



CURRICULUM VITEA

EGBON EMMANUEL EGHE

Nationality:	Nigeria
State of Origin:	Edo
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Professional Status:	Organic/Environmental Chemist

Present Position:

Reader.

EDUCATION INSTITUTIONS ATTENDED WITH DATES

2002 – 2010	Ambrose Alli University, Ekpoma, Edo State
1992 – 1994	University of Benin, Benin City, Edo State
1989 – 1991	University of Benin City, Edo State.
1985 – 1988	College of Education, Ekiadolor, Benin City, Edo State
1978 – 1984	Baptist High School, Benin City, Edo State

ACADEMIC AND PROFESSIONAL QUALIFICATIONS WITH DATE

2010	Ph.D in Analytical/Environmental Chemistry
1994	M.Sc. in Organic Chemistry
1991	B.Sc (Education) in Chemistry
1988	Nigeria Certificate in Education
1984	West Africa School Certificate/General Certificate of Education

EDUCATIONAL DISSERTATION

Ph.D . Analytical/Environmental Chemistry, 2010.

Ambrose Alli University, Ekpoma

Dissertation; Studies on the use of organically modified clays for the removal of organic contaminants in water and waste water.

M.Sc. Organic Chemistry, 1994

University of Benin City, Edo State.

Dissertation: Synthesis of some Analogs of Hydantoin and Barbiturates

B.Sc. Ed. (Chemistry), 1991.

University of Benin, Benin City, Edo State

Dissertation: Effect of Extra Lesson on Performance of Secondary School Students in Chemistry (A Case Study of Edo State)

National Certificate in Education (N.C.E), 1998

Ekiadolor, Benin City.

Dissertation: Ecological Study of selected Flora and Fauna in Ekiadolor

MEMBERSHIP OF PROFESSIONAL BODY

2011	America Chemical Society (ACS)
2008	International Union of Pure and Applied Chemistry (IUPAC)
2007	Institute of Chartered Chemistry of Nigeria (ICCON)
2000	Chemistry Advancement Society (CAS)
1999	Chemistry Society of Nigeria (CSN)

MEMBERSHIP OF OTHER BODIES

2017	Rotary Club International (District 9141 Ekpoma)
2012	Knight of St. John International (KSJI)
2002	Road Accidental Prevention Club of Nigeria (RAPCON) (Patron)
1996	Junior Engineering, Technology and Science Club (JETS) (Patron)
1996	Justice Development and Peace Commission (JDPC)
1994	Reader Club (Patron)

PAST/PRESENT OFFICIAL RESPONSIBILITY

1. Course Level Adviser	2003 - 2007
2. Faculty Representative	2008 – 2012
3. Examination Officer	2010 – 2012
4. Public Relations Officer, Chemistry Society Of Nigeria (CSN), Edo State Chapter	2008 – 2012
5. Member, Faculty Research Committee	2012 – 2017
6. The Secretary General, Chemical Society Of Nigeria (CSN) Edo State Chapter	2017-till date

- | | |
|--|----------------|
| 7. Financial Secretary, Chemistry Advancement Society (CAS), AAU – Ekpoma, Edo State | 2012 – 2014 |
| 8. Staff Adviser Student Chemical Society (SCSN) | 2008 - 2014 |
| 9. Course Level Adviser | 2009 - 2013 |
| 10. Ag. HOD Department of Chemical Sciences
Samuel Adegboyega University, Ogwa | 2014 – 2015 |
| 11. Member Post graduate committee (FNS) | 2015 – 2017 |
| 12. Course Level Adviser | 2015 – 2017 |
| 13. Ag. HOD Dept of Chem (presently) | 2016-till date |

EMPLOYMENT/PROFESSIONAL EXPERIENCE

NYSC

IKOYI

Community Officer/Orire Local Government Area, Oyo state.

COURSES TAUGHT:

Undergraduates: CHM101 – General Chemistry I, CHM102 – Practical Chemistry I (and coordinator 2000 – 2010), CHM112 - Practical Chemistry II, CHM203 – Organic Chemistry II, CHM212- Polymer Chemistry I, CHM214 – Radio & Nuclear Chemistry, CH303 Organic Chemistry III, CHM 308-Natural Products Chemistry I, CHM405 – Organic Synthesis, CHM 413- Physical Organic Chemistry , CHM 414 – Natural Product Chemistry II, CHM433 – Heterocyclic Chemistry and CHM 703 –Poly Functional And Aromatic compounds Chemistry.

POSTGRADUATE SUPERVISION

1. Effect of Hexadecyltrimethyl Ammonium Bromide Treated Clay on the properties of Natural Rubber Vulcanisate –**Wilson Onoriode (2012)**
2. Waste Water Treatment Using LaurlySulphate – Clay as Adsorbent – **IkienuwaOsasumwen Samuel (2013)**
3. Comparative Assessment of Nicotine content in some Cigarettes (Tobacco)– **Akinyeni, Oluwatosin Augustine2013**
4. Treatment of Waste Water Using Quaternary Ammonium Surfactant Modified clay – **Obrifor, Ese Bright (2013)**

