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EDO STATE, NIGERIA**

Biography/ Background

Regina Esosa Ohenhen works in the Department of Microbiology, Faculty of Life Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria. She joined the services of this University on 3rd January 1993. Currently she is a Professor of Food Microbiology and Dean of Faculty of Life Sciences. Professor Regina Esosa Ohenhen research focuses on fermentation Technology. She has a particular interest in fermentation of indigenous foods. She has published more than 38 peer-reviewed articles on her research in national and international journals. She is a member of the American Society for Microbiology - USA, Society for Applied Microbiology – U.K. and Nigerian Society for Microbiology. Some responsibilities held include – Head of Department, Department of Microbiology; Dean, Faculty of Life Sciences. She was on Sabbatical appointment at Benson Idahosa University, Benin City, Nigeria, where she taught courses in Microbiology. She is on the Editorial Board of several reputable scientific journals. She was a beneficiary of SFAM (Society for Applied Microbiology) President’s Fund Grant, to present research papers at the American Society for Microbiology Conference in Philadelphia, San

Francisco and Boston, U.S.A. Also a beneficiary of Scientific meeting grant, to present a paper in a Summer Conference in Dublin, Ireland. She plays Lawn tennis and enjoys reading books.

Qualifications

Ph.D (Food Microbiology), University of Benin – (2001)

M.Sc (Food/Industrial Microbiology), University of Ibadan - (1995)

B.Sc (Microbiology) Second Class Upper Division, Bendel State University, Ekpoma- (1991)

Research Focus

Fermentation Technology

Studies on Probiotics isolated from traditionally fermented food

Social /Community Engagements

She is involved in the mentoring of teenage girls

Publications

1. Nigerian Journal of Microbiology. 1999. 13: 87 – 94

Production of Food Condiment (Sauce) from African Oil Bean (*Pentaclethra macrophylla*-Bentham) and Preservation by Combined Application of Temperatures and Sodium Chloride.

Ogiehor, I.S. ; Ohenhen, R.E.,; Okwu, I.G. and Agbonlahor, F.E.

ABSTRACT

Protein rich food condiment (supplementation sauce) produced from African oil bean seeds (*Pentaclethra macrophylla* Bentham) and preserved by a combination of temperatures and sodium chloride (table salt) was investigated during ambient temperature (30.0 ± 2.0°C) storage for a period of five months. Results show that various combination of hurdle(s); heat at 65°C for 30 minutes (hurdle A); 65°C for 30 minutes and 5% (w/v) sodium chloride (hurdle B), resulted in a product with high ammonia nitrogen, poor appearance, poor consistency and unacceptable taste and odour. However, combination of heat at 65°C for 30 minutes, 5% (w/v) sodium chlorides, chilling at 7°C for 6h and reheating at 55°C for 10 minutes (Hurdle C) gave a product with stable microbial load, pH (8.5), amino nitrogen (5.75mg Ng⁻¹ dm) ammonia nitrogen (1.45 mg Ng⁻¹ dm), reducing sugar (7.5mg g⁻¹ dm) and acceptable organoleptic quality. The various quality attributes evaluated were significant at different levels among the hurdles applied.

Comparative acceptability scores with commercially available sauce show that African oil bean sauce was acceptable even though the commercially available sauce was more desirable.

2. Nigerian Journal of Microbiology. 1999. 13: 105 – 112

Application and Implementation of a Hazard Analysis Critical Control Point (HACCP) Programme in the Production of Ugba from African Oil Bean Seed (*Pentaclethra macrophylla* Benthain). A Model for Indigenous Fermented Food in Nigeria.

Ogiehor, I.S.; Orhue, P.O.; Ohenhen, R.E. and Omigie, O.

ABSTRACT

Previous reports indicated the insanitary and unhygienic conditions associated with the traditional processing of Ugba, to be responsible for the high microbial count associated with the finished product. Subsequent studies revealed the survival and profuse growth of *Salmonella typhimurium*, *Staphylococcus aureus*, *Escherichia coli* and *Vibrio cholerae* during fermentation alongside with other fermenting organisms. In response to this potential threat to public health, a model hazard analysis critical control points (HACCP) programme was designed, implemented, monitored and verified in three local production centres. Four critical control points (CCP) were identified. The key points were, water quality and source of water, usage of non-sterile banana leaves (*M. sapientum* – Linn) and Ororompo leaves (*M. oppositifolios* – Mull) for lining the basket and wrapping the final product respectively; starter culture for initiating fermentation and mixing with other ingredient prior to consumption (optional). In addition, general hygiene and sanitation conditions through out the processing stages were carefully inspected and problems identified and corrected. Testing of ugba samples from the three production centres verified that the HACCP programme was effective in controlling the risk of contamination. The effectiveness of the programme and the mode of implementation, monitoring and verification indicate it could serve as a model for the safe processing of related indigenous fermented foods.

3. Nigerian Journal of Microbiology.2000. 14(1): 55 – 61

Production of Extracellular proteinase by *Lactobacillus* species isolated from traditional alcoholic beverages.

Sanni, A.I.; Ohenhen, R. E. and Onilude, A. A.

ABSTRACT

Lactobacillus plantarum and *L. brevis* isolated from pito and burukutu, Nigerian traditional cereal-based alcoholic beverages, together with type strains *L. plantarum* ATCC 10776T, *L.*

brevis DSM 20054T and *L. buchneri* DSM 20057T were used in the study. All the test organisms demonstrated production of extracellular proteinase with *L. buchneri* having the highest amount of total soluble protein in its enzyme extract. The optimal incubation period for enzyme activity was 12 – 18h, while growth medium containing 0.5% peptone and 1% casein supported higher enzyme activity. The medium that had ammonium sulphate as nitrogen source had a repressive effect on enzyme production. All the chemical inhibitors had a varied decreasing effect on enzyme production, but pepstatin completely inhibited proteinase activity in all the organisms.

