

ISSN 1682-8356  
ansinet.org/ijps



INTERNATIONAL JOURNAL OF  
**POULTRY SCIENCE**

**ANSI***net*

308 Lasani Town, Sargodha Road, Faisalabad - Pakistan  
Mob: +92 300 3008585, Fax: +92 41 8815544  
E-mail: editorijps@gmail.com

## Effect of Crude Oil Polluted Water on the Organs of Cockerel Reared under Intensive System

P.O. Akporhwarho

Department of Animal Science, Delta State University, Asaba Campus, Asaba, Nigeria

**Abstract:** Data from sixty day old Harco cockerel were used to determine the effect of Crude oil contaminated water on the internal organs of cockerel. There were four treatment groups with fifteen replicates each. Treatment one (T<sub>1</sub>) which received crude oil free water served as control. Treatment 2, 3 and 4 received crude oil contaminated water at the rate of 5 ml, 10 ml and 15 ml respectively. Both feed and water were provided *ad libitum*. The experiment lasted for eight weeks. At the end of the experiment two birds were picked randomly from each compartment and slaughtered for post mortem examination, from the result gizzard, heart, liver and spleen, were significantly ( $p < 0.05$ ) depressive as a result of the toxic effect of crude oil, while the intestine and testis were not significantly ( $p < 0.05$ ) affected. This could be as a result of the body's ability to build up resistance against the toxic effect of crude oil.

**Key words:** Effect, crude oil, polluted water, organs, cockerels

### INTRODUCTION

Environmental pollution has towards the end of last century attracted world attention (Nodu *et al.*, 2005). Several environmental pollutions have been identified in this regard with crude oil penciled as the most prominent and the most occurring (Da-silva *et al.*, 1997). Environmental pollution from crude oil and its products have been known to cause toxic consequences and biochemical alterations in the lives of both marine and terrestrial animals (Carls *et al.*, 1999; Ngodigha *et al.*, 1999; Ovuru *et al.*, 2004). The deleterious effect of crude oil pollution on animal lives is enhanced by the fact that crude oil contains high levels of aromatic hydrocarbon and polycyclic aromatic hydrocarbons which alter normal biochemical processes in animal life. It has been reported that polycyclic aromatic hydrocarbons enhances mono-oxygenase activities and alters the biochemical components of blood in animals that ingest it (Ovuru *et al.*, 2004; Akporhwarho *et al.*, 2011). Despite these negative reports on crude oil, the commodity remains the most important commodity in Nigeria on which her economy rest. Because of its (crude oil) importance in the economy of Nigeria, the product is being constantly explored and exploited especially in the Niger Delta area where it is found. This therefore increases the incidence of its spillage and consequent pollution of the environment. As stated earlier, it deleterious effects on animal lives know no bound as it affects all aspects of animal development including growth and reproduction.

However poultry production is of great importance to human due to its contribution to man and his society such as: providing protein for most people throughout the world such products are meat and egg which have high nutritive value to human. Poultry droppings are

used as source of manure and employment opportunity (Rodenburg *et al.*, 2003). Consequently, for there to be optimum production of meat and egg of birds and maximum growth, they have to be given the proper nutrition. Thus the requirement for any nutrients being the amount of the nutrient which must be applied in the ration to meet the needs of the normal health birds in an otherwise balanced ratio and in an environment compatible with good health. All poultry species must receive sufficient clean water daily, to balance losses and provide optimum amount needed for new tissue formulation and other production. Sources of drinking water for poultry production are very important particularly with intensive system. The exploration of crude oil brings, about the pollution of our environment including our water ways. Hence crude oil exposure presents a potential hazard to both aquatic and terrestrial species (Shore and Douben, 1994). Studies have however revealed devastating consequences of crude oil contamination on various parameters in farm animals. In this regard, Nwokolo *et al.* (1994) reported poor hatchability in chickens, Berepubo *et al.* (1994) noted reduction in size of testis with possible sub-fertility among male rabbits fed graded dietary crude oil while Ovuru and Oruwari (2005) also observed hyperemia, vascular dilation and progressive necroses in the liver as well as reduced spermatogenesis. Hence this study is to investigate the effect of crude oil polluted water on the organs parameters of cockerel.