M.SC GRADUATES

1. Characterization and Treatment of Rubber processing and Pharmaceutical Effluent, Using, *Jatropha gossypifolia* stem latex –**Aigbojie, Aibhuedafe Sherry (2015)**
2. Evaluation of the food values and Phytochemical Constituents of some selected Medicinal plants –**Jimah, Abdulrahman(2015)**
3. Nutritional Evaluation and Phytochemical Properties of Wild Yam *Discorea villosa* – **Jide, Alfred Olaseeni(2016)**

Ph.D

Studies on the Properties of *Hura Crepitans* Seed Oil and its catalytic trans esterification conversions. **Aigbefo, Victor Ehi (2016)**

CURRENT

MASTER OF SCIENCE (M.SC) GRADUATES ;

1. Theses Title: The Use Of Modified Clay In Storm Water Treatment
Student: **Adesuyi A.T. (2015)**
2. Thesis Title: Comparative Studies On The Phytochemical Antibacterial, Antioxidant Properties In the Plants Parts Of *Anacardium Occidentale*, *Psidium Guajava*, *Phyllanthus Amarus* And *Rauwolfia Vomitoria*. Student: **Olayiode, E. Y. (2016)**
3. Thesis Title: Investigation of the Rheological And Physico – Mechanical Properties Of Rubber Seed Shell And Palm Kernel Shell-Filled Natural Rubber Vulcanizate.
Student: **Udokpoh N. U. ((2016).**
4. Thesis Title: The Cure Behaviour And Mechano-Physical Properties of Vulcanisate Filled with Powdered Coconut Fibre.
Student: **Onoriode W. (2016).**

RESEARCH INTEREST

- Sourcing , sorting and analyses of clay minerals
- Clay mineral modification & using different surfactants
- Utilization of clay minerals as coagulants acids.
- Utilization of clay minerals in pharmaceutical drug formulation'
- Utilization of clay in health matters'
- Utilization of clay and modified clay minerals in waste water treatment
- Water waste/ Water analyses'
- Storm water management'
- Determination of proximate and minerals composition of local herbs work and information '
- Collaborative Research and optimizing local herbs in health care treatment and management'

- Extraction and characterization of oils ; utilization and modifications.

. Syntheses of Analogs Of Hydantoin (BARBITURATES).

CONFERENCE/WORKSHOP ATTENDED

1. Akwa 2000, 23rd Annual International Conference of the Chemical Society of Nigeria (CSN) at Anambra State University Akwa, theme “Chemistry and Chemical Technology for Poverty Alleviation.
2. Abuja 2001, 24th Annual International Conference of the Chemical Society of Nigeria (CSN) at Nicon Hilton Hotel, Abuja Nigeria. Theme: “Chemistry and Sustainable Economic Development in Nigeria”.
3. Benin 2001, Annual Technical Conference/AGM “Rubber Con 2001” Polymer Institute of Nigeria (PIN). Held at Saidi Centre, Murtala Mohammed Way, Benin City. Theme: “Meeting the Challenges of Change: The Role of Technology in the Rubber Industry”
4. Ekpoma, 2002. 15th Annual Conference of Biotechnology Society of Nigeria (BSN) Held at Ulta Modern Lecture Theatre, Ambrose Alli University, Ekpoma, Edo State, Nigeria. 31st July – 3rd August, 2002.
5. Ekpoma 2005, 1st ChemTech Conference Edo State Chapter of Chemical Society of Nigeria, Held at: The Library Complex Ambrose Alli University, Ekpoma, Edo State, Nigeria. 29th July, 2005.
6. Iyanomo 2007, 3rd Annual Chemtech Conference, Chemical Society of Nigeria (CSN) Edo State Chapter, Held at New Conference Hall, Rubber Research Institute of Nigeria, Benin City, Edo State. Theme: Chemistry and the Rubber Industry Thursday, 26th July, 2007.
7. ASOCHEM 2007, 30th Annual International Conference for Chemical Society of Nigeria (CSN) Held at merit House, Maitama, Abuja. Nigeria. Theme: “Chemistry, A Key Driver For National Development and Growth” 24th – 28th September, 2007.
8. DELTACHEM 2008, 31st Annual Conference of Chemical Society of Nigeria Held at Petroleum Training Institute (PTI) Conference Centre Complex, Effurun – Warri, Delta State, Nigeria. Theme: “Strategic Re-Positioning of Chemistry for National Development” 22nd – 26th September 2008.
9. ICCON 2008. Institute of Chartered Chemist of Nigeria MANDATORY TRAINING WORKSHOP. “Principles of Chemical Management and “Principles of Environmental Impact Assessment”. Held at Lagos Airport Hotel, Ikeja, Lagos. 21st – 22nd October, 2008.