4. The Journal of American Science. 2006. 2(2) 13 – 16

Growth Responses of Bacterial Isolates on Various Concentrations of Crude Oil.

Ohenhen, R. E.; Ikolo, F. E. and Uzeh, E. R.

ABSTRACT

Biodegradation of crude oil in natural ecosystems is quite complex, as it occurs relatively slowly. The study areas for this research were the Eriemu and Otorogu flowstations located in Ughelli-East and Ughelli-West Local Government Areas of Delta State, Nigeria. Studies of the microbial population and diversity of Eriemu and Otorogu flowstations were carried out by microbial enumeration and identification, determination of growth responses of bacterial isolates in 10 parts per thousand, 60 ppt and 120 ppt crude oil sample. The microbial enumeration shows a heterotrophic bacterial count ranging from 8.28×10^4 to 9.80×10^5 cfu/ml for both flowstations while the hydrocarbon degrading bacteria ranged from 1.11×10^4 to 3.07×10^5 cfu/ml for both flowstations. The following microorganisms were isolated from the samples: *Bacillus* spp (Isolate X07), *Salinococcus* spp (Isolate X10), *Alcaligenes* spp (Isolate E70), *Cunninghamella* spp, *Penicillium* spp and *Aspergillus* spp. Statistical analysis shows a correlation between the growth responses and the media for the isolates. Understanding the microbial degradation process of crude oil will increase possibilities of developing models and strategies for removing crude oil from contaminated sites.

5. Journal of Science, Engineering and Technology. 2007. Vol. 14, Number 1: 7270 – 7276

Enumeration of Airborne Microflora in some Poultry Houses in Edo State.

Ohenhen, R. E.

ABSTRACT:

Microbiological enumeration of air samples was carried out to determine the types of microorganisms associated with air in poultry houses in Edo state. The mean total aerobic plate

count of air samples obtained ranged from 0.90×10^2 cfu to 2.03×10^2 cfu. The mean mold counts of air samples obtained ranged from 0.10×10^2 cfu to 0.16×10^2 cfu. The microorganisms isolated from the air samples included bacteria of the genera *Lactobacillus*, *Staphylococcus*, *Pseudomonas*, *Streptococcus*, *Micrococcus*, *Aeromonas*, *Bacillus*, *Enterobacter* and *Klebsiella*: molds of the genera *Neurospora*, *Aspergillus*, *Penicillium*, *Mucor*, *Botrytis*, *Cladosporium* and *Fusarium*.

6. Journal of Research in Bioscience. 2006. Vol.2 No2 10 – 12

The effect of toothpaste on oral microflora.

Ohenhen, R. E.; Uzeh, R. E. and Izugbe, E. U.

ABSTRACT

The oral cavity of humans is home to a wide variety of microorganisms, which affect the host either negatively or positively. The interactions between these microorganisms with each other and with the host results in a delicate balance. Which if disturbed, can lead to various oral infectious disease. The use of toothpaste as mouth washing agent is a conventional means of oral hygiene. This study examined the efficacy of toothpaste in inhibiting the growth of oral microflora. One hundred oral swabs were collected and three organisms – *Streptococcus* spp, *Staphylococcus* spp and *Escherichia coli* were isolated. There was no significant difference in the effect of the various brands of toothpaste on the oral isolates. Since they all contained fluoride as the active ingredient, through some inhibited particular species better than others.

7. Journal of Applied Sciences. 2007. Vol . 10 (1) 6754 – 6762

Medium for optimum yeast induction from the blastospore producing ascomycetes.

Omoifo, C.; Ohenhen, R.E. and Oguekhian, V.

ABSTRACT

Saccharomycopsis sp. a relatively new species among the ascomycetes was subjected to various growth media which include complex, intermediate and synthetic media. Growth count was taken at twenty-four hours interval and morphological changes were observed. Terminal budding yeast cells, pseudohyphae, conidia and septate hyphae were observed in all the media except sucrose multi ionic broth in which only conidia and septate hyphae occurred, enterothallic conidia also occurred in glucose – yeast extract.

8. Nigerian Annals of Natural Sciences. 2006. Vol .6 (2) 106 – 111

Microbial contamination of retail drugs (syrups) in Ekpoma-Nigeria.

Akpe, R.A.; Esumeh, F.I.; Osagie, R.N and Ohenhen, R.E.

ABSTRACT

The microbial quality of retailed commonly used drugs. Ranferon, chloroquine, leadmol and feclox syrups were determined using standard microbiological procedures. The result showed that the fresh samples were sterile but microbial contaminants were detected after container was opened and these increased in species and number as the number of days after opening increased. The pH of the syrups were also found to change from slightly acidic values to neutrality as the number of days after opening the containers increased. The bacterial isolates includes *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, and diphtheroids. The only fungal isolate is *Mucor* sp. the total viable count for bacteria ranges from 1×10^2 to 7.9×10^6 cfu/ml. The public health implications of these findings are hereby discussed.

9. Journal of Science, Engineering and Technology. 2007. Vol. 14 No 3: 7547-7552

Antimicrobial activity of extract of bitter leaf (*Vernonia amygdalina*)

Ohenhen, R.E., Uzeh, R.E., Iyamu, M.I. and Uduebholo, E.

ABSTRACT

Antimicrobial activity of the leaf extract of *Vernonia amygdalina* was investigated on some test organisms using the agar diffusion and the tube dilution methods. The solvents used were water and ethanol. The result showed that *Staphylococcus aureus*, *Streptococcus faecalis*, *Pseudomonas* spp, *Streptococcus viridans*, *Bacillus subtilis*, and *Corynebacterium diphtheria* were susceptible to the extracts while *Proteus* spp, *Klebsiella* spp, *Candida albicans* and *Escherichia coli* were resistant to the extract. For susceptible strains, the diameter of the zone of inhibition ranged from 9mm to 20mm. The ethanol extracted leaf extract was found to be relatively more effective against the test organisms than water extract leaf extract.

