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Preliminary Investigation of the Anti-cough Activities of the Aqueous Extract of *Vernonia amygdalina* Del leaf in Poultry Management.

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Abstract

The two respiratory diseases of birds in poultry management-catarrh and cough were treated with aqueous leaf extract of *Vernonia amygdalina*. Palm kernel cake-mixed feed was fed to acclimatized broilers, and the feed induced catarrh and cough in these birds. The arrival and post-acclimatization weights of the birds were measured and recorded. However, keeping the other natural materials that are used in treating respiratory diseases in birds aside, these birds was fed with hybrid feed according to their weights. An amount, 800 grammes of *Vernonia amygdalina* leaf were mashed with water (concoction) and the first-time mixture was administered to the coughing birds. It was observed that groups 2,3,4 and 5, that were given different weights by volumes (w/v) of animal/extract of 50/10, 100/16, 150/21, and 200/28 showed a reduction in the number of bouts of cough to the degree of 1,2, 2, and 1 respectively. However, this shows that the concoction of Vernonia amygdalina contains anti-cough agent that clears the respiratory airways of birds. The degree of airways clearance was found to be cocoction-concentration.

Keywords: catarrh, bouts, weight, poultry, cough, disease, catarrh, concoction.

Introduction

Chicken and egg production in Nigeria are generally faced with diseases as major constraint. Poultry diseases are managed very well by skilled veterinary Doctors. Palm kernel cake has been a major raw material in the poultry feed manufacture and it has become so vital that birds needed that for different anatomical, physiological and biochemical functions. It was also found out that when birds are fed with feedstuff high in palm kernel cake (PKC), incidence of catarrh and cough increased appreciably. However, cough in poultry can now be managed conveniently with the leaf extract of *Vernonia amygdalina* , also known as "bitter leaf'or "Shiwaka" (Hausa), "Onugbu"(Igbo) or "Ewuro" (Yoruba). *Vernonia amygdalina*, grows in tropical rainforest, coastal areas and Guinea savannah regions [21]. It is distributed from Sudan on the North to South Africa [12]. The shrub is 3-8m high, soft-wood with alternate oblong or elliptic lanceolate leaves, 7-15 cm by 3-7 cm concentrate basically and acuminate at apex. Inflorescence is scented, corymbiform with many capitulate, florets are white, bluish, flowering and fruiting period is usually in dry season {16}. Medicinally, the leaves have anti-oxidant {10; 7}, ant-inflammatory {22}, anti-microbial [6; 18; 23]; anti-diabetic [1; 2] and lipolytic activities [17]. Pastoralists and other livestock producers in the Northern Guinea savannah frequently utilize *Vernonia amygdalina* as anti-helminth in ruminant livestock. It is also used as vegetable in the Eastern Nigeria [9].

Vernonia amygdalina contains vernodalin, vernomygdin, saponin [5,] vitamin C [8], cardiac glycoside, flavonoids, sesquiterpene, lactones, vernolepin and kaempferol [12]. The rationale behind this study was to bring to bare theanti-cough activities of the leaf extract of *Vernonia amygdalina* using animal models.

Materials and Methods

Experimental ration/design

Pelletized growers (Vital) feed was purchased from ModernMarket Makurdi, Benue State, Nigeria. The feed and palm kernel cake were weighed in the ratio of 5:2, mixed and kept in an air-tight and dried containers for animal feeding.

Ethical clearance

The ethical consideration for the animals was obtained from the animal Right Board, College of Vetenary Medicine, Joseph Sarwuan Tarka Univisity, Makurdi, Benue State Nigeria.

Animal grouping and treatment

Twenty five (25) male Broilers of four weeks old were procured from the University's poultry at the College of Animal production, North Core of the Federal University of Agriculture Makurdi, Benue State, Nigeria. The birds were grouped in to five with five birds per group and were treated as follows

Group 1: Normal control (Acclimatized Broilers + standard feed + water)

Group 2: (Acclimatized Broilers + 50 mg/kg b.w of mixed feed + PKC + water)

Group 3: (Acclimatized Broilers + 100 mg/kg b.w of mixed feed + PKC + water)

Group 4: (Acclimatized Broilers +150 mg/kg b.w of mixed feed + PKC + water)

Group 5: (Acclimatized Broilers + 200 mg/kg b.w of mixed feed + PKC + water)

Experimental

Five groups of five male Broilers each of four (4) weeks were weighed on arrival and fed with standard feed and water *ad libitium* for two weeks and were re-weighed, after which their masses, initial and final were recorded. At the end of this period, they were started on the 5:2 mixed vital grower's feed and palm kernel cake (PKC) in varied quantities and water *ad libitium* for another two weeks. Within the first week however, the number of times/ bouts of cough in the animals were observed and recorded. Also, by the second week, 800 grams of *Vernonia amygdalina* leaves dried at room temperature were mashed and the first time-water was collected and administered to the coughing birds. The administration of this aqueous extract was in order of 10 mL to the 50 Mg/ kg b.w, 16 mL to 100 Mg/kg b.w, 21 mL to 150 Mg/kg b.w and 28 mL to 200 Mg/kg b.w . The order of cough reduction was 1,2, 2, 1 for groups 2, 3, 4 and 5 respectively.