10. IPAN 2009. Institute of public Analyst of Nigeria, 9th MANDATORY TRAINING WORKSHOP. Theme: Environmental Analyst for Sustainable Development Held at Lagos Airport, Hotel, Ikeja, Lagos. Tuesday 28th and Wednesday 29th April, 2009.
11. OGUN 2012. 33rd Annual International Conference of Chemical Society of Nigeria (CSN).Held at Ogun State Cultural Centre Kuto. Abeokuta 20 – 24th September, 2010.
12. IYONOMO 2011. 5th Annual ChemTech Conference 2011. Theme: Sustainable Green Chemistry and Rubber Industry. Held at Conference Hall, Rubber Research Institute of Nigeria, KM 19, Benin-Sapele Highway, Iyanomo Benin City, Edo State, Nigeria. Thursday, 28th July, 2011.
13. KWARA 2011. 34th Annual International Conference of Chemical Society of Nigeria (CSN) Theme: Chemistry and the Millennium Development Goal. Held at Main Auditorium, University of Ilorin, Ilorin Nigeria. September 19th – 23rd, 2011.
14. GHANA 2011. International Conference on Research and Capacity Building (IRCAB). Theme: “Attaining Africa’s 21st Century Development Goals”. Held At Theatre Conference Hall, University of Ghana, East Legion, Accra – Ghana. September 15th – 16th, 2011
15. BENIN 2012. 6th Annual ChenTech Conference 2012. Theme: The Role of Chemistry in National Transformation. Held at 500LT Faculty of Physical Sciences, University of Benin, Ugbowo – Lagos Road. Thursday 26th July 2012.
16. BENIN 2012. Polymer Institute of Nigeria 23rd Annual Technical Conference/AGM. Theme Adding Value to Nigeria’s Polymeric NATursl Resources for Sustainable Economic Development Held at Best Western Homeville Hotel Evbuomwan Street, Off Sapele Road, Etete, Benin City, Edo State, Nigeria. Wednesday 24th – Friday 26th October, 2012.
17. EKPOMA 2016.TEEAL/AGORA. ITOCA (Information Training and Outreach Centre for Africa) 7th – 9th June, 2016 at Ambrose Alli University, Ekpoma

ABSTRACT

SYNTHESIS OF SOME ANALOGS OF HYDANTOIN- POTENTIAL ANTI-CONVULSANT AGENTS.

BY

Egbon, E. E. * Ogbeide, N. O. and * Ejimadu, I. M.
Chemistry Department Ambrose Alli University Ekpoma -
Edo State.

*Chemistry Department University of Benin, Benin City

ABSTRACT

The following thiobarbituric acids;

(i) *N, N - Bis (3-nitrophenyl) -2- thiobarbituric acid [mp = 244⁰ C, R_f 0.68 (10% Chloroform/Acetone) 20.4% yield]*

(ii) *N, N-Bis (2, 4-dichlorophenyl) -2- thiobarbituric acid [mp = 281⁰ C, R_f = 0.76 (10% Chloroform/Acetone); 30.92% yield]*

(iii) *N, N-Bis (2, 4-dichlorophenyl) -2- thiobarbituric acid [mp= 317⁰ C; R_f = 0.87 (10% Chloroform/Acetone); 39.778% yield were synthesized from thiourea derivatives when treated with diethyl malonate in Benzene containing KOH and under reflux. The thiourea derivatives themselves were obtained by the reaction of substituted aniline and carbon disulphide in pyridine (with KOH) at reflux. Infrared absorption spectra of the thiobarbituric acids of (i.), (ii) and (iii) were obtained and showed the expected absorption bands of the groups present and these are presented.*

The details of other synthesis analogs made in this project are also presented.

Equilibrium isotherm analysis of the sorption of congo red by palm kernel coat

Research Article

Nurudeen A. Oladoja^{1*}, Isaac A. Ololade¹, Justice A. Idiahe²,
Emmanuel E. Egbon³

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²Department of polymer Technology, Auchi Polytechnic, Auchi, PMB 234312001, Nigeria

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Received 3 November 2008; Accepted 6 April 2009

Abstract: The ability of Palm Kernel Coat (PKC), a waste agricultural product, in the abstraction of Congo Red (CR), an anionic dye, from aqueous solution was studied. The effects of sorbent dose and temperature were studied using batch sorption system. Isotherm experiments were conducted and the data obtained were fitted with different equilibrium isotherm equations namely, Langmuir, Freundlich, Dubinin-Radushkevich (D-R), Temkin, Harkins–Jura and Halsey isotherm equations. The Langmuir isotherm equation gave the best description of the sorption process and the maximum saturated monolayer sorption capacity of the PKC for CR was 79.37 mg g⁻¹. Harkins–Jura isotherm equation gave the poorest description of the sorption process. The linear form of the Langmuir equation was used to analyze the data obtained when the sorbent dosage was optimized by method of continuous variation. The results obtained showed that the equilibrium monolayer sorption capacity, q_m , of the PKC for CR decreased (79.37–17.07 mg g⁻¹) with an increase in sorbent dosage. The relationship between the dimensionless parameter, K_R , and initial concentration, C_0 , showed that the sorption of CR was favored at higher initial dye concentration and PKC dosages than the lower ones. The thermodynamic parameters, such as change in the free energy, the enthalpy and the entropy, were also evaluated. The thermodynamic analysis showed that the sorption is spontaneous and exothermic.

Keywords: Equilibrium • Isotherm • Dye • Palm kernel coat • Sorption • Monolayer

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Sorption of Cu (II) ion from aqueous solution by scrap tyre

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Received 1 April 2009; Accepted 7 December 2009

ABSTRACT

The use of Scrap Tyre (ST) for the sorption of Cu (II) ion from aqueous solution has been studied in a batch experiment. Investigation includes the effect of initial Cu (II) ion concentration and agitation speed. Three kinetic models (Pseudo first order, pseudo second order and Elovich kinetic models), were employed to predict the overall rate constant of sorption, the equilibrium sorption capacity and the initial sorption rate. The equilibrium sorption of Cu (II) ion by ST was analysed using Langmuir, Freundlich and Temkin isotherm models. The monolayer sorption capacity (mg/g) of ST for Cu (II) ion was 34.84. Thermodynamic parameters were calculated and the sorption process was found to be spontaneous and exothermic. The use of ST as a sorbent in Cu (II) ion attenuation in wastewater shall help to reduce the cost of treating Cu (II) ion bearing wastewater and to curtail the negative environmental impact of ST as a solid waste.