### MATERIALS AND METHODS

Sixty day old harco cockerels purchased from a reputable hatchery in Agbor, Delta State, Nigeria were used for this research in the Delta State University, Asaba Campus, Teaching and Research Farm. On

arrival in the farm, they were left to rest for one week to recover from transportation stress and to acclimatize to the environment. They were randomly distributed into four groups (A, B, C and D) of 15 birds per group. Group A served as the control while birds in group B, C and D were placed on crude oil contaminated water levels of 5 ml, 10 ml and 15 ml respectively (i.e 0.05%, 0.10% and 0.15%). The water was contaminated using syringe with a maximum calibration of 20 ml. all the groups were replicated thrice with five birds each. Feed and water were served *ad libitum* for eight weeks. Administration of contaminated water was began on the eight days. The crude oil used for this study was obtained from Warri refinery and petrochemical company, Warri, Delta State, Nigeria under the permission from the Department of Petroleum Resources, NNPC, Warri, Nigeria. The crude oil was stored in a clean container and kept in laboratory until its required for used. At the end of eight week, two birds from each replicate were randomly selected, slaughtered, bled and scalded at 65°C in water bath for 30 sec before de feathering. The organs measured were the liver, lungs, heart, spleen intestine, testis and gizzard. Organs measured were expressed as g/kg. Data collected on the organs were subjected to analysis of variance and treatment means separated by Duncan's multiple range tests using SPSS package 2001.

Table 1: Effect of different level of crude oil on the internal organs of cockerel

Organs	A	B	C	D
Gizzard	58.01 <sup>a</sup> ±4.91	28.51 <sup>b</sup> ±4.23	32.83 <sup>b</sup> ±1.94	27.41 <sup>b</sup> ±6.42
Heart	6.63 <sup>a</sup> ±1.47	2.69 <sup>b</sup> ±0.74	25.70 <sup>b</sup> ±0.49	2.77 <sup>b</sup> ±0.26
Intestine	51.08 <sup>a</sup> ±10.93	45.63 <sup>a</sup> ±12.49	43.35 <sup>a</sup> ±6.54	26.29 <sup>b</sup> ±5.65
Liver	33.00 <sup>a</sup> ±6.16	12.29 <sup>b</sup> ±1.84	15.40 <sup>b</sup> ±0.74	14.38 <sup>b</sup> ±1.75
Lungs	5.11 <sup>a</sup> ±1.43	3.31 <sup>b</sup> ±0.80	3.58 <sup>b</sup> ±0.42	2.22 <sup>b</sup> ±0.94
Spleen	1.54 <sup>a</sup> ±0.38	0.55 <sup>b</sup> ±0.14	1.14 <sup>b</sup> ±0.19	0.26 <sup>b</sup> ±0.15
Testis	32.26 <sup>a</sup> ±6.16	26.05 <sup>b</sup> ±7.01	26.61 <sup>b</sup> ±3.01	5.14 <sup>b</sup> ±1.45

Means in the same row having different super subset are significantly different (p<0.05)

## RESULTS AND DISCUSSION

Table 1 above present the mean values and standard error for the internal organs weight (g) of cockerel birds fed with various level of crude oil polluted water. The effect of treatment was significantly different (p<0.05) on all the parameters measured. The result shows that crude oil contaminated water has depressive effect significantly on gizzard, heart and liver at treatment T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> while there is no significant effect of crude oil contaminated water on intestine and testis, lungs have no significant difference in treatments T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> except in T<sub>4</sub> while spleens have significant difference in T<sub>2</sub> and T<sub>4</sub>.

The reduction in size observed in the gizzard, heart and liver in the crude oil treatment group T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> when compared with T<sub>1</sub> which served as the control simply shows that the gizzard, heart and liver were responding

to the toxic effect due to the intake of crude oil contaminated water at different level (i.e 0.05%, 0.01% and 0.018%) respectively. The observations of this study have striking similarities with those observed by Ohale (1986) and Berepubo *et al.* (1994). The increase trend exhibited in treatments T<sub>2</sub> and T<sub>4</sub> by the spleen and non significant exhibited by the lungs in T<sub>2</sub> and T<sub>3</sub> except in T<sub>4</sub> was due to nothing shorts of the body's ability to build up resistance against the toxic effect of crude oil on these organs is in agreement with the report of Miller *et al.* (1998) and Ngodigha *et al.* (1999) on the post matern lesion of the organs of rabbit.