Statistical analysis

The data obtained in this study were expressed as mean ± S.D. Test for significance between mean parameter in respect of group differences were performed using student t-test [19].

Results and Discussion

Results of the preliminary investigation of the anti-cough activities of the aqueous extract of *Vernonia amygdalina* Del leaf in poultry management are presented in the Figures below. Figure 1 showed tha arrival weight of the experimental animals (Chicks). The weights ranged 1.07 through 1.07 kg. These chicks were acclimatized for seven days and their weights were taken again (Figure 2). The weight range were recorded as 1.40 through 2.20 kg. The animals were treated with standard feed and paln kernel cakes. Reduction in cough bouts on adminstration of *Vernonia amygdalina* concoction is presented in Figure 3. The concoction significantly reduced the coughing bouts from range of 3-5 bouts per hour to 0.2-0.4 bouts per hour.

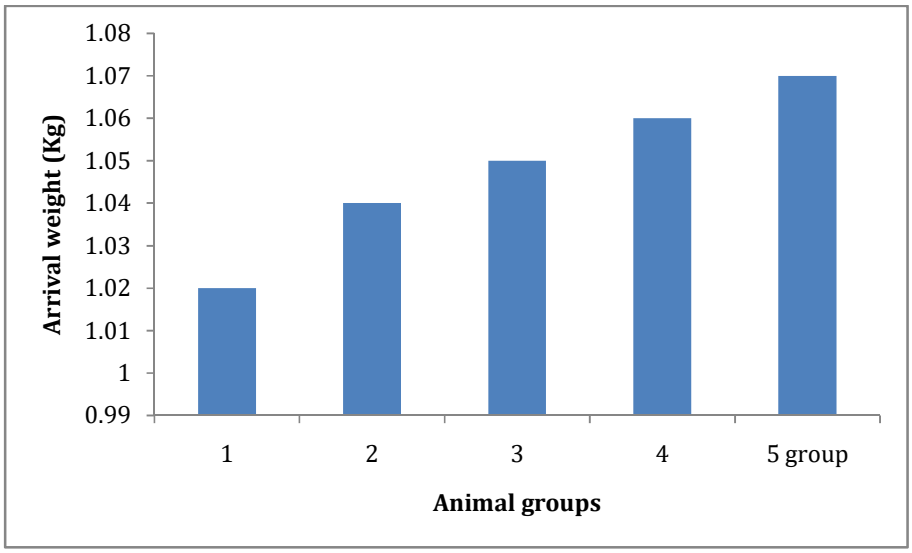

Figure 1. The arrival weight of the experimental animals (Chicks)

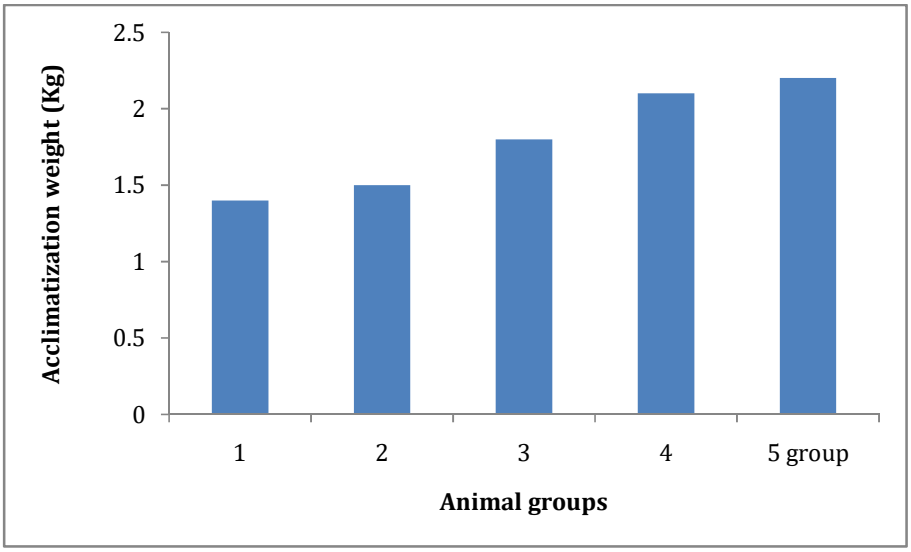

Figure 2 presents the acclimatization weight of the chicks which increased from 1.40 through 2.20 kg within one week.

