EC, and TP-P. Using these data, along with the hydraulic loading rates and quantitative runoff collection, mass balances on the above parameters were calculated to determine the surface treatment of the lagoon effluent. These mass balances suggest that overland flow is an excellent treatment system for liquid lagoon effluents with mass reductions of greater than 60% for all parameters on both slopes, except NO₃-N, which had an approximate increase of 1.7 times on the 11% slope. Samples collected from the three lysimeter depths (soil percolate) suggest that NO₃-N leaching from the plots may be a concern over an extended period of use.

46. Evaluation of the chemical composition of manures from different organic wastes and their potential for supply of nutrients to tomato in a tropical ultisol.

Asiegbu,-J.E.; Oikeh,-S.

Biol-agric-hortic. Oxon: A B Academic Publishers. 1995. v. 12 (1) p. 47-60.

NAL Call Number: S605.5.B5

Descriptors: lycopersicon-esculentum. tropical-soils. ultisols, animal-manures. sewage-sludge. pig-manure. poultry-manure. organic-wastes. waste-utilization. npk-fertilizers. comparisons, nutrient-content. nutrient-availability. soil-ph. use-efficiency. nutrient-uptake. application-rates.

47. Evaluation of the stabilization level of pig organic waste: influence of humic-like compounds.

Govi,-M.; Ciavatta,-C.; Sitti,-L.; Gessa,-C.

Commun-soil-sci-plant-anal. New York, N.Y.: Marcel Dekker. 1995. v. 26 (3/4) p. 425-439.

NAL Call Number: S590.C63

Descriptors: pig-slurry. sludges, pig-manure. straw, composting, composts, maturation, decomposition, humification, humic-acids. fulvic-acids. organic-matter. isoelectric-focusing. degradation.

48. Fertilization of spring barley by combination of pig slurry and mineral nitrogen fertilizer.

Petersen,-J.

J-agric-sci. Cambridge: Cambridge University Press. Sept 1996. v. 127 (pt.2) p. 151-159.

NAL Call Number: 10-J822

Descriptors: hordeum-vulgare. crop-production. nitrogen-fertilizers. potassium-fertilizers. phosphorus-fertilizers. pig-slurry. application-rates. application-date. seeds, straw, crop-yield. nitrogen-content. nutrient-uptake. mathematical-models. equations, denmark.

49. A field treatment plant for pig slurry.

Martinez,-J.; Hao,-X.

Water-sci-technol. Kidlington, Oxford, UK: Elsevier Science Ltd. 1996. v. 34 (11) p. 87-92.

NAL Call Number: TD420.A1P7

Descriptors: pig-slurry. biological-treatment. application-to-land. nitrate, leachates, percolation, lolium-perenne. waste-water-treatment. bioreactors, denitrification, water-reuse. irrigation-water. chemical-oxygen-demand. nitrogen, phosphorus, drainage-water.

50. Forage characteristics, steer performance, and water quality from bermudagrass pastures fertilized with two levels of nitrogen from swine lagoon effluent.

Harvey,-R.W.; Mueller,-J.P.; Barker,-J.A.; Poore,-M.H.; Zublena,-J.P.

J-anim-sci. Champaign, Ill.: American Society of Animal Science. Feb 1996. v. 74 (2) p. 457-464.

NAL Call Number: 49-J82

Descriptors: beef-cattle. piggery-effluent. application-to-land. nitrogen-fertilizers. rotational-grazing. cynodon-dactylon. concentrates, rumen-fluid. forage, nitrogen-content. groundwater-pollution. liveweight-gain. feed-conversion.

Abstract: Four .8-ha pastures of bermudagrass (*Cynodon dactylon* [L.] Pers.) were fertilized with either 456 or 873 kg/ha of nitrogen (N) from swine lagoon effluent (two replicates per treatment) and grazed by steers over two summers. Within each pasture, steers received forage only, an energy source (corn), a mixture of corn and soybean meal, or a mixture of corn and blood meal via electronic Calan feeders. All supplements were offered at a level of 1.36 kg/d, and the soybean meal and blood meal supplements provided similar quantities of protein. Weight gains were similar among supplemented steers, but supplemented steers gained faster ($P < .05$) than controls. Nitrogen fertilization level had no effect on steer gains, steer grazing days per hectare, or in vitro dry matter disappearance, NDF, and ADF of clipped forage samples. Plant protein and nitrate ion concentrations were greater ($P < .06$) in clipped forage samples receiving the higher N application rate.

51. Forage production as affected by swine effluent and commercial fertilizer applications.

Phillips,-J.M.; Simpson,-R.B.

Proc-Am-Forage-Grassl-Counc-1992. Georgetown, TX: American Forage and Grassland Council. 1995. v. 4 p. 155-159.

NAL Call Number: SB193.F59

Descriptors: pig-slurry.

52. Forage systems utilizing swine lagoon effluent: dream--or nightmare.

Poore,-M.; Green,-J.

Proc-South-Pasture-Forage-Crop-Improv-Conf. New Orleans: Agricultural Research Service, U.S. Dept. of Agriculture, 1996. (52nd) p. 109-116.

NAL Call Number: 60.19-So83

Descriptors: fodder-crops. crop-production. pig-slurry. application-to-land. north-carolina.

53. Gas production and digestion efficiency of sewage sludge containing elevated toxic metals.

Wong,-M.H.; Cheung,-Y.H.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 54 (3) p. 261-268.

NAL Call Number: TD930.A32

Descriptors: sewage-sludge. anaerobic-digestion. heavy-metals. pig-manure. biogas, methane-production. gas-production. toxicity, chlorella-pyrenoidosa. growth, bioassays, waste-utilization.

Abstract: The present project was aimed at studying the effects of increasing loading of heavy metals on the anaerobic digestion of sewage sludge. The first experiment indicated that a sludge sample collected from Taipo Sewage Treatment Plant had a higher gas yield than one from Shatin Sewage Treatment Plant, which was possibly due to the higher content of heavy metals, including Cr, Cu, Ni and Zn, in Shatin sludge. Adding pig manure to both sludges raised their biogas yields. The second experiment of dosing different concentrations of the four metals to Taipo sludge showed that gas yields were severely inhibited at the highest concentration of each metal tested. The degree of toxicity of the four metals tested was in the order of Cr > Ni > Cu > Zn. The third experiment used water extracts of the digested materials for the cultivation of a microalga, *Chlorella pyrenoidosa*, and the results showed that 5% extracts of both sludges alone gave higher algal growth than the control (Bristol's medium).

54. Groundwater quality in an eastern Coastal Plain watershed.

Stone,-K.C.; Novak,-J.M.; Jennings,-G.D.; McLaughlin,-R.A.; Hunt,-P.G.

Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri . St. Joseph, MI: ASAE, c1995. v. 3 p. 263-266.