Keywords: Adsorptions; Copper ion; Scrap tyre; Mass transfer; Intraparticle; Liquid film

AN OVERVIEW OF ANAEROBIC SYSTEMS FOR DOMESTIC AND INDUSTRIAL SLUDGE TREATMENT

Asia, I. O. Egwaikhide, P. A. Ize-Iyamu, O.K . and **Egbon, E. E.**

Department of Chemistry, Ambrose Alli University, P. M. B. 14, Ekpoma Nigeria

(Accepted 15th September, 2003)

ABSTRACT

The increasing global concern on the environment demands that wastes should be properly managed in order to minimize and possibly eliminates their potential harm to public health and the environment. Amongst the various practical treatment method, anaerobic digestion is often the most attractive solution for treatment of sludge due to the following advantages: a high BOD and COD reduction, a high solids reduction, reduction of nitrates and phosphates, production of energy as biogas, production of a bio-fertilizer, small production of already stabilized biological sludge that can be used as nutrients, lower capital investment and operating cost. In Nigeria, besides the inherent advantages, climatic conditions are favourable and there is a considerable capacity to develop and optimize the process in research institutions and universities.

Built environment journal, vol 1 no 2, July 2005

Built environment journal, vol 1 no 2, July 2005

ADSORPTION OF PHENOLS FROM AQUEOUS SOLUTION
USING MODIFIED KAOLINITE

E.E. Egbon, O. K. Ize-Iyamu, I. O. Asia, P.A Egwakhide.

Ambrose Alli University Ekpoma,

Edo State,

Nigeria

ABSTRACT:

Widespread contamination of soil and groundwater by many synthetic organic chemicals has been recognized as an issue of growing importance in recent years. Phenoxy compounds when added to the soil may react with the soil clay minerals. This study concerns such reactions. Results obtained show that these organic molecules are strongly sorbed by the (kaolinite) clay minerals both by raw clay and organic modified one, with the later exhibiting far better sorption inter phase than the former.

Proximate and Mineral Composition of Mucuna Pruriens

E.E. Egbon*, E.O. Jatto, I.O. Asia and O.K. Ize-Iyamu.

Department of Chemistry, Ambrose Alli University, Ekpoma

(Email: egbon4@yahoo.com)

*Corresponding Author:

ABSTRACT

The leaves of Mucuna pruriens (Devils beans) were studied and the proximate evaluation and composition of some of the mineral nutrient were out. The aim as to find out why pregnant women and anaemic patients consume leave extract of this plant. The results show viz: Crude protein, 4.13% \pm 0.06, Crude fat 0.01% \pm 0.00, Crude fibre 10.17% \pm 1.62, Carbohydrates 60.93% \pm 1.22 with converted fat to fatty acid and metabolisable energy of 0.008% and 103.58KJ/100mg respectively. While mineral components, which were determined using appropriate analytical tools were measured in mg/100g, viz: Na=31.57% \pm 0.2f0, K=38.19% \pm 0.31, Mg=18.13% \pm 0.5, Ca=22.01% \pm 0.09, Mn=3.17% \pm 0.019, Zn=17.28% \pm 0.04, P=55.09 \pm 0.28, Fe=8.47 \pm 0.26. These results show a high metabolisable energy value with low fat to fatty acid value and remarkable high iron (Fe) content in the sample tested.

COMPARATIVE STUDIES ON THE TREATMENT OF BREWERY SLUDGE USING LOCALLY SOURCED AND CONVENTIONAL COAGULANTS.

Ize-Iyamu, O.K¹ Eguavoen, I.O², Asia, I.O³, **Egbon, E.E.**⁴, Ize-Iyamu, O.C⁵, Ebessunun B⁶

Department of Chemistry, Faculty of Natural Sciences,
Ambrose Alli University, Ekpoma, Edo State, Nigeria.

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Received August 11 2009 Accepted September 25 2009

ABSTRACT

*Composite sampling was done in the collection of sludge from the Brewery. The collected sludge samplers were characterized physicochemically according to standard procedures and were each found to have pollution potentials on the basis of some parameters determined, amongst which were COD, Turbidity, BOD, and Heavy metals. The values of these pollutant indicators were quite high, varying from one industry to another. Optimum dosage of the locally sourced coagulant, *Jatropha gossypifolia* stem latex and the conventional coagulant, alum were determined and were found to be 1.00ml for *Jatropha gossypifolia* stem latex at a pH of 6.7 and 3.80gm for alum at pH 4.3 respectively. The sludge samples were treated using the optimum coagulant dosages proportionally. The results obtained show that, there were reductions in pollution indicators as observed from the values of the parameters determined, thus, an improvement on the quality of the sludge samples. In the sludge treated with the locally sourced coagulants, there was 78.28%, 78.91% and 88.25% reduction in the COB, BOD and Turbidity. The total solid and suspended solids increased by 22.24% and 14.47% respectively, while in the treatment with the conventional coagulant, COD BOD and Turbidity reduce by 91.00%, 93.00% and 86.78% respectively. The total and suspended solids increased by 26.46% and 20.85% respectively. A comparison of the locally sourced coagulant with the conventional ones showed that it was not only as good but also be possible replacement for the conventional coagulant.*

Keywords: Sludge, *Jatropha gossypifolia*, Alum, Pollution.