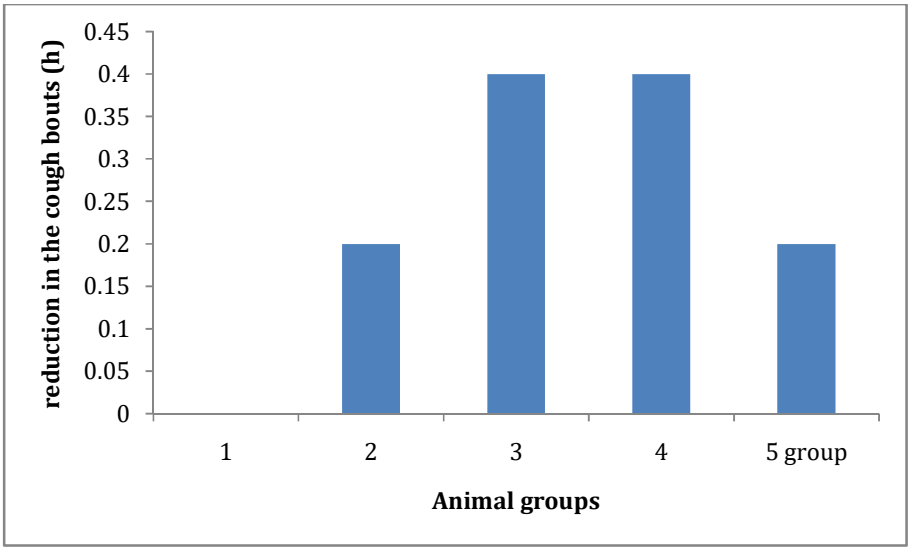

Figure 3. Reduction in cough bouts on administration of *Vernonia amygdalina* concoction

Cough and catarrh are respiratory diseases of farm animals which may be caused by microbes or feed. In this feed-induced respiratory diseases, such symptoms as coughing, sneezing, swollen faces, nasal discharges, frothy eyes and a drop in egg-laying capacity among others are common. Sometimes, there is loss of appetite and yellowish droppings [5]. In peasantry/backyard poultry management, some natural materials that are used in treating the birds are- white vinegar, molasses solution, sugar solution, honey and electrolyte.The anti-cough activity shown by the aqueous extract of *Vernonia amygdalina* leaf on poultry at a concentration of 0 , 50 , 100 , 150 and 200 Mg agrees with the report of [12; 16], that the leaves are used to treat pneumonia, skin infections as well as cough. The anti-microbial activity exhibited by *Vernonia amygdalina* may be due to the presence of its phytochemicals. This agrees with the reports of [10; 7] as well as [6] that bitter leaf contained flavonoids which have anti-oxidant and anti-microbial activities. Also, the bitter principles in bitter leaf as well as the astringent properties made bitter leaf an anti-diabetic agent [1]. [22] reported the anti-inflammatory

activity of bitter leaf and this is in concordance with its use in treating skin infections [16]. Medicinally, the leaves are used as anti-malarial, anti-microbial, diuretic and anti-helminthi agent. It is a purgative and general tonic but can be used as a topical lotion for parasitic skin diseases as they are used to check nausea and to wean children [12]. The peeled stem is used to clean teeth and the bark is administered for several diseases and diarrhoea. But the root is very poisonous [12]. Other uses of this are in artritis, diabetes mellitus, insomnia, liver and kidney problems [1]. In this study, it was observed that in the avian family, an increase in feed and water intake is an important index of good health, growth and development generally result to an increase in weight. A look at figures 1 and 2 shows an increase in the weight of the birds comparing the arrival and post-acclimatization weights. Weight gain in experimental animal models is an indicator of improved environment, feed intake and good acclimatization care. However, the increased body weight could be due to increased feed and water intake observed all through the experimental period [20]. It was also observed that the cough induced by the palm kernel cake in the post-acclimatization feeding decreases in its number of bouts per hour as both the animal weight and concentrations of the *Vernonia amygdalina* aqueous extract increase. The number of bouts plateaus in groups 3 and 4 and tails in group 5. Hence, *Vernonia amygdalina* may be useful in boosting animal production in Nigeria. Our findings were also supported by the reports of [13] that *Vernonia amygdalina* contains vernodalin-vernonin (alkaloid) and cardiac glycoside. Consumption of *Vernonia amygdalina* leaves may not pose any threat of carcinogenicity on animals liable to consume it since some steroids are carcinogenic and vernonia leaves lack steroid. The bitter leaf water was able to reduce the number of bouts of coughing in the experimental birds minimally and this was supported by [14] who reported that the flavonoids component of the phytochemicals present in the *Vernonia amygdalina* water exhibit anti-viral activities. [11] also reported the pharmacognostic importance of *Vernonia amygdalina* leaf in veterinary practices.