NAL Call Number: TD365.C54-1995

Descriptors: groundwater, water-quality. groundwater-pollution. nitrate, nitrate-nitrogen. herbicide-residues. alachlor, metolachlor, triazines, monitoring, wells, application-to-land. piggery-effluent. lagoons, waste-treatment. north-carolina.

55. Handling liquids and solids on hog farms.

Haywood,-F.

Biocycle. Emmaus, PA: JG Press, Mar 1997. v. 38 (3) p. 55-57.

NAL Call Number: 57.8-C734

Descriptors: composting, pig-manure. waste-utilization. colorado.

56. Impact evaluation of agrotechnologies in watersheds.

Gomarasca,-M.A.

Environ-monit-assess. Dordrecht: Kluwer Academic Publishers. June 1996. v. 41 (2) p. 159-170.
NAL Call Number: TD194.E5

Descriptors: pig-farming. waste-water. fertilizers, crop-production. oryza-sativa. nitrogen, water-pollution. groundwater-pollution. watersheds, rivers, land-use-planning. environmental-impact. remote-sensing. geographical-information-systems. integrated-systems. decision-making. maps, development-projects. italy.

57. In situ inactivation of animal viruses and a coliphage in nonaerated liquid and semiliquid animal wastes.

Pesaro,-F.; Sorg,-I.; Metzler,-A.

Appl-environ-microbiol. Washington: American Society for Microbiology. Jan 1995. v. 61 (1) p. 92-97.

NAL Call Number: 448.3-Ap5

Descriptors: bacteriophages, bovine-parvovirus. encephalomyocarditis-virus. bovine-herpesvirus. rotavirus, bovine-adenovirus. inactivation, cattle-slurry. cattle-manure. pig-manure. liquid-manures. risk, application-to-land.

Abstract: The persistence of five animal viruses, representing picorna-, rota-, parvo-, adeno-, and herpesviruses, and the coliphage f2 was determined in the field by exposing the viruses to different animal wastes and by adopting an established filter sandwich technique. This technique allows us to copy the natural state of viruses in the environment, where adsorption onto or incorporation into suspended solids may prolong virus survival. Using filter sandwiches either equipped with porous (15 nm in diameter) or poreless polycarbonate (PC) membranes, it was possible to differentiate between overall virus inactivation and the effect of virucidal agents that act through poreless PC membranes.

58. Influence of soil water potential and slurry type on denitrification activity.

Petersen,-S.O.; Andersen,-M.N.

Soil-biol-biochem. Exeter: Elsevier Science Ltd. July 1996. v. 28 (7) p. 977-980.

NAL Call Number: S592.7.A1S6

Descriptors: denitrification, biological-activity-in-soil. soil-water-potential. soil-water-content. organic-amendments. pig-slurry. cattle-slurry. organic-matter.

59. Influence of the concentrated pig slurry on soil and corn fodder yield and chemical composition in presence of N top dressing.

Vasconcelos,-E.; Cabral,-F.

Fertil-res. Dordrecht: Kluwer Academic Publishers. 1995/1996. v. 45 (1) p. 25-29.

NAL Call Number: S631.F422

Descriptors: zea-mays. fodder-crops. pig-slurry. organic-fertilizers. application-rates. crop-yield. plant-composition. nutrient-content. nutrient-uptake. soil-fertility. soil-organic-matter. nutrient-availability.

Abstract: A pot experiment was carried out using corn plants (*Zea mays* L.), in order to define the possible utilization of the concentrated pig slurry as an organic fertilizer, avoiding soil pollution caused by its chemical composition. Results obtained showed that on a slightly loamy coarse sand soil an amount of 40 t ha⁻¹ on fresh weight basis of concentrated pig slurry can eventually substitute mineral nitrogen and phosphate fertilization at planting. The effects of increasing amounts of this organic fertilizer on soil characteristics and corn fodder composition were also investigated.

60. Influence of the time and rate of liquid-manure application on yield and nitrogen utilization of silage corn in south coastal British Columbia.

Zebarth,-B.J.; Paul,-J.W.; Schmidt,-O.; McDougall,-R.

Can-j-soil-sci. Ottawa: Agricultural Institute of Canada, 1957, May 1996. v. 76 (2) p. 153-164.

NAL Call Number: 56.8-C162 English; Summary in: French *Descriptors:* zea-mays. cattle-manure. pig-manure. liquid-manures. nitrogen-fertilizers. application-rates. timing, spring, autumn, nitrogen, nutrient-availability. nutrient-uptake. soil, nitrate-nitrogen. nitrogen-content. crop-yield. recovery, british-columbia.

61. Isolation and characterization of a phenol-degrading, sulfate-reducing bacterium from swine manure.

Boopathy,-R.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 54 (1) p. 29-33.

NAL Call Number: TD930.A32

Descriptors: pig-manure. sulfate-reducing-bacteria. phenol, phenolic-compounds. microbial-degradation. acetic-acid. waste-water-treatment. isolation, characterization.

Abstract: A sulfate-reducing bacterium isolated from swine manure used phenol as its sole source of carbon and energy. Sulfate was used as the electron acceptor. The major end product of phenol metabolism was acetic acid. For every mole of phenol degraded, almost 2 moles of acetic acid were produced. Acetic acid was not degraded further to CO₂, indicating that this sulfate-reducing bacterium (SRB) is an incomplete oxidizer unable to carry-out the terminal oxidation of organic compounds. The SRB isolate also used chlorophenol as the sole source of carbon and energy. However, it did not use the chlorophenolic compounds containing two or more chlorine atoms, dichlorophenol and pentachlorophenol.

62. Laboratory study of surface aeration of anaerobic lagoons for odor control of swine manure.

Zhang,-R.H.; Dugba,-P.N.; Bundy,-D.S.

Trans-ASAE. St. Joseph, MI: American Society of Agricultural Engineers. Jan/Feb 1997. v. 40 (1) p. 185-190.

NAL Call Number: 290.9-Am32T

Descriptors: pig-manure. lagoons, aeration, odor-emission. anaerobic-treatment. ammonia, dissolved-oxygen. odor-abatement.

Abstract: Surface aeration of swine manure stored in anaerobic lagoons for odor control was experimentally studied in the laboratory. The effects of different aeration rates and depths on reduction in emission of odorous gases were determined for both continuous and intermittent aeration processes. Surface aeration was found to be effective for controlling odors of anaerobic lagoons. Continuous low rate aeration to maintain the dissolved oxygen in the surface liquid layer at 0.5 to 2.5 mg/L was effective for odor control but resulted in high ammonia emission rates. Intermittent aeration was found to be a feasible approach to minimize the energy requirement for aeration while still effectively controlling the odors of the manure.

63. Making economic sense of why swine effluent is sprayed in North Carolina and hauled in Iowa.

Roka,-F.M.; Hoag,-D.L.; Zering,-K.D.

Animal waste and the land-water interface. Boca Raton: Lewis Publishers, c1995. p. 545-552.