10. Journal of Nature and Science. 2006. 4 (3) 37 – 40

Microbiological and Nutritional Qualities of Dairy Products: Nono and Wara.

Uzeh, R.E.; Ohenhen, R.E. and Rojuginboka, A.K.

ABSTRACT

The microbiological and nutritional qualities of two fermented dairy products: nono and wara were investigated. Bacteria and fungi were isolated from both products. The bacteria isolated include *Acinetobacter mallei*, *Alcaligenes faecalis*, *Bacillus cereus*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Micrococcus* spp *Serratia* spp, *Flavobacterium* spp, *Staphylococcus aureus* and *Klebsiella licquifasciens*. The fungal isolates were *Aspergillus niger*, *Aspergillus fumigatus*, *Penicillium chrysogenum*, *Rhizopus* spp, *Fusarium moniliforme* and *Trichoderma reesii*. The mean total plate count of nono was 3.55×10^8 cfu/ml, while that of wara was 4.55×10^8 cfu/g. The mean coliform count was 4.25×10^7 cfu/ml for nono and 2.40×10^7 cfu/g for wara. While the mean fungal count was 12.9×10^6 cfu/ml for nono and 1.31×10^7 cfu/g for wara. The respective moisture content and total titratable acid were higher in nono (86.03% 1. 37%) than in wara (55.68%. 0. 48%). Wara was of a higher pH (4.64) than nono (2.87). Wara had higher values respectively for fat, ash and protein (18.55%, 1. 5% and 23%) than nono (3.68% 0.97% and 6.40%) while the carbohydrate level was lower in wara (1%) than in nono (2.9%). Nono and in particular, wara are of good protein sources. However, the range of microorganisms isolated from both products pose serious threat to food safety and the need to ensure the microbiological safety of these products cannot be over emphasized.[Nature and Science 2006(3) 37-40]

11. The Journal of American Science. 2006. 2(3) 1-3

Multiple Antibiotic Resistant Index and Plasmid of *Escherichia coli* in Beef in Ekpoma.

Umolu, P.I.; Ohenhen, R.E.; Okwu, I. G. and Ogiehor, I. S.

ABSTRACT

Escherichia coli, a member of the family Enterobacteriaceae, has been known to cause infection in man and animals. Sixty samples of beef were collected randomly from Ekpoma market, in Edo State. *E. coli* were isolated from 40/60 (66.7%) of samples. All isolates were sensitive to ciprofloxacin, 78% were resistant to tetracycline, 73% resistant to cefuroxime, 43% resistant to cotrimoxazole, 35% to nalidixic acid. All isolates were 100% resistant to chloramphenicol and ampicillin. Nine different resistant patterns were observed. Multiple antibiotics resistance was observed among isolates. Seven of the nine resistant patterns observed were screened for plasmid, it was observed that they harboured one or more plasmids that was of sizes 23.13kb and 4.361kb. This study points to the fact that farmers should exercise caution in the use of antibiotics in farms.

12. Pakistan Journal of Nutrition. 2006. 5(5) 458-460

Bacterial Contamination of Tsire-Suya, a Nigerian Meat Product.

Uzeh, R.E.; ¹Ohenhen, R.E. and Adeniji, O.O.

ABSTRACT

Samples of raw meat prior to roasting, and tsire suya were analyzed bacteriologically for total viable, coliform, Staphylococcal counts and the presence of *Pseudomonas aeruginosa*, *Bacillus cereus*, *Staphylococcus aureus* and *Escherichia coli*. The sensitivity of the bacterial isolates to some antibiotics and spices was evaluated. The total viable count varied from 20×10^2 to 289×10^2 cfu/g for the raw meat and 7×10^2 to 171×10^2 cfu/g for the tsire-suya. The coliform count was 4×10^2 to 71×10^2 cfu/g for the raw meat and 1×10^2 to 42×10^2 for the tsire suya while the Staphylococcal count ranged from 1×10^2 to 60×10^2 cfu/g for the raw meat and 1×10^2 to 12×10^2 cfu/g for tsire-suya. From results obtained bacterial count was higher in raw meat than in tsire-suya. *P. aeruginosa*, *B. cereus*, *S. aureus* and *E. coli* were isolated from the raw meat and tsire-suya. The isolates were sensitive to some of the antibiotics and spices tested. However, *E. coli* was only sensitive to gentamicin. While *P. aeruginosa* on the other hand was resistant to *Aframomum melegueta*, *Piper quinense* and *Capsicum frutescens*, the three spices tested for this study. The incidence of the isolated bacteria in tsire-suya, ready-to-eat meat product in Nigeria is of health significance.

13. African Journal Biotechnology. 2006. Vol.5 (22) 2077-2080

Microorganisms associated with the preparation of plantain pudding in Western Nigeria.

Ohenhen, R.E.; Enweani, I.B.; Ogiehor, S.I and Uwabor, K.

ABSTRACT

The microbiological and physico-chemical quality of plantain pudding was evaluated during processing and storage under ambient temperature (30.5°C) for 120h duration. Results indicates that the total viable bacteria count decreased from 1.36×10^5 cfu/g (raw sample) to 0.3×10^1 cfu/g after cooking and thereafter increase steadily to 1.05×10^8 cfu/g while the total fungi count decreased from 2.70×10^4 cfu/g to non detectable count after boiling but increase to 6.40×10^6 cfu/g at the end of the storage period. Seven bacteria genera; *Bacillus*, *Staphylococcus*, *Streptococcus*, *Pseudomonas*, *Klebsiella*, *Lactobacillus* and *Escherichia coli* and six fungi

genera; *Fusarium* spp. *Aspergillus* spp, *Penicillium* spp. *Alternaria* spp. *Geotrichium* spp and *Cladosporium* spp were detected and isolated. The pH decreased from 5.7 (raw sample) to 4.7 after boiling and thereafter decreased gradually till the end of the storage period while the titratable acidity increased slightly. Furthermore, the moisture content decreased steadily all through the storage period.