<http://www.akamaiuniversity.us/PJST.htm>

Characterization and Treatment of Sludge from the Brewery using Chitosan

Osaro K. Ize-Iyamu, Ph.D.^{1**}; Osayanmo Eguavoen, Ph.D.¹; Micheal Osuide, Ph.D.¹; **Emmanuel E.Egbon, Ph.D.¹**; Oghomwen C. Ize-Iyamu, B.Sc.^{2*}; Vincent O. Akpoveta, M.Sc.¹; and Oscar O. Ibizubge, B.Sc.¹.

¹Department of Chemistry, Faculty of Natural Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria.

² Department of Chemistry, Faculty of Sciences, University of Benin, Benin City, Edo State, Nigeria.

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ABSTRACT

Sludge samples were collected from the brewery (composite sampling type). The collected sludge samples were characterized physicochemically according to standard procedures and were each found to be polluted on the basis of some parameters determined, amongst which are COD, Turbidity, and BOD. Triplicate determinations were done in each case and the mean values obtained from statistical evaluation using the Tukey-Kramer multiple comparison tests. The values obtained for sludge were found to be 2072 mg/l, 1034 NTU. and 640mg/l for COD, Turbidity, and BOD, respectively. The Total Solids (TS) and Suspended Solids (SS) were 7307.50 mg/l and 2067.50 mg/l, respectively. Optimum dosage of the coagulant determined was 1.50 ml of 1% chitosan solution/100ml sludge. On the basis of this, the sludge was treated proportionally and the treated sludge sample, characterized. From the results obtained, there were significant reductions ($p < 0.05$) in pollution as indicated from the values of the parameters determined, thus, an improvement on the quality of the sludge samples with 81.48%, 81.72%, and 88.27% reduction in the COD, BOD, and Turbidity, respectively. The TS and SS increased by 29.01% and 18.73%, respectively. Chitosan was found to be effective at low levels, its effectiveness is less pH dependent and does not pose problems in terms of residual metal contamination and are generally more biodegradable, therefore more environmental friendly. It is ready availability and cheap. The use of the coagulant for the treatment of sludge can be so recommended as the treated sludge could either be used as soil conditioners/enhancers, land filling/reclamation or added to other materials for block making. Studies are underway in their use in the treatment of industrial effluent.

(Keywords: sludge, biological oxygen demand, BOD, chemical oxygen demand, COD, turbidity, chitosan, coagulant)

TREATMENT OF WASTE WATER FROM FOOD INDUSTRY USING CLAY

E.E. Egbon*, J.E. Ebhoaye, I.O. Asia, O.K. Ize-Iyamu, I.E. Egbon, and M.J. Ehigbor

Department of Chemistry, Faculty of Natural Sciences, Ambrose Alli University,
Ekpoma, Edo State.

Abstract

The waste water samples were collected using composite sampling technique from a fast food centre in Ekpoma and characterized physic-chemically according to standard procedures and were found to have pollution potentials. The samples were treated clay in a batch system the samples showed a colour change from brown (before treatment) to a very light brown (after treatment). There was reduction in turbidity values from 296.43-113.60 NTU; conductivity, 110.00-55.84 mscm⁻³ and dissolved solids, 77.40-17.23 mg/l. The percentage reduction of COD AND BOD was 78.0% and 79.09% respectively. The study also shows that TS and phepol had percentage reduction of 76% and 58% respectively. The investigation shows that clay is a potential substance for adsorption of environment pollutants such as Pb, Cd, Cu, Zn and Cr which were reduced to below detectable levels.

Keywords: Clay, pollutants, wastewater, adsorption.

FOOD INDUSTRY WASTEWATER TREATMENT USING SURFACTANT MODIFIED CLAY

E.E. Egbon, J.E. Ebhoaye, I.O. Asia, O.K. Ize-Iyamu, I.E. Egbon, and M.J. Ehigbor

Department of Chemistry, Faculty of Natural Sciences, Ambrose Alli University, Ekpoma,
Edo State.

Abstract

Wastewater was collected from a fast food centre in Ekpoma, using composite sampling technique. The wastewater was physic-chemically characterised according to standard procedures before treatment using hexyldecyltrimethylammonium bromide (HDTMAB) modified clay in a batch system. The results obtained showed that there were reductions in pollution indicators as observed from the values of the various of the various pollution parameters investigated; an appreciable improvement on the quality of the water. The colour of the wastewater changed from dark brown to light brown after treatment. There was reduction in turbidity values from 296.43-1.07 NTU; Colour, 8.90-0.08 and dissolved solids, 77.40mg/l-8.67mg/l. Percentage reduction of COD AND BOD, phenol, oil and grease were 76.6%, 78.4%, 98.2% and 84.04% respectively. Traces of heavy metals were reduced to below detectable levels. The results from investigation showed that surfactant modified clay can be effective in the treatment of wastewater.