NAL Call Number: TD930.A55-1995

Descriptors: pig-manure. management, intensive-livestock-farming. waste-utilization. economics, north-carolina. iowa.

64. Managing North Carolina's livestock waste: challenges and opportunities.

Hoban,-Thomas-J.; Clifford,-William-B.

North Carolina Cooperative Extension Service.

[Raleigh, N.C.?]: N.C. Cooperative Extension Service, 1995. 27 p.

NAL Call Number: S655.H63--1995

Descriptors: Manure-handling-North-Carolina. Cattle-Manure-Handling-North-Carolina. Poultry-Manure-Handling-North-Carolina. Swine-Manure-Handling-North-Carolina.

65. Managing North Carolina's swine waste.

Hoban,-Thomas-J.; Clifford,-William-B.

North Carolina Cooperative Extension Service.

[Raleigh, N.C.?]: N.C. Cooperative Extension Service, 1995. 1 folded sheet (4 p.)

NAL Call Number: S655.H634--1995

Descriptors: Swine-Manure-Handling-North-Carolina.

66. Microbial activities during composting of spent pig-manure sawdust litter at different moisture contents.

Tiquia,-S.M.; Tam,-N.F.Y.; Hodgkiss,-I.J.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. Mar 1996. v. 55 (3) p. 201-206.

NAL Call Number: TD930.A32

Descriptors: pig-manure. litter, sawdust, composting, moisture-content. microbial-activities. oxygen-consumption. atp, temperature, air-temperature. biomass, carbon, nitrogen, oxidoreductases, enzyme-activity. correlation, environmental-factors.

Abstract: The changes in microbial properties, including total aerobic heterotrophs, O₂-consumption rate, ATP content, dehydrogenase activity and microbial biomass C and N of the spent pig-manure sawdust litter were examined during further composting. The effects of three moisture levels, 50% (pile A), 60% (pile B) and 70% (pile C), on the composting process were also evaluated. Piles A and B had very similar trends of change in temperature and microbial properties during the composting period but pile C was significantly different. A moisture content of between 50 and 60% can be considered as the optimal moisture level for further composting of the spent litter. In general, the total aerobic heterotrophs, O₂ consumption rate and ATP content of all piles increased dramatically during the thermophilic stage of composting, but then decreased slowly and were maintained at lower levels at the end of the composting process.

67. Modeling the effects of diet formulation on nitrogen and phosphorus excretion in swine waste.

Bridges,-T.C.; Turner,-L.W.; Cromwell,-G.L.; Pierce,-J.L.

Appl-eng-agric. St. Joseph, MI: American Society of Agricultural Engineers, Sept 1995. v. 11 (5) p. 731-739.

NAL Call Number: S671.A66

Descriptors: pigs, diet, modification, protein, phosphorus, nitrogen, excretion, pollution, simulation-models. pollution-control. sustainability.

Abstract: Two weight classes of growing-finishing swine were fed corn-soybean diets lower in protein and phosphorus to determine the reduction in nitrogen (N) and phosphorus (P) in swine

waste when compared to pigs fed a conventional diet. For the two weight classes, total N waste was reduced 32% and 25% while total P excretion was reduced 39% and 38%. The experimental results were used to calibrate the NCPIG model to predict N and P excretion levels. Model excretion values for the same diets showed similar trends in mineral reduction by diet, but were higher for urinary N when compared to observed values. The results of this project indicate that diet manipulation is a viable tool for U.S. swine producers in maintaining a sustainable U.S. swine industry.

68. Nitrogen and phosphorus forms in soils receiving manure.

Sharpley,-A.N.; Smith,-S.J.

Soil-sci. Baltimore: Williams & Wilkins Co., Apr 1995. v. 159 (4) p. 253-258.

NAL Call Number: 56.8-So3

Descriptors: agricultural-soils. pig-slurry. poultry-manure. cattle-manure. application-to-land. application-rates. nitrogen, phosphorus, nutrient-availability. inorganic-compounds. organic-compounds. movement-in-soil. losses-from-soil. land-productivity. long-term-experiments. oklahoma, texas.

69. Nitrogen and phosphorus removal for swine wastewater by ammonium crystallization and intermittent aeration process.

Liao,-C.M.; Maekawa,-T.; Feng,-X.D.

J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. New York, Marcel Dekker. 1995. v. B30 (5) p. 733-758.

NAL Call Number: TD172.J61

Descriptors: pig-slurry. chemical-treatment. aeration, nitrogen, phosphorus, biochemical-oxygen-demand. waste-water-treatment.

70. Nitrous oxide and methane emissions from pig slurry amended soils.

Sommer,-S.G.; Sherlock,-R.R.; Khan,-R.Z.

Soil-biol-biochem. Exeter: Elsevier Science Ltd. Oct/Nov 1996. v. 28 (10/11) p. 1541-1544.

NAL Call Number: S592.7.A1S6

Descriptors: nitrous-oxide. methane, emission, losses-from-soil. nitrification, denitrification, microbial-activities. silt-loam-soils. pig-slurry. application-to-land. soil-injection. surface-treatment. incorporation, air-pollution. global-warming.

71. On-farm composting feasible for disposal of swine carcasses.

McCaskey,-T.A.; Little,-J.A.; Krotz,-R.M.; Lino,-S.P.; Hannah,-T.C.

Highlights-agr-res. Auburn, Ala.: Agricultural Experiment Station of Auburn University, 1954, Spring 1996. v. 43 (1) p. 18-20.

NAL Call Number: 100-A11H

Descriptors: pigs, carcass-disposal. composting, techniques, odor-abatement. fertilizers, nutrient-content. waste-disposal. alabama.

72. Options for managing odor: a report from the Swine Odor Task Force.

Swine Odor Task Force.

North Carolina Agricultural Research Service.

[Raleigh, NC]: North Carolina Agricultural Research Service, North Carolina State Univ., [1995]

78 p.

NAL Call Number: TD930.2.O64--1995

Descriptors: Swine-Housing-Waste-disposal-North-Carolina. Swine-Housing-Odor-control-North-Carolina.

73. Organic and inorganic nutrients removal from pig slurry by water hyacinth.

Delgado,-M.; Guardiola,-E.; Bigeriego,-M.

J-environ-sci-health,-Part-A,-Environ-sci-eng. Monticello, NY: Marcel Dekker Inc. 1995. v. A30 (7) p. 1423-1434.

NAL Call Number: TD172.J6

Descriptors: eichhornia-crassipes. pig-slurry. uptake, chemical-oxygen-demand. ammonium-nitrogen. nitrate-nitrogen. biomass-production. climatic-factors. seasonal-variation. waste-water-treatment. pollution-control.

74. Performance of bedding materials in affecting ammonia emissions from pig manure.

Andersson,-M.

J-agric-eng-res. London ; Orlando: Academic Press, Nov 1996. v. 65 (3) p. 213-222.