14. Journal of Research in Bioscience. 2007. Vol. 3 No 2, Pp 13-14

Antibacterial effect of Honey on Bacterial isolates from wounds.

Ohenhen, R.E.; Enaigbe, A. and Osagie, A.

ABSTRACT

The antimicrobial effects of local honey on bacterial isolates were determined using filter paper disc (Disc Diffusion Method) impregnated with concentrated honey in varying concentration of 10%-100%. Result obtained indicated that when honey was diluted, there were no zones of inhibition of bacterial growth around disc impregnated in concentrations of 10%-30%. Whereas zones of inhibition that ranged between 4mm-12mm were observed at concentrations of 40%-90%. However, there was a wide zone of inhibition of 15-17mm when the honey was undiluted. Results obtained therefore have validated the potential uses of honey in management of infection due to these tests organisms.

15. Journal of Advancement in Medical and Pharmaceutical Science. 2007. Vol. 1 No.2 50-54

Self Medication of Anti-malaria drugs at Household levels in Uzea Ward, Edo Central Senatorial District, Nigeria.

Osagie, R.N.; Ohenhen, R.E.; Osagie, V. E . and Akpe, R. A.

ABSTRACT

At Uzea Ward in Esan North East Local Government Area of Nigeria, 400 households were visited to determine the percentage of households indulging in self- medication. (12%) households were found to indulge in self – medication with antimalarials. The most common of the antimalarials used for self – medication were quinine (38.5%) and chloroquine (33.6%), most of these found to be in tablest forms (79.2%). The sources of these drugs were mostly from dispensaries/local government primary health care centre, with one situated at Uzea and another at Olilin. Frequent episodes of malaria were given as the most (58%) common reasons for self-medication, in the families. Also distance from residential areas to the nearest health centre (26%) was also give as another reason. There was a statistically significant ($P<0.05$) association, between self-administration of anti-malarial drugs, number of people in a household and presence of a family member with febile illness.

16. Journal of Research in Bioscience. 2007. Vol . 3 No. 2 Pp 58-62

Qualitative Determination of Organic and Amino Acids present in Ogi: A Corn meal fermented product.

Ohenhen, R.E. and Ikenebomeh, M. J.

ABSTRACT

Ogi slurry was produced using five different methods, steeped one stage fermented ogi slurry (maize fermented for 72h), steeped two stage fermented ogi slurry (steeped one stage fermented ogi slurry, fermented for another 72h), germinated ogi slurry (maize germinated for 96h), germinated fermented ogi slurry (germinated ogi slurry fermented for 72h) and inoculated fermented ogi slurry (maize fermented with previous steep water): Two varieties of maize were used in this study (white and yellow). Results showed that the different methods of production of the ogi effected various degrees of changes in the quality of ogi. The presences of three organic acids (Lactic acid, acetic acid and butyric acids) were sort in this research. There was a fair agreement on the acetic acid to lactic acid ratio. Butyric acid was only present in steeped one stage fermented ogi slurry. Lactic acid and acetic acid were present in all the samples analyzed. The qualitative analysis of amino acids in all the ogi slurries showed that amino acid was present in all the sample analyzed.

17. The Journal of American Science. 2007. 3(1) 38-42

Shelf Stability and Enzyme Activity Studies of Ogi: A Corn Meal Fermented Product.

Ohenhen, R.E. and Ikenebomeh, M.J.

ABSTRACT

Ogi slurry was produced by fermenting corn grains with previous steep water for 72h in the ratio of 100:0 Steep water: water and the resulting ogi slurry was called inoculated fermented ogi slurry. Shelf life studies of inoculated fermented ogi slurry were carried out 60 days. The pH, titratable acidity, colour and flavor were monitored and were observed not to have changed throughout the 60 days period of investigation. Enzyme activity was determined in the inoculated fermented ogi slurry and results showed that proteinase activity was higher in inoculated fermented ogi slurry (6.05''0.01mg/ml) compared to the uninoculated ogi slurry (4.08''0.01mg/ml). A similar trend was observed for amylase and lipase activities.

18. Journal of Applied Sciences. 2007. Vol. 10 (4): 7434-7441

Biological Evaluation of Ogi Protein

Ohenhen R.E. and Ikenebomeh, M.J.

ABSTRACT

Biological evaluation of ogi protein was investigated using the protein efficiency ratio (PER) determination. Five different diets formulations were used. These include- inoculated fermented ogi, market ogi slurry, growers mash, rabbit pellets and *Lactobacillus plantarum* and *Enterobacter cloacae* inoculated ogi. Protein efficiency ratio determination carried out using experimental diets indicated that growers mash had the highest value. However, rats fed with inoculated fermented ogi slurry gained weight at the end of the study.

19. Continental Journal of Microbiology.2008. 2:11-15

A comparison of preservation methods of traditionally processed dawadawa.

Ohenhen, R.E.; Imarenezor, E.P.K.; Iyamu, M.I and Aigbokhan, F.I.

ABSTRACT

The preservation of dawadawa using sun drying and oven drying was compared with fresh dawadawa for bacterial load, moisture content and nutritional content. *Bacillus subtilis* and *Staphylococcus* sp were isolated from the fresh dawadawa while *Bacillus subtilis* was isolated from the sun dried and oven dried dawadawa. In terms of bacterial load, fresh dawadawa had the highest bacterial load of 10 cfu/ml, followed by sun dried with 10 cfu/ml and the lowest was oven dried which has 10 cfu/ml. Comparing the moisture content of dawadawa, the sun dried reduced from 100g to 36.5g while the oven dried reduced from 60g to 21.7g. The nutritional content of dawadawa was accessed based on its protein and glucose value. Oven dried dawadawa has the highest value for both contents with 52.94g/l and 45.83mg/dl with a pH of 6.5 respectively. Fresh dawadawa has protein value of 51.21g/l but with the lowest glucose value of 41.67mg/dl with a pH of 8.1. Sun dried dawadawa has the lowest protein value of 51.18g/l, but with a better glucose value of 43.75mg/dl with a pH of 6.4 than the fresh dawadawa.