Keywords: Clay, surfactant, pollutants, wastewater, adsorption.



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237.244

Research Article

Characterization and Treatment of Sludge from the Brewery Using *Jatropha gossypifolia* Stem Latex

Ize-Iyamu, O.K¹., Eguavoen, I.O²., Akpoveta O.V³ Osakwe S.A⁴ Egbon, E.E⁵.,
Ize-Iyamu and O.C⁶., Ibizugbe, O.O⁷

1, 2, 3, 5, 6, 7 Department of Chemistry, Faculty of Natural Sciences,
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State University, Abraka, Delta State, Nigeria.

Received: 21 July 2012; **Revised:** 12 September 2012; **Accepted:** 17
September 2012

Abstract: Sludge according to the US Environmental Protection Agency (EPA) defined sludge as the semi – liquid residue or slurry remaining from treatment of industrial water and wastewater. Composite sampling was done in the collection of sludge from a Brewery. Locally sourced natural coagulant of plant origin, *jatropha gossypifolia* stem latex was also collected. The stem latex is commonly used by people in this part of the country to stop bleeding from minor cuts, injuries and bruises. The collected sludge sample was characterized physicochemical according to standard procedures and was

found to have high pollution potentials on the basis of some parameters determined, amongst which COD, Turbidity and BOD are. The values were found to be

1034.00NTU, 640.00mg/l and 2072.19mg/l for Turbidity, BOD and COD respectively. The Total Solids (TS) and Suspended Solids (SS) were 7307.50mg/l and 2067.50mg/l respectively. Optimum dosage of the coagulant was determined for the *jatropha gossypifolia* stem latex and was 1.00 ml at pH of 6.7. On the basis of this, the sludge was treated and the treated sludge sample, characterized. Triplicate determinations were done in each case and the mean values and standard deviations obtained from statistical evaluation using the Tukey-Kramer multiple comparison tests. From the results obtained, there were significant reductions ($p < 0.05$) in pollution in measured parameters indicated by the values of the parameters determined, thus, an improvement on the quality of the sludge samples with 78.28%, 78.91% and 88.25% reduction in the COD, BOD and Turbidity in the treated sludge sample. The total and suspended solids increased by 22.24% and 14.47% respectively. The *jatropha gossypifolia* stem latex was also effective at low levels, its effectiveness is less pH dependent and does not pose problems in terms of residual metal contamination and are generally more biodegradable, therefore more environmental friendly. It is readily available, cheap and easy to handle. The use of the coagulant for the treatment of sludge can be so recommended.

Keywords: Sludge, *Jatropha gossypifolia*, Pollution,

PHYSICOCHEMICAL TREATMENT OF BREWERY SLUDGE WITH LOCALLY SOURCED COAGULANTS (CHITOSAN AND CLAY)

Ize-Iyamu, O.K¹., Eguavoen, I.O¹., **Egbon, E.E¹**., Ize-Iyamu, O.C²., Azih, M.C¹.,
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ABSTRACT

One week composite sampling was done in the collection of sludge from the Brewery. Locally sourced coagulants, chitosan and clay were also collected. The collected sludge sample was characterized according to standard procedures and values of some of the parameters; Turbidity, BOD and COD were found to be 1034.00 ± 4.10 NTU, 640.00 ± 4.00 mg/l and 2072.19 ± 4.55 mg/l respectively. The Total Solids (TS) and Suspended Solids (SS) were 7307.50 ± 3.60 and 2067.50 ± 4.20 mg/l respectively. This portends pollution. Optimum dosage determined for the combined/mixed coagulants was found to be 2.40ml of 1% chitosan solution combined with 2.40g of clay per 100ml sludge at pH of 6.7. On the basis of this, the sludge was treated and the treated sludge sample, characterized. Triplicate determinations were done in each case and the mean values and standard deviations obtained from statistical evaluation using the Tukey-Kramer multiple comparison tests. From the results obtained, there were significant reductions ($p < 0.05$) in pollution in measured parameters of the sludge samples with 88.54 %, 89.81 % and 93.20 % reduction in the COD, BOD and Turbidity in the treated sludge sample, thus an improvement in the quality of the sludge in terms of pollutant load. The total and suspended solids increased expectedly, by 26.99% and 21.40 % respectively. The synergistic effects of the combined coagulants were very evident in the results obtained. Locally sourced coagulants posses numerous advantages including their less pH dependence and do not pose challenges in terms of residual metal contamination and are generally more biodegradable, therefore more environmental friendly. They are readily available, cheap and easy to handle. The use of the coagulants for the treatment of sludge and indeed where coagulation and flocculation is desirous can be so recommended.

Keywords: Sludge, Chitosan, Exoskeleton, Clay, Pollution, Synergistic.