NAL Call Number: 58.8-J82

Descriptors: pig-manure. litters, straw, peat, absorbents, newspapers, ammonia, odor-emission. measurement, deep-litter-housing. odor-abatement. nitrogen, ammonium-nitrogen. carbon-nitrogen-ratio.

75. Performance, water use and effluent output of weaner pigs fed ad libitum with either dry pellets or liquid feed and the role of microbial activity in the liquid feed.

Russell,-P.J.; Geary,-T.M.; Brooks,-P.H.; Campbell,-A.

J-sci-food-agric. Sussex: John Wiley & Sons Ltd. Sept 1996. v. 72 (1) p. 8-16.

NAL Call Number: 382-So12

Descriptors: feeds, feed-mechanisms. liquids, contamination, pig-feeding. pellets, water-use. lactobacillus, ph, coliform-bacteria. growth-rate. feed-evaluation. effluents, piglets,

Abstract: Forty eight and ninety six pigs weaned at 22.6 +/- 2.6 days, were allocated to two trials to study the effect of feeding post-weaning diets ad libitum, either as dry pellets (DF) or as meal mixed with water in the ratio 2.5:1 (LF). The trials, lasting 28 days, differed only in the type of trough used to present the liquid feed to the pigs. In both trials the daily gain of LF pigs over the 4 weeks of the trial was significantly ($P < 0.001$) better than that of the DF pigs. Daily gains for the two treatment groups were respectively 428 and 343 +/- 15 g day⁻¹ in Trial 1 and 454 and 397 +/- 10 g day⁻¹ in Trial 2. The feed conversion ratio (FCR) (corrected to fresh weight of dry feed) of LF pigs was significantly poorer ($P < 0.01$) than that of DF pigs in both trials primarily as a result of feed wastage by the LF pigs. FCR for the DF and LF pigs was, respectively, 1.31 and 1.89 + 0.05 in Trial 1. In Trial 2 improvements in the trough design reduced the difference in FCR. FCR for the DF and LF treatments was 1.37 and 1.44 +/- 0.02 respectively. In Trials 1 and 2 LF pigs used on average 76% and 35% more water than DF pigs. LF pig produced 12% (Trial 1) and 5.7% (Trial 2) more effluent per unit of liveweight gain than DF pigs. Microbiological examination of the liquid feed system demonstrated that the system acted as a fermenter.

76. Persistence of inoculated hepatitis A virus in mixed human and animal wastes.

Deng,-M.Y.; Cliver,-D.O.

Appl-viron-microbiol. Washington: American Society for Microbiology. Jan 1995. v. 61 (1) p. 87-91.

NAL Call Number: 448.3-Ap5

Descriptors: hepatitis-a-virus. survival, inactivation, pig-slurry. septic-tank-effluent. mixtures, risk, application-to-land.

Abstract: The persistence of hepatitis A virus (HAV) was determined both in mixtures of septic tank effluent (STE) with dairy cattle manure slurry (DCMS) and in mixtures of STE with swine manure slurry (SMS). HAV was consistently inactivated more rapidly in the two types of mixed wastes than in STE alone or in the control Dulbecco's phosphate-buffered saline (PBS). At 5 degrees C, the D values (time, in days, for a 90% reduction of virus titer) were 34.6 for the mixed STE and DCMS, 48.5 for the mixed STE and SMS, 58.5 for STE, and 217.4 for the Dulbecco's PBS control. At 22 degrees C, the D values were 23.0, 17.1, 35.1, and 90.1 for the four suspension media, respectively. A comparison of HAV inactivation in mixed wastes subjected to different treatments at the same pH and temperatures showed that the virus inactivation in the mixed wastes was related, at least in part, to microbial activity. In mixed STE and DCMS, the D values at 25 degrees C were 8.3 for raw mixed wastes, 15.1 for autoclaved

mixed wastes, and 9.6 for bacterium-free filtrate of raw mixed wastes; D values at 37 degrees C were 6.8, 10.1, and 7.0 for these three suspension media, respectively. In mixed STE and SMS, the D values at 25 degrees C were 8.1 for raw mixed wastes, 14.3 for autoclaved mixed wastes, and 9.1 for bacterium-free filtrate of raw mixed wastes; the D values at 37 degrees C were 6.8, 9.4, and 6.9 for the three suspensions, respectively.

77. PH and buffer component dynamics in the surface layers of animal slurries.

Sommer,-S.G.; Sherlock,-R.R.

J-agric-sci. Cambridge: Cambridge University Press. Aug 1996. v. 127 (pt.1) p. 109-116.

NAL Call Number: 10-J822

Descriptors: soil-amendments. pig-slurry. cattle-slurry. chemical-composition. carbon, inorganic-compounds. ammonia, nitrogen-content. volatile-compounds. fatty-acids. quantitative-analysis. carbon-dioxide. gas-exchange. temperature, ph, buffers, chemical-reactions. mathematical-models. equations.

78. Phosphate enrichment in the sandy loam soils of West-Flanders, Belgium.

Smet,-J.-de; Hofman,-G.; Vanderdeelen,-J.; Meirvenne,-M.-van.; Baert,-L.

Fertil-res. Dordrecht: Kluwer Academic Publishers. 1995/1996. v. 43 (1/3) p. 209-215.

NAL Call Number: S631.F422

Descriptors: arable-land. sandy-loam-soils. phosphorus, saturation, leaching, losses-from-soil. eutrophication, water-pollution. risk, pigs, intensive-livestock-farming. pig-slurry. liquid-manures. regional-surveys. belgium.

Abstract: The last three decades, pig breeding has evolved towards a specialised, large scaled, land independent bio-industry in the province of West-Flanders. Subsequently, in certain regions, very high amounts of liquid pig manure are produced each year. This pig slurry is used as a fertilizer at a rate which very often exceeds normal agricultural practices. Because of the nonequilibrium between the phosphorus crop requirements and the P-inputs, phosphates accumulate in the soil. However, the phosphate sorption capacity of a soil is limited. Once the sorption capacity is exceeded, phosphates will start leaching through the soil profile. Since, during winter, in these areas, the groundwater table is situated at a depth of less than 1.0 m, phosphate breakthrough might take place.

79. Phytotoxicity of fatty acids present in dairy and hog manure.

Edney,-N.A.; Rizvi,-M.

J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. New York, Marcel Dekker. 1996. v. B31 (2) p. 269-281.

NAL Call Number: TD172.J61

Descriptors: dairy-wastes. pig-manure. fatty-acids. phytotoxicity, sorghum, seed-germination. inhibition, alpha-amylase, enzyme-activity. application-to-land. waste-disposal.

80. Pig slurry amendment and herbicide coapplication effects on s-triazine mobility in soil: an adsorption-desorption study.

Businelli,-D.