20. Continental Journal of Medical Research. 2009. 3:1-6

The Effect of mouthwash on Oral Microflora

Egharevba F.; Ohenhen R.E.; Imarenezor E.P.K.; Ebure C.

ABSTRACT

Three different concentrations of mouthwashes 001, 002 and 003 formulated from $H_2O_2/Na_2B_4O_7$ were assayed for their inhibitory effect on *Streptococcus mutans*, *Streptococcus salivarius* and *Candida albicans* at different concentration of 12%, 9%, 6%, 3% and 1%. The results showed that the mouthwashes significantly reduced to different levels the microbial count of all organisms used. The reduction in microbial count ranged from initial count of 2.4×10^6 cfu/ml to 0.62×10^6 cfu/ml for *Streptococcus mutans*, 2.1×10^6 cfu/ml to 0.48×10^6 cfu/ml for *Streptococcus salivarius* and 1.0×10^6 cfu/ml to 0.23×10^6 cfu/ml for *Candida albicans*, depending on the mouthwash concentration. At $P < 0.05$, there was no significant difference ($P < 0.05$) amongst the three different mouthwashes in terms of inhibitory properties, though showing a significant decrease ($P < 0.05$) in microbial count. The mouthwashes contained the same compositional compounds but at different concentrations which most probably account for the observed differences in their inhibitory activities. The above results show that the mouthwashes 001, 002 and 003 have good antimicrobial properties.

21. Continental Journal of Microbiology. 2009. 3:1-12

Microbial Assessment of Ground Melon Preserved with Salts.

Iyamu, M.I.; Amhanre I.N. and Ohenhen R.E.

ABSTRACT

Microbial assessment of ground melon preserved with some salts (sodium chloride, sodium citrate and a mixture of sodium chloride and sodium citrate) was evaluated. The results revealed that after 5 days, there were no changes in the microbial quality of the ground melon. However, both the preserved and the control (unpreserved) melon samples changed from milk to brown colour after 31 days. The melon preserved with 10% sodium citrate had the highest mean plate count of 8.0×10^7 cfu/g while the one preserved with 10% sodium chloride had the mean plate count of 5.0×10^7 cfu/g. *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Aspergillus niger* were isolated from the preserved and the control (unpreserved) samples.

22. Journal of Science, Engineering and Technology. 2011. 18(1): 9835-9841

Solar Disinfection of Drinking Water.

Orhue, P.O. ;Ohenhen, R.E. and Elisha, E.V.

ABSTRACT

Solar disinfection of water (SODIS) was carried out using sterile water sample. *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* were inoculated into duplicate samples of the water. One duplicate was exposed under the direct sunlight for up to twenty-one days while the other was stored at room temperature in a dark cupboard. The progressive extinction of bacteria was studied from day zero through day seven to day twenty-one. *E. coli* did not survive for more than seven days under sunlight or at room temperature unlike *Staphylococcus aureus* and *Pseudomonas aeruginosa* which survived for up to fourteen days at room temperature and two and seven days respectively under direct sunlight. This study has given impetus to the prospect of solar disinfection in disinfection and preservation of drinking water

23. Journal of Applied Science. 2011. 14(1): 9508 – 9515

Bacterial Flora of Small Edible Land Snail (*Limicolaria flammea* - MUELLER)

Imarenezor, E.P.K. ;Ekozien, M.I. ;Ohenhen, R.E. and Omoigberale, M.N.O.

ABSTRACT

A total of fifty edible small land snails (*Limicolaria flammea* Mueller) were randomly collected from Ekpoma town, Ileh, Irukekpen, Benin City and Uhiele in Edo state, Nigeria. The bacterial flora isolated from four anatomical parts of this small edible land snail using standard bacteriological methods include visceral shell (*Escherichia coli*, *Proteus stuarti*, *Enterobacter species*, *Klebsiella species*, *Pseudomonas aeruginosa*, *Salmonella species*, and *Bacillus species*), visceral fluid (*Bacillus species* and *Proteus stuarti*), visceral mass and intestine (*Escherichia coli*, *Proteus species*, *Klebsiella*, *Citrobacter*, *Pseudomonas aeruginosa*, *Serratia* and *Staphylococcus aureus*), head/foot region (*Escherichia coli*, *Proteus species*, *Klebsiella*, *Citrobacter*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Salmonella typhimurium* and *Yersina species*). The mean total viable bacterial count in cfu/g for the four anatomical parts of visceral shell, visceral fluid, visceral mass/intestine and head/foot region were 1.4×10^8 , 3.1×10^2 , 1.1×10^6 and 7.2×10^6 respectively. The total bacteria count was higher on the visceral shell with a mean of 1.4×10^8 cfu/g and the visceral fluid had the lowest mean bacterial count of 3.1×10^2 cfu/g. The presence of these potential pathogens as normal flora in the edible small land snails call for caution in the handling and processing for consumption, although the findings were not meant to discourage

the rearing and consumption of this snail but rather it was recommended for consumption as it is a very important and cheap source of alternative animal protein.

24. African Journal of Science. 2011. 12(1): 2702-2711

Microbiological Quality and Shelf Life Studies of Groundnut cake sold in selected markets in Edo North Nigeria.

Ohenhen, R.E. ; Odion-Owase, E. and Odion-Owase, A.