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The Use of *Jatropha Gossypifolia* Stem Latex and Chitosan in the Treatment of Brewery Sludge

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Category: Research Paper

Abstract:

Sludge, the settleable solids separated from liquids during various processes was collected by composite sampling method from the Brewery. Locally sourced natural coagulants, *jatropha gossypifolia* stem latex and chitosan were also collected. The collected sludge sample was characterized physicochemically according to standard procedures and was found to have high pollution potentials on the basis of some parameters determined. The values of some of the parameters were found to be 1034.00NTU, 640.00mg/l and 2072.19mg/l for Turbidity, BOD and COD respectively. The Total Solids (TS) and Suspended Solids (SS) were 7307.50mg/l and 2067.50mg/l respectively. Optimum dosage determined for the combined/mixed coagulants was 1.10ml of *jatropha gossypifolia* stem latex and 1.10ml of 1% chitosan solution respectively per 100ml sludge at pH of 6.7. On the basis of this, the sludge was treated and the treated sludge sample, characterized. Triplicate determinations were done in each case and the mean values and standard deviations obtained from statistical evaluation using the Tukey-Kramer multiple comparison tests. From the results obtained, there were significant reductions ($p < 0.05$) in pollution with over 90% reduction in the COD, BOD and Turbidity in the treated sludge sample. The total and suspended solids expectedly, increased by 34.24% and 19.98% respectively. The synergistic effects of the combined coagulants were very evident in the results obtained. The coagulants are readily available, biodegradable, therefore more environmental friendly. The use of the coagulants for the treatment of sludge can be so recommended.

Keywords: Sludge, *Jatropha gossypifolia*, Chitosan, Exoskeleton, Pollution, Synergistic

PHARMACEUTICAL INDUSTRY WASTEWATER TREATMENT USING ORGANIC SURFACTANT MODIFIED CLAY

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ABSTRACT

This study was carried out to find out how effective and efficient clay, modifies with hexadecyltrimethylammonium (HDTMA) can be as adsorbent, to reduced various contaminants in wastewater. Waste-water was collected from pharmaceutical industry using composite sampling. The result of both untreated and treated wastewater recorded. There were converted to percentage reduction. The results shows percentage reduction of color (88.12%), total solid (61.60%), COD (87.47%), BOD (79.59%) and TKN (70.89). While phenol, THC and level of heavy metals reduced to below detectable level (BDL). Hence, surfactant modify clay can serve as effective and efficient adsorbent to sorb both organic and inorganic contaminants from wastewater and act as vital material in environment treatment processes.

Keywords: Modified, hexadecyltrimethylammonium bromide, surfactant, adsorbent, contaminant.

The Treatment of Sludge from the Rubber Processing Industry with Chitosan

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Abstract

Composite sludge samples were collected from a Rubber Processing industry. The collected sludge samples were characterized according to standard procedures. The values of some of the parameters were found to be 996.55 ± 5.85 NTU, 229.00 ± 7.80 mg/L and 1921.20 ± 6.50 mg/L for Turbidity, BOD and COD respectively. The Total Solids (TS) and Suspended Solids (SS) were 6217.00 ± 7.00 and 2733.00 ± 5.80 mg/L respectively. This portends pollution. Locally sourced coagulant, chitosan was obtained and the optimum dosage determined. It was found to be 2.10cm^3 of 1% chitosan solution per 100 cm^3 sludge at pH of 7.9. On the basis of this, the sludge was treated and the treated sludge sample, characterized. Triplicate determinations were done in each case and the mean values and standard deviations obtained from statistical evaluation using the Tukey-Kramer multiple comparison tests. From the results obtained, there were significant reductions ($p < 0.05$) in pollution in measured parameters of the treated sludge samples with 74.69 %, 77.67 % and 81.70 % reduction in the COD, BOD and Turbidity respectively, thus improving the quality of the sludge in terms of toxins. The total and suspended solids increased expectedly, by 30.58 % and 12.92 % respectively. The coagulant was quite effective at low levels. It also showed other characteristics of locally sourced coagulants, which include less pH dependence, readily available, cheap and easy to handle, more biodegradable, therefore more environmentally friendly. The use of the coagulant for the treatment of sludge and indeed where coagulation and flocculation is desirable can be so recommended.

Keywords: Biodegradable, Chitosan, Exoskeleton, Pollution, Sludge.

A STUDY OF THE PHYSIC CHEMICAL PROPERTIES OF THE SURFACE WATER AND THE HEAVY METALS COMPOSITION OF THE BOTTOM SEDIMENTS OF IJANA RIVER, WARRI, DELTA STATE, NIGERIA.

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Abstract

A study was carried out to investigate the concentrations, distribution and speciation of some heavy metals such as Cd, Cu, Pb, and Cr in the bottom sediments of Ijana River which has been contaminated by effluent from petroleum exploitation activities. The total concentration level Cd, Pb, Cu, and Cr were determined specifically at upstream, effluent zone, downstream and of storm water of the river, Pb, Cu and Cr were found to be most abundant metals in the river. The distribution pattern of the river indicates the source of pollution to be land based. Sequential extraction showed that 30-60% of Cd, were exchangeable fraction, indicating that Cd in the sediment posed a high risk to local environment while Cu, Pb and Cr ere at moderate risk level. From the relationship between percentage fraction of metal speciation and total metal concentration, it was found that the distribution of Cd, Cu, and Pb in some fraction were dynamic in the process of pollutants migration and the stability of metal in sediments of the river decreased in the order Cr>Pb>Cd>Cu. The correlation analysis suggest that some of the metals are strongly associated, indicating a common source or chemical similarity. The pollution load index (PLI) of the studied area ranged from 0.10 to 50.78, which indicated the sediments were polluted while the index of geoaccumulation showed that all the sampling points may face a severe metal pollution/ contamination problem in the future.