J-environ-qual. Madison: American Society Of Agronomy,. Jan/Feb 1997. v. 26 (1) p. 102-108.
NAL Call Number: QH540.J6

Abstract: Amendments with pig slurry containing dissolved organic matter (PSDOM) and herbicide coapplication are agronomical practices that can influence the mobility of herbicides through the soil profile, thus enhancing the risk of groundwater pollution. Batch equilibrium experiments were conducted on a clay loam soil to quantify the influence of these practices on the sorption and desorption of three s-triazine herbicides. Soil adsorption and desorption capability for atrazine was reduced when it was applied with the other two s-triazines in the batch experiment solution. The PSDOM treatment immediately after atrazine application had a greater enhancing effect on its desorption than treatment with a 0.01 M CaCl₂ solution alone. To reduce the risk of groundwater s-triazine pollution, pig slurry should be applied to the soil before herbicide treatment.

81. The pollution of the Black Sea from livestock and steps towards its limitation.

Marinova,-S.M.

Water-sci-technol. Kidlington, Oxford, UK: Elsevier Science Ltd. 1995. v. 32 (7) p. 9-12.
NAL Call Number: TD420.A1P7

Descriptors: water-pollution. animal-wastes. phosphorus, potassium, nitrogen, pollutants, cattle-manure. pig-manure. liquid-manures. pollution-control. application-to-land. black-sea. bulgaria.

82. Poly(hydroxybutyrate-co-hydroxy-valerate) from swine waste liquor by *Azotobacter vinelandii* UWD.

Cho,-K.S.; Ryu,-H.W.; Park,-C.H.; Goodrich,-P.R.

Biotechnol-lett. London, UK.: Chapman & Hall. Jan 1997. v. 19 (1) p. 7-10.
NAL Call Number: QR53.B56

Descriptors: waste-utilization.

83. A preliminary study of piggery waste treatment by an upflow sludge bed anaerobic reactor and a packed bed anaerobic reactor.

Sanchez,-E.P.; Monroy,-O.; Canizares,-R.O.; Travieso,-L.; Ramos,-A.
J-agric-eng-res. London ; Orlando: Academic Press, Oct 1995. v. 62 (2) p. 71-76.
NAL Call Number: 58.8-J82

Descriptors: pig-slurry. waste-treatment. anaerobic-digestion. chemical-oxygen-demand.
pollution-control.

84. Quantification of ventilation on distribution of gaseous pollutants emitted from stored swine manure.

Liao,-C.M.; Bundy,-D.S.
J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. New York, Marcel Dekker. 1995.
v. B30 (6) p. 859-893.
NAL Call Number: TD172.J61

Descriptors: pig-manure. gases, pollutants, spatial-distribution. ventilation, air-flow. pig-housing. simulation-models. quantitative-analysis.

85. Reduction of H₂S/NH₃ production from pig feces by controlling environmentally conditions.

Chung,-Y.C.; Huang,-C.P.; Tseng,-C.P.
J-environ-sci-health-Part-A,-Environ-sci-eng-toxic-hazard-substance-control. Monticello, NY:
Marcel Dekker, Inc. 1996. v. A31 (1) p. 139-155.
NAL Call Number: TD172.J6

Descriptors: animal-wastes. pigs, storage, temperature, humidity, odor-abatement.

86. Reduction of odor and volatile substances in pig slurries by using pit additives.

Zhu,-J.; Bundy,-D.S.; Li,-X.W.; Rashid,-N.
J-environ-sci-health-Part-A,-Environ-sci-eng-toxic-hazard-substance-control. Monticello, NY:
Marcel Dekker, Inc. 1997. v. A32 (3) p. 605-619.
NAL Call Number: TD172.J6

Descriptors: odor-abatement. volatile-compounds. air-pollution. pollution-control.

87. Reduction of odorous compounds in fresh pig slurry by dietary control of crude protein.

Hobbs,-P.J.; Pain,-B.F.; Kay,-R.M.; Lee,-P.A.

J-sci-food-agric. Sussex: John Wiley & Sons Ltd. Aug 1996. v. 71 (4) p. 508-514.
NAL Call Number: 382-So12

Descriptors: diet, crude-protein. pig-slurry. odors, odor-emission. essential-amino-acids.
nitrogen, excretion, protein-balance. nutrient-intake. pigs.

Abstract: Two diets containing reduced levels of crude protein for both growing (35-65 kg) and finishing (65-95 kg) pigs were tested against standard commercial diets to determine changes in the odorants produced in fresh slurry. The experimental diets were formulated on a least cost basis using either a full commercial database or with restriction mainly to home-grown (UK) cereals and pulses. Major odorants responsible for pig odour from slurries were identified and their concentrations determined using gas chromatography-mass spectrometry. Five out of 10 odorants from slurries produced by growing pigs were significantly lower ($P < 0.05$) in concentration for each of the low crude protein diets compared with the commercial diet. Reducing dietary nitrogen and providing essential amino acids in an ideal protein ratio not only decreases the nitrogen excreted by the pig, but also reduces odorants produced in the resultant slurries.

88. Removal of nitrogen from swine manure wastewaters by ammonia stripping.

Liao,-P.H.; Chen,-A.; Lo,-K.V.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 54 (1) p. 17-20.

NAL Call Number: TD930.A32

Descriptors: pig-slurry. waste-water. waste-water-treatment. nitrogen, ammonia, aeration, temperature, ph.

Abstract: Laboratory-scale experiments were undertaken to investigate aeration and air stripping as methods for removing ammonia from swine wastewaters with high nitrogen concentrations. The effects of temperature, air to liquid flow ratio and pH were investigated using wastewaters with a range of solids concentrations and pH values. At a pH of 11.2, the aeration method took approximately 150 h to achieve 90% removal efficiency. This was achieved with temperatures of 22 degrees C and a low airflow rate of 1.15-1.60 l/min. At a comparable pH (11.5), the best results for the air-stripping method achieved 90% removal with only 7 h of treatment.

89. Research and extension activities in animal waste management: addendum to the report of the Swine Odor Task Force.

Swine Odor Task Force. North Carolina Agricultural Research Service. North Carolina Cooperative Extension Service.

[Raleigh, N.C.?]: N.C. Agricultural Research Service, N.C. Cooperative Extension Service, College of Agriculture and Life Sciences, North Carolina State University, [1995] 33 p.

NAL Call Number: TD930.2.S94--1995

Descriptors: Animal-waste-Research-North-Carolina. Animal-waste-Study-and-teaching-North-Carolina.

90. Restoration of productivity to a desurfaced soil with livestock manure, crop residue, and fertilizer amendments.

Larney,-F.J.; Janzen,-H.H.