ABSTRACT

A total of two hundred groundnut cake samples were purchased directly from local producers in five different locations in Edo North. Microbiological analysis of the samples for eight weeks revealed the presence of *Enterococcus faecalis*, *Bacillus cereus* and *Staphylococcus aureus* as the isolated bacteria and *Aspergillus niger*, *Mucor spp*, *Saccharomyces cerevisiae*, *Aspergillus fumigatus* and *Aspergillus oryzae* as the isolated fungi. The microbial load of the groundnut cake increased from 5.2×10^2 to 7.2×10^8 for fungi and 3.4×10^3 to 9.2×10^8 for bacteria. There was also significant difference in the pH and the titratable acidity ($P < 0.05$) of the groundnut cake in respect to the storage period. Sensory evaluation of the groundnut cake samples on the basis of colour, texture, aroma and taste showed that significant difference ($P < 0.05$) was established in respect of the storage period.

25. African Journal of Science. 2011. 12(1): 2810-2816

Proximate Analysis and the Effects of Enzyme Activities on the rate of deterioration of groundnut cake produced and sold in some markets in Edo North.

Ohenhen, R.E. ; Odion-Owase, E. and Odion-Owase, A.

ABSTRACT

Samples of groundnut cake were purchased from five different locations in Edo North. The proximate analysis of the groundnut cake revealed that the protein, fat, ash, crude fibre, moisture, and carbohydrates contents differed significantly with increased storage period. The increase in the percentage of fat content could lead to rapid onset of rancidity of the groundnut cake. However, the result showed the groundnut cake was highly nutritious. Lipase, amylase, and protease extracted from the isolated microorganisms had no significant effect on the deterioration rate of the groundnut cake due to the decrease in pH value.

26. International Journal of Research and Advancement in Bioscience. 2012. 2:91-95

Biodegradation of Surfactant in Detergent effluent by Consortia of bacteria resident in detergent-effluent Polluted Waterbodies in South West Region, Nigeria.

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ABSTRACT

Degradation of detergent surfactant in raw and diluted effluent by consortia of resident bacteria of the effluent and water bodies that regularly receive detergent effluent was studied. Raw and diluted surfactant-containing effluents were inoculated with standardized pure cultures of bacteria resident in the water bodies. Biodegradation was monitored as primary degradation measured in terms of half-life ($t_{1/2}$). Biodegradation of the surfactant in the effluent proceeded slowly, with $t_{1/2}$ ranging from between 20 – 30 days. Biodegradation of the surfactant by single organisms was most rapid using *Pseudomonas putida* ($t_{1/2}$ = 23 days) and slowest using *Alcaligenes odorans* ($t_{1/2}$ = 28 days). Biodegradation was more rapid using the various consortia than using single pure cultures ($t_{1/2}$ ranged between 19 and 25 days). Rates of biodegradation using consortia of bacteria can be ranked as : four-membered ($t_{1/2}$ = 19days) > three-membered ($t_{1/2}$ = 20 to 23 days) > two – membered ($t_{1/2}$ = 21 to 25 days). There appears to be a synergistic action in the degradation of the surfactant. The slow rate of degradation of the surfactant is possible explanation for observed persistence of the surfactant in the water bodies.

27. African Journal of Microbiology Research. 2012. Vol.6 (20):4336-4339

Antibiogram Types of *Klebsiella aerogenes* isolated from urinary tract infection (UTI).

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ABSTRACT

Thirty three (33) strains of *Klebsiella aerogenes* isolated from 197 in-and out-patients with symptoms of urinary tract infection (UTI) at University of Benin Teaching Hospital (UBTH), Benin City were used for this study. Twenty-one antibiotics were used for the antibiogram typing. Organisms were isolated from 65 positive samples, with the most prevalent being *Staphylococcus aureus* (40.0%), others were *Escherichia coli* (26.2%), *Pseudomonas aeruginosa* (12.3%), *Klebsiella* spp (9.2%), *Proteus* spp (6.2%), *Acinetobacter* spp (4.6%) and *Providencia* spp (1.5%). Majority of the isolates were highly sensitive to the quinolones (47.3%) and less sensitive to the penicillins (7.2%). Isolates of *Pseudomonas aeruginosa* were most sensitive to

ofloxacin (50.0%), rifampicin (50.0%) and even gentamycin (50.0%), and less sensitive to tetracycline and chloramphenicol (12.5%) respectively. This study is of great concern to public health; it is suggested that suitable antimicrobial intervention should be administered to reduce the risk of multidrug-resistant (MDR) pathogens.

28. American Journal of Research Communication. 2013. Vol. 1(3):35-49

Escherichia coli O157:H7-Prevalence and Risk Factors of Infection in Edo State, Nigeria.

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ABSTRACT

We determined the prevalence of *Escherichia coli* O157:H7 as well as risks factors of infection in Edo State, Nigeria. One thousand (1000) fecal specimens from consenting persons from both sexes and of all age groups within the 3 Senatorial districts, reporting with cases of diarrhea and other gastrointestinal complaints as well as apparently healthy individuals, were inoculated onto MacConkey, Sorbitol MacConkey, Eosin Methylene Blue and Blood agar. Media were incubated aerobically at 37⁰C for 24 hr. Isolates were identified using standard microbiological techniques. For the study data, Chi-square (X^2) or Fisher's exact test as appropriate and odd ratio analysis were done using the statistical software INSTAT, A 2.7% rate of infection was recorded. Most of the isolates were recovered from subjects living within the bustling commercial city of the state where access to fast-food and road side restaurants is common. Other favorable factors found to be associated with infection included diarrhea as clinical symptoms, the wetter seasons of the year and asymptomatic carriage of infection. Gender and age were not statistically significant ($p>0.05$) risk factors of infection in this study.

29. International Journal of Basic and Applied Sciences. 2013. 2(2):170-175

Microbiome of Madila – a southern-african fermented milk product.

Ohenhen, R.E.; Imarenezor E.P.K, and Kihuha A.N.