Keywords: Pollution load index (PTI), Index of Geoaccumulation, Speciation, sediment pollutants, heavy metal, correlation analysis.

PHYSIC-CHEMICAL STUDIES OF SOME CLAY DEPOSIT FROM EDO STATE

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ABSTRACT

Raw clays were collected from different parts of Edo State and physical, Mineralogical and geochemical analysis were carried out using standard procedures. Results from the physical analysis showed that, these clays can be used for brick making, catalysis, absorption and adsorption purposes. The mineralogical analysis show that kaolinite (27.70%) is present, smectite (7.64%) and quartz (70.45), which further provides their industrial and commercial values and applications when exploited. Their geochemical analyses using x-ray diffractometry, further gave credence to their utility and viability in all areas of human (and material) endeavours.

Keywords: *Absorption, adsorption, catalysis, geochemical, mineralogical, raw clay.*

TREATMENT OF WASTE WATER FROM PHARMACEUTICALS INDUSTRY USING NATIVE CLAY

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Abstract

Waste-water from pharmaceutical plant was collected using composite sampling. This was characterized and treated using native clay samples collected from selected clay deposits in Edo State of Nigeria. The aim was to find out the effectiveness of clay as coagulant in waste water treatment processes. The results of the parameters studied before and after treatment, show significant reduction. For the kaolinite clay, color, Total Solid (TS), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Total Kjeldahl Nitrogen, Phenol and Total Hydrocarbon Count (THC) show percentage reduction of 49.51, 51.89, 73.82, 72.81, 59.24, 82.19 and 33.85 respectively. The mixed clay sample shows percentage reduction of color (35.64), TS (50.57), COD (57.86), BOD (70.70), Phenol (80.22) and THC (19.46). Results from this study show that clay material can effectively be used as adsorbent as all heavy metals were reduced to Below Detectable Level (BDL).

Keywords: Pharmaceutical, wastewater, absorbent, reduction, composite, native clay, below detectable level.

EVALUATION OF CITRIC VALUES OF SUGAR AND pH OF SOME SELECTED FRUITS

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Abstract

This study was carried out to determine the citric acid, level of sugar and P^H values of some selected fruit collected directly from farms in Ekpoma, Edo State and evaluates the values of those parameters on daily basis for five days using standard methods. The five fruits were collected: orange, pipeapple, water melon, pawpaw and sugar cane and results that pineapple has the highest citric acid value of 0.50/100cm³ while water melon was the least 0.23/100cm³. Orange showed the highest (7.0⁰ brix level of sugar), while pawpaw had the least (2.0⁰ brix). The P^H values of all the fruits decreased as they aged. From the overall results, when fruits are over matured, their citric acid values, level of sugar and P^H decreased due to decrease in juice content and ripening (maturation) activities except for oranges and the results were compared with standard quality of fruits and orange was the closest of all the fruit samples studies.

Keywords: Orange, pineapple, water melon, pawpaw, sugar cane citric acid values, level of sugar, evaluate, pH.

A Study of the Thermodynamic of the Treatment of Rubber Effluent Using Powdered Snail Shell

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ABSTRACT

Thermodynamic studies of the treatment of rubber effluent was carried out, the change in standard Gibb's free energy (ΔG^0) of hydrogen ion concentration (pH) were (0.0359, 0.0736, 0.0385, 0.0789, 0.0423Kj/mol), dissolve oxygen (DO) (1.486, 1.535, 1.515, 1.361 and 1.396 Kj/mol) the values of change in standard entropy (ΔS^0) and standard enthalpy (ΔH^0) were 297.30kj/mol and 105.92kj/mol for hydrogen ion concentration (pH) , 261.28kj/mol and 25.36kj/mol for dissolved oxygen (DO) Other parameters such as Alkalinity, Turbidity, Total solid (TS), Biochemical oxygen demand (BOD) and Sulphate have negative values of change in standard Gibb's free energy (ΔG^0), the values are Alkalinity (-1.253, -1.261, -1.287, -1.320, -1.396 Kj/mol), Turbidity (-1.201, -1.026, -1.026, -1.060 and -0.915 kj/mol) Total Solids (TS), (-0.429, -0.421, -0.435, -0.353 and -0.135Kj/mol), Biochemical oxygen demand (BOD) values (-8.152, -8.401, -8.688, -8.857 and -9.400 Kj/mol), and sulphate values (-16.70, -17.29, -19.88, -18.47 and -19.65Kj/mol). The change in standard entropy (ΔS^0) was positive for most parameters except electrical conductivity (EC), alkalinity and phosphate with values of -281.77kj/mol, -15.86kj/mol and -179.09kj/mol and change in standard enthalpy (ΔH^0) also have negative values for most of the parameters of the rubber effluent except hydrogen ion concentration (pH), dissolved oxygen (DO), Turbidity, Total Solid (TS) total dissolved solid (TDS) and total suspended solid (TSS). In addition, the physicochemical properties (Hydrogen ion concentration (pH), temperature, alkalinity, turbidity, total solids, suspended solids, dissolved solids, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, electrical conductivity, and phosphate, Nitrate-Nitrogen, Sulphate, lead (Pb) and cadmium (Cd)) were analysed for wastewater from rubber effluent.

KEYWORDS: Thermodynamics, rubber, spontaneous, entropy, enthalpy, Gibb's free energy