Agron-j. Madison, WI: American Society of Agronomy, Nov/Dec 1996. v. 88 (6) p. 921-927.
NAL Call Number: 4-AM34P

Descriptors: triticum-aestivum. cattle-manure. composts, mixtures, wood-shavings. poultry-manure. pig-manure. crop-residues. alfalfa-hay. pisum-sativum. hay, barley-straw. organic-fertilizers. nitrogen-fertilizers. phosphorus-fertilizers. wheat-s traw. crop-yield. grain, soil-fertility. nitrate-nitrogen. eroded-soils. phosphorus, nutrient-uptake. dry-matter-accumulation. waste-utilization.

Abstract: Many agricultural fields on the semiarid Canadian prairies have areas of inherently low productivity associated with loss of soil quality due to erosion. This study compared the efficacy of various amendments in restoring productivity to a desurfaced fine-loamy, mixed Typic Haploboroll (Lethbridge series) in southern Alberta. In spring 1992, 14 amendment treatments (including livestock manures, crop residues, combinations of straw and chemical fertilizer, and fertilizer alone) were applied to a site where the Ap horizon (approximately 15-cm depth) had been mechanically removed to simulate erosion. The manures and crop materials were incorporated into the degraded surface on an equivalent dry-weight basis at 20 Mg ha⁻¹. The overall best amendments were hog manure, poultry manure, and alfalfa hay.

91. Safeguards against pathogens in Danish biogas plants.

Bendixen,-H.J.

Water science and technology: v. 30 no. 12.

Anaerobic digestion VII selected proceedings of the IAWQ 7th International Symposium on Anaerobic Digestion, held in Cape Town, South Africa, 23-28 January 1994. 1st ed. Tarrytown, N.Y.: Pergamon: Elsevier Science, 1995. p. 171-180.

NAL Call Number: TD420.A1P7-v.30-no.12

Descriptors: anaerobic-digestion. animal-wastes. animal-manures. biogas, methane-production. pathogens, indicator-species. streptococcus, risk, disease-prevention. inactivation, bacteria, viruses, animal-parasitic-nematodes. cattle-slurry. pig-slurry. denmark.

92. Simulated and measured effect of rectangular obstructions on carbon dioxide gas dispersion in a scaled swine building.

Hoff,-J.S.; Li,-J.; Tsao,-L.

Trans-ASAE. St. Joseph, MI: American Society of Agricultural Engineers. Sept/Oct 1995. v. 38 (5) p. 1519-1532.

NAL Call Number: 290.9-Am32T *Descriptors*: pig-housing. artificial-ventilation. carbon-dioxide. dispersion, air-flow. pigs, physical-models. mathematical-models. pig-manure. emission.

Abstract: Gas dispersion from shallow manure storage pits was experimentally measured and mathematically modeled in a 1:6-scale ventilation chamber. The chamber represents a geometrically scaled model of a production swine grower facility. Gas injection was simulated from shallow pits using carbon dioxide (CO₂). The results indicate significant differences in gas concentration between the animal-occupied zone (AOZ) and human-occupied zones (HOZ), especially at ventilation rates representative of mild weather conditions. AOZ CO₂ concentrations were 12 times higher than HOZ during minimum ventilation conditions and six times higher during mild weather ventilation conditions.

93. Solepur: a soil treatment process for pig slurry with subsequent denitrification of drainage water.

Martinez,-J.

J-agric-eng-res. London ; Orlando: Academic Press, Jan 1997. v. 66 (1) p. 51-62.

NAL Call Number: 58.8-J82

Descriptors: pig-slurry. biological-treatment. soil-treatment. drainage-water. waste-water-treatment. leachates, chemical-composition. water-quality. denitrification, lolium-perenne. nitrate-nitrogen. pollution-control. water-conservation. irrigation-water. brittany.

94. Spatial and seasonal distribution of organic amendments affecting methane emission from Chinese rice fields.

Wassmann,-R.; Shangguan,-X.J.; Tolg,-M.; Cheng,-D.X.; Wang,-M.X.; Papen,-H.; Rennenberg,-H.; Seiler,-W.

Biol-fertil-soils. Berlin, Germany: Springer-Verlag. 1996. v. 22 (3) p. 191-195.

NAL Call Number: QH84.8.B46

Descriptors: rice-soils. methane, emission, losses-from-soil. seasonal-fluctuations. fertilizers, mixtures, green-manures. rice-straw. pig-slurry. application-to-land. timing, organic-fertilizers. spatial-distribution. patterns, air-pollution. hunan.

Abstract: The effect of fertilizers on methane emission rates was investigated using an automated closed chamber system in Chinese rice fields (Hunan Province). Each of three experiments compared two fields treated with a first uniform fertilizer dose and a second fertilizer dose which was different for each of the two fields. The uniform fertilizer doses for both fields in each experiment comprised mineral (experiment 1), organic (experiment 2) and combined mineral plus organic components (experiment 3). In all three experiments the second fertilizer dose

comprised organic amendments for field 1 and no organic amendments for field 2. The rate of increase in methane emission with a given amount of organic manure was found to depend on the total amount of organic manure applied. A single dose of organic manure increased the emission rates by factors of 2.7 to 4.1 as compared to fields without organic manure (experiment 1).

95. Stability of porcine reproductive and respiratory syndrome virus in the presence of fomites commonly found on farms.

Pirtle,-E.C.; Beran,-G.W.

J-Am-Vet-Med-Assoc. Schaumburg, IL: American Veterinary Medical Assoc. Feb 1, 1996. v. 208 (3) p. 390-392.

NAL Call Number: 41.8-Am3

Descriptors: arterivirus, stability, survival, alfalfa, wood-shavings. straw, plastics, rubber, stainless-steel. water, buffers, saliva, urine, pig-slurry.

96. Studies on reducing ammonia and odor emissions from swine farms with use of biological waste air washing.

Lais,-Stephan.

Forschungsbericht Agrartechnik des Arbeitskreises Forschung und Lehre der Max-Eyth-Gesellschaft Agrartechnik im VDI; 293. Hohenheim: Arbeitskreises Forschung und Lehre der Max-Eyth-Gesellschaft Agrartechnik im VDI, 1996. 145 p.

NAL Call Number: S760.G3F67--Nr.293 Language: German

97. A study of the potential contribution of sedimentation to aerobic treatment processes for pig slurry.

Martinez,-J.; Burton,-C.H.; Sneath,-R.W.; Farrent,-J.W.

J-agric-eng-res. Orlando: Academic Press, June 1995. v. 61 (2) p. 87-96.

NAL Call Number: 58.8-J82

Descriptors: pig-slurry. aerobic-treatment. sedimentation, chemical-oxygen-demand. copper, zinc, manganese, separation.

98. Surface application of liquid swine manure: chemical variability.

O'Dell,-J.D.; Essington,-M.E.; Howard,-D.D.

Commun-soil-sci-plant-anal. Monticello, NY: Marcel Dekker Inc. 1995. v. 26 (19/20) p. 3113-3120.

NAL Call Number: S590.C63

Descriptors: pig-manure. liquid-manures. chemical-composition. nitrogen, phosphorus, potassium-. nutrient-content. temporal-variation. application-to-land. application-rates. optimization, zea-mays. crop-production.