ABSTRACT

This study was embarked upon to obtain strains of lactic acid bacteria from a traditional fermented milk product-Madila. The milk was obtained locally from three different locations. Samples of the Madila were taken at different intervals during the course of the preparation and analysed. Characterization of seven isolates through morphological, physiological, biochemical and carbohydrate fermentation test have been reported. Six species of lactic acid bacteria were identified and they include *Lactobacillus acidophilus*, *Lactobacillus delbrueckii*, *Lactobacillus*

plantarum, *Lactococcus lactis*, *Lactobacillus fermentum* and *Lactobacillus brevis*, other non lactic acid bacteria identified were *Escherichia coli*, *Bacillus cereus* and *Staphylococcus aureus*. The counts ranged from 7.15×10^2 to 2.57×10^5 for non lactic acid bacteria and 2.25×10^7 to 8.63×10^9 for lactic acid bacteria. It was observed that the counts of non lactic acid bacteria reduced progressively as the number of lactic acid bacteria increased.

30. International Journal of Basic and Applied Sciences. 2013. 2(2):189-192

Prevalence of urinary schistosomiasis in Enwan - A rural community in Akoko – Edo local government area, Edo State, Nigeria.

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ABSTRACT

The prevalence of urinary schistosomiasis in Enwan, a rural community of Edo State, Nigeria was study with a total of 300 individuals volunteering to take part in the investigation for the presence of *Schistosoma haematobium* ovas in their urine samples. Of this total samples which comprises of 193 (64.3%) males and 107 (35.7%) females examined for the presence ova of *S. haematobium* in their urine using centrifugation technique, overall, 130 (43.3%) had the eggs of *S. haematobium* in their urine and which was graded as light infection (< 50 ova/10ml) and heavy infection (≥ 50 ova/10ml) of urine. A total of 75 (57.7%) had light infection while 55(42.3%) had heavy infection for *S. haematobium*. Thirty one (37.3%) had heavy infection while 52(62.7%) light infection of 83(63.9%) positive males for *S. haematobium*. Twenty four (51.1%) had heavy infection while 23(48.9%) had light infection of 47(36.1%) positive females for *S. haematobium*. Males had the highest to the lowest prevalence rate at age between 16 – 20 years 37 (71.2%), 26 – 30 years 17(44.7%), 11 – 15 years 13 (30.2%) and 21 – 25years 16 (26.7%) in that order, Females had the highest to the lowest prevalence rate at age 11 – 15years 6 (66.7%), 16 – 20years 25 (62.5%), 21 - 25years 10 (33.3%) and 26 – 30 years 6(21.4%) in that order. Male's prevalence rate when compared to that of female showed no significant difference in the surveyed population.

31. African Journal of Microbiology Research. 2013. 7(19) 1964-1976

Induction of yeast cells from sporangiospores of *Rhizopus stolonifer* was inhibited by sodium fluoride.

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ABSTRACT

This study was aimed at determining the effect of the glycolytic inhibitor, sodium fluoride (NaF), on induced yeast cells. *Rhizopus stolonifer* was cultivated in synthetic broth for 120 h, at pH 4.5 and ambient temperature of $28 \pm 1^\circ \text{C}$, using sporangiospores as inoculum. Growth was in discrete units, which were sedimented. Microscopic examination revealed induction of neoplasts, protoplasts and yeast cells, but biomass profiles (OD, 625nm) did not exhibit sigmoid pattern in control or glycolytic inhibitor-NaF incorporated broths. A two-way analysis of variance showed that NaF and its interaction with time significantly affected growth ($p < 0.05$). Means separation was into three subsets, with 20 mM (subset 1) having the highest biomass and least occurred at 5 mM, which was comparable to 30 mM, control and 10 mM (subset 3). A further study revealed effect of application time of NaF at two levels (20 and 10 mM) on morphological expression. Three main effects were observed: (a) complete inhibition of yeast induction, (b) delayed induction of yeast cells and (c) apoptosis of induced yeast cells. In the complete absence of yeast cells, protoplasts were copiously produced. However, when yeast cells were induced prior to NaF challenge, the inhibitor caused death of cells. Hence, it was suggested that induction of terminal budding yeast cells was closely associated with glycolysis. Further studies are recommended in order to examine the contribution of individual inductive enzymes including those of glycolysis, during the transformation process.

32. American Journal of Research Communication. 2014. 2(1) 86-94

Physicochemical studies on fecal isolates of *Escherichia coli* O157: H7 from people in Edo State, Nigeria.

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ABSTRACT

The aim of this study was to investigate some physicochemical properties of *Escherichia coli* O157:H7 isolated from people in Edo State. This organism belongs to the group classified as “diarrhoeagenic” due to its ability to cause diarrhea in humans. Its ability to produce toxins and survive stomach acidity, contributes to its success as a food-borne pathogen. In this study, fecal specimens obtained from one thousand persons with gastrointestinal complaints were inoculated onto Sorbitol MacConkey agar (Oxoid, CM 813) supplemented with Cefixime-Tellurite (Oxoid SR 172) and incubated at 37°C for 24hr. Twenty-seven (27) specimens yielded *Escherichia coli* O157:H7 strains identified serologically using the *E coli* O157 latex agglutination kit (Oxoid DR620), and standard biochemical tests. The effects of exposure of local isolates of the organism to experimental temperatures of 37°C , 50°C and 70°C , at varying pH values of 3.0, 7.0, and 9.0, were assessed by their viability on Eosin Methylene Blue agar plates (Oxoid CM 0069). This was carried out by taking the average colony counts of growth at intervals of 5, 10, 15, and 30 minutes of incubation at 37°C for 24 hours. *E. coli* O157:H7 was found to survive at 4°C , irrespective of acid, neutral or alkaline conditions of growth. Colony counts were found to be higher for isolates kept at neutral pH of 7.0 and highest in broth kept at 37°C than those kept at

other temperatures. Strains of *E. coli* O157: H7 appear to be hardy organisms and proper sanitation at both personal and community levels would be required to effectively control disease occurrence due this organism.