**Conclusion and recommendation:** The results of this study prove that at various level of crude oil contamination. The various organs of cockerel, response to the toxic effect of crude oil which has an adverse effect on them. This effect brings about decrease in size of birds and may lead to death due to much and prolong intake of the crude oil contaminate water.

Base on the outcome of this study, the following recommendation are necessary.

- The federal government of Nigeria should invest money to protecting the habitants of the oil producing areas from this unfortunate incidence of water and land pollution resulting from crude oil explorations.
- Farmers should ensure that water and feed given to birds and animal in general should be from a good source and be clean from all manner of pollution.

## REFERENCES

- Akporhwarho, P.O., I. Udeh, Isikwenu and O. Otobo, 2011. Effect of Crude oil polluted water on the haematology of cockerel reared under intensive system. 36th proceeding of the Annual conference of the Nigerian Society for Animal Production (NSAP) 30, pp: 130-131.
- Berepubo, N.A., N.C. Johnson and B.T. Sese, 1994. Growth potential and organ weights of weaner rabbits exposed to crude oil contaminated forage. *Int. J. Amin. Sci.*, 9: 73-76.
- Carls, M.G., S.D. Rice and J.E. Hose, 1999. Sensitivity of fish embryos to weathered crude oil: Part I. Low level exposure during incubation causes malformations, genetic damage and mortality in larval pacific herring (*Clupea pallasii*). *Environ. Toxicol. Chem.*, 18: 481-493.
- Da-silva, E.M., M. Peso-Aguitar, M.D.T. Navaro and C.A. Chastinet, 1997. Impact of petroleum pollution on aquatic coastal ecosystems in Brazil. *Environ. Toxicol. Chem.*, 16: 112-118.
- Miller, D. S.D. Peakall and W.B.L. Kinter, 1998. Ingestion of crude oil sublethal effects on rearing gull chicks. *J. Sci.*, 1991: 215-317.

- Ngodigha, E.M., F.O. Olayinka, B.M. Oruwavi, I.K.E. Ekweozor and S.M. Nekhe, 1999. Toxic effects of crude oil on organs and blood cells of West African Dwarf Goat. *Nig. Vet. J.*, 20: 82-91.
- Nodu, M.B., N.A. Berepubo and S.S. Ovuru, 2005. Puberty onset in young female rabbits experimentally fed crude oil contaminated forage. 30th proceedings of the Annual conference of the Nigerian Society for Animal production, 30 pp: 30-32.
- Nwokolo, E., L.O.C. Ohale, R. Ndaguide and E.C. Ibe, 1994. Anatomic and growth characteristic pullet chicks exposed to varying levels of Nigerian crude petroleum. Paper No PA/94/10.
- Ohale, L.D.C., 1986. Anatomical changes in the testis and comb of cockerel following hexesterol implantation. *Zoriya Vet.*, 1: 69-74.
- Ovuru, S.S., N.A. Beropubo and M.B. Modu, 2004. Biochemical blood parameters in semi-adult rabbits experimentally fed crude oil contaminated diets. *Afr. Biotech.*, 3: 343-345.
- Ovuru, S.I. and B.M. Oruwari, 2005. The effects of weathered crude oil (Bonny light) on blood cells profile and organ weights in rabbits. 30th proceeding of the Annual conference of Nigeria society for animal production (NSAP).
- Rodenburg, T.B., A.J. Buitenhuis, B. Ask, K.A. Uitdehaag, P. Koene, J.J. Van Der Poel and H. Bovenhuis, 2003. Heritability of feather pecking and Open-juiled response in Laying hens at two different ages. *Br. Poult. Sci.*, 82: 861-867.
- Shore, R.F. and P.E. Douben, 1994. Predicting ecotoxicological impacts of environmental contamination on terrestrial small mammals. *Rev. Environ. Contam. Toxicol.*, 13: 49-89.
- SPSS, 2001. Statistical package for social scientist SPSS Inc. Chicago IL.