Abstract: The determination of manure loading rates for crop production is complicated by the temporal variability in manure nutrient concentrations and the difficulty in obtaining representative samples on which to base application rates. The variation in nutrient concentrations in liquid swine manure obtained from an agitated anaerobic lagoon was examined during application to experimental plots. Grab samples were collected from a lagoon approximately two to four weeks prior to application and analyzed for nitrogen (N), phosphorus (P), and potassium (K). Based on the preliminary P analyses, swine manure application rates were computed. Manure from the lagoon was surface-applied to corn plots to provide P rates of 15, 30, and 60 kg P/ha. During application, each tankload of manure was sampled to determine P rates for each plot. The solids content of each manure load was highly variable as were the total concentrations of manure N and P. Potassium content of the manure was also related to the solids content, although not to the same extent as N and P. Manure application resulted in P rates of 17, 32, and 49 kg P/ha in 1992, while the 1993 rates were 5, 11, and 22 kg P/ha.

99. Survival of *Serpulina hyodysenteriae* in an effluent lagoon.

Olson,-L.D.

J-Am-Vet-Med-Assoc. Schaumburg, IL: American Veterinary Medical Assoc. Dec 1, 1995. v. 207 (11) p. 1470-1472.

NAL Call Number: 41.8-Am3

Descriptors: treponema-hyodysenteriae. survival, pig-manure. piggery-effluent. infectivity, swine-dysentery. pigs, drinking-water.

100. Sustainability issues of U.S. swine production.

Honeyman,-M.S.

J-anim-sci. Champaign, IL: American Society of Animal Science. June 1996. v. 74 (6) p. 1410-1417.

NAL Call Number: 49-J82

Descriptors: pigs, pig-farming. sustainability, pig-manure. agricultural-structure. rural-economy. pigmeat, meat-quality. application-to-land.

Abstract: The incorporation of livestock into agricultural systems ensures a more sustainable agriculture. Sustainable swine production systems are defined as those that combine production and management techniques to enhance profit and improve the ecological and socioeconomic surroundings. At the interface of sustainable agriculture and swine production are several levels of issues. Four levels of issues are the farm, the rural community, the society or consuming

public, and the ecosystem or environment. By examining each level, long-term sustainability issues for U.S. swine production emerge.

101. Swine manure and N-management systems: impact on groundwater quality.

Kanwar,-R.S.; Karlen,-D.L.; Camberdella,-C.; Cruse,-R.M.

Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri . St. Joseph, MI: ASAE, c1995. v. 2 p. 91-94.

NAL Call Number: TD365.C54-1995

Descriptors: nitrate, nitrate-nitrogen. leaching, drainage-water. groundwater-pollution. subsurface-drainage. pig-manure. application-to-land. no-tillage, chiselling, zea-mays. glycine-max. rotations, continuous-cropping. application-rates. strip-cropping. trifolium-alexandrinum. avena-sativa. medicago-sativa. crop-yield. soil-fertility. nitr ogen-fertilizers. iowa.

102. Swine manure cleanup criteria calculation for odor causing volatile organic compounds based on manure-to-ventilation air exposure pathway.

Liao,-C.M.; Liang,-H.M.; Singh,-S.

J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. Monticello, NY: Marcel Dekker, Inc. 1997. v. B32 (4) p. 449-468.

NAL Call Number: TD172.J61

Descriptors: pig-manure. air-pollutants. volatile-compounds. odor-emission. ventilation, exposure, air-pollution. pollution-control. pig-housing. mathematical-models.

103. Swine manure nitrogen conservation in storage using sphagnum moss.

Barrington,-S.F.; Moreno,-R.G.

J-environ-qual. Madison: American Society Of Agronomy. July/Aug 1995. v. 24 (4) p. 603-607.

NAL Call Number: QH540.J6

Descriptors: pig-slurry. liquid-manures. sphagnum, depth, storage, nitrogen-retention. nitrogen-content. evaporation, ammonia, volatilization, losses.

Abstract: Sphagnum peat moss, floating on swine manure in storage, was tested during three summers as an N conservation method in experimental tanks which measured 0.75 m in diameter and 3.0 m deep. Three depths of floating peat moss (0, 10, and 20 cm) were tested. The swine manure was analyzed prior to the tests and after 14 wk of storage, from June to mid-September. An average of 54, 60, and 76% total N conservation was observed for the respective treatments. Twenty centimeters of peat moss significantly reduced manure N losses and manure evaporation during storage.

104. Swine odor nuisance.

Vukina,-T.; Roka,-F.; Palmquist,-R.B.

Choices. [Ames, IA: American Agricultural Economics Assoc., First Quarter 1996. v. 11 (1) p. 26-29.

NAL Call Number: HD1751.C45

Descriptors: pig-farming. odor-emission. legal-rights. regulations, meat-and-livestock-industry. animal-wastes. north-carolina.

105. Swine waste disposal dilemma: a case study.

Mikkelsen,-R.L.

J-nat-resour-life-sci-educ. Madison, WI: American Society of Agronomy, Fall 1995. v. 24 (2) p. 169-172.

NAL Call Number: S530.J6

Descriptors: pig-slurry. waste-disposal. livestock-enterprises. management-education. agricultural-education. teaching-methods. case-studies. soil-fertility. nitrogen-cycle. grassland-management. nitrates, groundwater-pollution. lagoons, graduate-study. north-carolina.

106. Swine wastewater treatment by media filtration.

Szogi,-A.A.; Humenik,-F.J.; Rice,-J.M.; Hunt,-P.G.

J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. Monticello, NY: Marcel Dekker, Inc. 1997. v. B32 (5) p. 831-843.

NAL Call Number: TD172.J61

Descriptors: pig-slurry. waste-water-treatment. filtration, gravel, chemical-oxygen-demand. pollution-control.

107. Swine-lagoon seepage in sandy soil.

Westerman,-P.W.; Huffman,-R.L.; Feng,-J.S.

Trans-ASAE. St. Joseph, MI: American Society of Agricultural Engineers. Nov/Dec 1995. v. 38 (6) p. 1749-1760.

NAL Call Number: 290.9-Am32T

Descriptors: pig-slurry. lagoons, sandy-soils. coastal-plain-soils. seepage, groundwater, water-quality. pollutants, water-pollution. seasonal-fluctuations. transport-processes. monitoring.

Abstract: Swine manure anaerobic lagoons have sometimes been constructed in sandy soil without clay liners. Two swine manure, anaerobic lagoons located in sandy, coastal plain soil were investigated. Both continued to have significant seepage after 3.5 to 5 years of receiving waste. Monitoring wells indicated broad seepage plumes, and much variation in concentrations of several parameters with well location, time, and depth of well. The variations indicate the difficulty of accurately monitoring and quantifying seepage transport of nutrients, and the complexity of developing groundwater transport models to accurately predict transport and transformations of chemical compounds, particularly ammonium and nitrate nitrogen, at various distances from the lagoon.