33. Journal of Agriculture and Veterinary Science. 2015. 8(7):32-34

Leeches – Guide to Survey of African Trypanosomiasis in wild animals in Niger Delta, Nigeria.

Odoya E.M., Adeyemo, A.O., Ohenhen, R.E. and Bekabain, O.H.

ABSTRACT

Transmission of trypanosome is traditionally to vectors, *Glossina*, *Tarbanids* and *Stomoxys* but is implicated in leeches. Increasing seropositive cases of Human African Trypanosome without corresponding vector implication has been noted in Abraka, Nigeria. This fails to explain the epidemiological relation between vector presence and humans infected with African Trypanosomiasis in the study area. Surveillance of trypanosome among wild animals may be complex and difficult. Besides, wild life such as Bushbuck and Hogs are known to be healthy carriers of trypanosomes and can sustain transmission in both human and livestock. A total of 12 earthen fish ponds in the swampy wild area of Ogono village in Abraka, Nigeria were surveyed for the presence of leech parasites. Over 250 leeches were harvested with an average of 20 leeches from each pond. In the laboratory, examination of gut aspirates of leeches using tuberculin syringe revealed dark sanguineous fluid after being fed using laboratory rats and observed for 32 weeks. This suggests that digested blood from its several preys can be aspirated and analyzed for DNA extraction. Hence DNA analysis of gut content could bring about knowledge of the presence of the wild reservoir hosts in areas of surveillance. Also, DNA analysis to identify the presence of trypanosomes in leeches which may have fed on trypanosome infected bushbuck, hog or other aquatic animals which are known reservoir of African trypanosomiasis, could facilitate the surveillance and the epidemiology to trypanosomiasis in wild animals.

34. British Microbiology Research Journal. 2015. 9(3):1-9

Effects of pH and storage temperatures on antibacterial activity of bacteriocin produced by lactic acid bacteria isolated from ogi.

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ABSTRACT

Aims: Lactic acid bacteria are important organisms recognized for their fermentative ability. They produce various compounds including bacteriocins which are proteinaceous antimicrobial compounds. The purpose of this study was to evaluate the lactic acid bacterial content of ogi, extract crude bacteriocin from the lactic acid bacterial isolate (s) and determine the effects of pH and storage temperature on the antimicrobial properties of the crude bacteriocin extract. **Study Design:** The study was designed to isolate and characterize lactic acid bacteria from ogi, thereafter extract crude bacteriocins from the isolates and then determine the antibacterial activities of the bacteriocins so extracted against some known indicator organisms. **Place and Duration of Study:** Ogi samples were purchased from vendors who hawk it around the Benson Idahosa University campus and the study was done at the Department of Basic Sciences, Faculty of Basic and Applied Sciences, Benson Idahosa University, Benin City, Nigeria; between October 2012 and June 2013. **Methodology:** Preliminary isolation and characterization of lactic acid bacteria was done using standard microbiological methods after which the bacteriocins were extracted by propagating in 500ml MRS broth (pH 7.0 glucose 0.25% w/v) and incubated for 72h at 30⁰C under anaerobic conditions. Extract was obtained by centrifuging cultures at 10,000 rpm for 20 min. Antimicrobial activity of the extract was determined using agar well diffusion method. Indicator organisms utilized were; *Escherichia coli* and *Staphylococcus aureus*. The effects of pH and storage temperatures of the crude bacteriocin, on the antimicrobial properties were determined using standard methods. **Results:** *Lactobacillus plantarum*, *Lactobacillus casei*, *Lactobacillus brevis*, *Lactobacillus fermentum*, and *Lactobacillus jensenii* were the lactic acid bacteria species isolated and identified from the Ogi samples. *Lactobacillus plantarum* had the highest zone of inhibition during the screening test for antibacterial activity and was used to produce the bacteriocins used for the subsequent tests. At pH 2, there was a high antimicrobial activity but at pH 10, there was no antimicrobial activity. Crude bacteriocin extract stored at -20⁰C also showed the highest antimicrobial activity. **Conclusion:** This study has established that Ogi is a viable source of several lactobacilli which are capable of producing several antimicrobial compounds such as bacteriocins. It also established that bacteriocins recovered from *Lactobacillus plantarum* have a potent antimicrobial activity against a variety of both diarrhoeagenic and spoilage bacterial

35. Journal of Environmental Science, Toxicology and food Technology. 2015. 9(6):31-33

An Overview of the Distribution of *Staphylococcus aureus* in the hospital Environment.

E.M. Odoya, R.E. Ohenhen, C.T. Adias, O.N. Stanley and G.B. Ojusin

ABSTRACT

Background: Bacteria are the major causes of nosocomial infections. *Staphylococcus aureus* is highly invasive and virulent strains have been described as the aetiological agents of nosocomial

infections in different hospitals. The objective of the study was to determine the distribution of *S. aureus* qualitatively from various spaces in the hospital.

Materials: A general hospital in a semi urban community in Bayelsa State, Nigeria was used for this study. Sterile swab sticks moistened in sterile water used to smear the various spaces in the hospital. Mannitol salt agar was used for the culturing and identification was done using standard microbiological procedures.

Results: The result showed a prevalence of 54.05% of *Staphylococcus aureus* contaminated surfaces in the hospital environment. *S. aureus* was present in all the samples but the samples collected from the hospital toilet had 100% positive results followed by samples collected from the reception area while the lowest positive result was recorded in the samples collected from the hospital wards.

Conclusion: The fact that these contaminants were at high levels in these environments as established in this study is of great concern. These results suggest that disinfection by wiping with 80% (v/v) ethyl alcohol is not adequate for total elimination of *S. aureus*.

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