108. Treatment of piggery wastewater by contact aeration treatment in coordination with the anaerobic fermentation of three-step piggery wastewater treatment (TPWT) process in Taiwan.

Su,-J.J.; Liu,-Y.L.; Shu,-F.J.; Wu,-J.F.

J-environ-sci-health-Part-A,-Environ-sci-eng-toxic-hazard-substance-control. Monticello, NY: Marcel Dekker, Inc. 1997. v. A32 (1) p. 55-71.

NAL Call Number: TD172.J6

Descriptors: pig-slurry. waste-water-treatment. pollution-control.

109. Treatment of swine wastes by a high-rate-modified-anaerobic-process (HRAMP).

Montalvo,-S.J.

Bioresour-technol. Oxford, U.K.: Elsevier Science Ltd. 1995. v. 53 (3) p. 207-210.

NAL Call Number: TD930.A32

Descriptors: animal-wastes. pigs, waste-treatment. anaerobic-digestion. cuba.

Abstract: In order to solve an actual problem existing in Cuba in swine waste treatment plants, a system called 'high-rate-modified-anaerobic-process' (HRAMP) was developed. It consisted mainly of the incorporation of a liquid anaerobic reactor (LAR) into the existing plants to treat the supernatant liquid coming from the sedimentation unit. In this work the main results were obtained over a 3-year period. A laboratory-scale comparison with conventional processes was made which showed that HRAMP was 16-50% more efficient than conventional plants. This better operation was due to the inoculum, that would be added daily to LAR from the anaerobic sludge-digester that already exists in piggery waste treatment plants.

110. Treatment of swine wastewater by constructed wetlands.

Szogi,-A.A.; Hunt,-P.G.; Humenik,-F.J.; Rice,-J.M.

Clean water, clean environment, 21st century team agriculture, working to protect water resources conference proceedings, March 5-8, 1995, Kansas City, Missouri. St. Joseph, MI:

ASAE, c1995. v. 2 p. 227-230.
NAL Call Number: TD365.C54-1995

Descriptors: wetlands, aquatic-plants. piggery-effluent. lagoons, waste-treatment. waste-water-treatment. ammonia, ammonium-nitrogen. nitrogen, phosphorus, nitrate-nitrogen. nutrient-uptake. wetland-soils. anaerobic-conditions. denitrification, n orth-carolina.

111. Use of residence time distribution for evaluation of gaseous pollutant volatilization from stored swine manure.

Liao,-C.M.

J-environ-sci-health,-Part-B,-Pestic-food-contam-agric-wastes. New York, Marcel Dekker. 1997. v. B32 (1) p. 127-145.

NAL Call Number: TD172.J61

Descriptors: pig-manure. air-pollutants. volatilization, air-flow. age, mass-transfer. mathematical-models. pig-housing.

112. Using riparian buffers to treat animal waste.

Hubbard,-R.K.; Vellidis,-G.; Lowrance,-R.; Davis,-J.G.; Newton,-G.L.

Animal waste and the land-water interface . Boca Raton: Lewis Publishers, c1995. p. 127-134.

NAL Call Number: TD930.A55-1995

Descriptors: riparian-forests. pig-slurry. filters, runoff, water-quality. water-pollution. pollution-control. bioremediation.

113. Volatile fatty acids as indicators of process imbalance in anaerobic digestors.

Ahring,-B.K.; Sandberg,-M.; Angelidaki,-I.

Appl-microbiol-biotechnol. Berlin, Germany: Springer Verlag. July 1995. v. 43 (3) p. 559-565.

NAL Call Number: QR1.E9

Descriptors: cattle-manure. pig-manure. mixtures, anaerobic-digestion. anaerobic-digestors. volatile-fatty-acids. methane-production. temperature, indicators, waste-treatment.

Abstract: In continuously stirred tank reactor experiments, with manure as substrate at thermophilic temperatures, the use of volatile fatty acids (VFA) as process indicators was investigated. Changes in VFA level were shown to be a good parameter for indicating process instability. The VFA were evaluated according to their relative changes caused by changes in hydraulic loading, organic loading or temperature. Butyrate and isobutyrate together were found to be particularly good indicators. Butyrate and isobutyrate concentrations increased significantly 1 or 2 days after the imposed perturbation, which makes these acids suitable for

process monitoring and important for process control of the anaerobic biological system. In addition it was shown in a batch experiment that VFA at concentrations up to 50 mM did not reduce the overall methane production rate. This showed that VFA accumulation in anaerobic reactors was the result of process imbalance, not the cause of inhibition, thus justifying the use of VFA as process indicators.

114. Volatilization of ammonia, nitrous oxide and nitric oxide in deep-litter systems for fattening pigs.

Groenestein,-C.M.; Faassen,-H.G.-van.

J-agric-eng-res. London ; Orlando: Academic Press, Dec 1996. v. 65 (4) p. 269-274.

NAL Call Number: 58.8-J82

Descriptors: pigs, deep-litter-housing. ammonia, nitrous-oxide. nitric-oxide. emission, pig-manure. litter, air-quality. comparisons, volatilization, nitrification, denitrification, finishing, artificial-ventilation.

115. Water contamination by ammonium nitrogen following the spreading of hog manure and mineral fertilizers.

Gangbazo,-G.; Pesant,-A.R.; Barnett,-G.M.; Charuest,-J.P.; Cluis,-D.

J-environ-qual. Madison: American Society Of Agronomy. May/June 1995. v. 24 (3) p. 420-425.

NAL Call Number: QH540.J6 *Descriptors:* zea-mays. phleum-pratense. trifolium-repens. ammonium-nitrate. application-rates. pig-manure. application-methods. split-dressings. losses-from-soil. ammonium-nitrogen. pollutants, runoff. drainage-water. seasonal-variation. quebec.

Abstract: Inappropriate fertilization practices in regions where livestock manure exceeds crop requirements may cause pollution by $\text{NH}_4^+\text{-N}$ during snowmelt. Annual and seasonal $\text{NH}_4^+\text{-N}$ losses were evaluated for three consecutive years from 45 m² corn (*Zea mays* L.) and timothy (*Phleum pratense* L.) and red and white clover (*Trifolium repens* L.) erosion plots that had annually received the recommended chemical fertilizer rates of 180 and 55 kg N ha⁻¹, respectively, plus hog manure at twice those rates. Total N applications for corn and forage were 540 and 165 kg ha⁻¹ except for a check plot receiving only fertilizer. The hog manure was surface-applied in three different ways: all in the fall, all in the spring, and in a split application with about one-half in each season. Total $\text{NH}_4^+\text{-N}$ losses in both runoff and drainage water from autumn application were greater than for the two other application methods for corn and the forages.

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