Conclusion

This study showed that *Vernonia amygdalina* aqueous leaf extract has possible cough-reducing activities that lowered to the barest minimum the number of the coughing bouts in birds fed with palm kernel cake-mixed feedstuff. However, it is recommended that further work should be done to know the actual component of the extract responsible for the observed activities.

Declaration of conflicting interests

The authors declared no potential conflicts of interest

References

[1] Adeniji, M.O. (2003). Medicinal Plants in Nigeria. Herbal treatment of Human Diseases. YNK International (Nig) Ltd. pp.17-28.

[2] .Akpawo, M. I., Atanwho, U, Akpantah, A, Fischer, V. A., Igiri, A and Ebong, E. (2011). Effects of combined leaf extracts of *Gongronema latifolum* (Utazi) on the pancreatic β-cells of Streptozocin- induced diabetic rats. *British Journal of Medicine and Medical Reserve,* **1** (1): 24-34.

[3] .Alada, A. R.A, Salman, T. M, and Oyebola, D. D. O. (2014). Role of Adrenergic Receptors in Glucose, Fructose and Galactose Uptake in Dogs. Nigerian Journal of physiological Science: **29** (12): 088-089.

[4]. Atangwho, I. J.,Egbung, G. E., Ahmad, M, Yam, M. F. and Asmawi, M. Z. (2013). Antioxidant and anti-diabetic properties of leaves from *Vernonia amygdalina* Del. Growing in Malayasia. *Food Chemistry* 141**:** 3428-3434.

[5] Collins Korang (2018). Fourteen Major Chicken Diseases, Symptoms, Prevention and Treatments. My Farms Blog Agrihome.

[6] Cushine, T. P. and Lamb, A. J. (2005). Anti-microbial activities of flavonoids. International Journal of Anti-microbial Agents., 26**:** 343-356.

[7]. Disilvestro, R. A. (2001). Flavonoids as anti-oxidants. In Handbooks of Nutraceaucals and Functional foods. Wildman REC (edition) Chapter 8: *CRC Boca Raton* pp.127-142.

[8] Ghana Herbal Pharmacopoiea (GHP) (1992). Technology Transfer Centre (TTC), *Council for Scientific and Industrial Research (CSIR).* Accra, Ghana. Pp. 40.

[9] Green, B. O. (2006). Principles of Angiosperm Taxonomy. Osia International , Port-Harcourt, Nigeria. pp.7-93.

[10] Guo, J. J., Hsiah, H.Y. and Hu (2009). Chain-breaking activity of carotenes in lipid peroxidation. A theoretical study. *Journal of physical chemistry,* 113; 15699-15708.

[11].Ibrahim ,G., Abdurahman, E.M and Katayal, V.A. (2004). Pharmacognostic studies on the leaves of *Vernonia amygdalina* Del. (Asteraceae). *Nigerian Journal of Natural Products and Medicine.* 08: pp.8-89.

[12] Iwu, M. M, (1993). *Vernonia amygdalina* Del. (Compositae). Handbook of Africa Medicinal

Plants. *CRC Press Boca Ann. Abor* London. pp. 256.

[13] Jisaka, M. Ohigashi, H., Takegawa, K., Hirota, M ., Irie, R., Huffman, A., Kashimizu, K. (1993). Steroid glycosides from *Vernonia amygdalina*; A possible Chimpanzee plant medicinal plants. *Phytochemistry.*34: 409-413.

[14] Kevin Zandi, Boon-Teong Teoh, Sing-Sin Sam, Pooi-Fong, Mohd Rais Mustafa and Sazaly Abubakar (2011). Anti-viral activity of Four types of bioflavonoid against dengue virus type 2. *SPRINGER NATURE.* Virology Journal 8 : 560.

[15].Kupchan, N., Hemingway, R. J. Karin, A and Weiner, D. (1969). *Journal of Organic Chemistry* 34; 3908-3911.

[16] Mann, A., Gbate, N. And Umar, A. N. (2003). *Vernonia amygdalina* .Medicinal and Economic Plants of Nupe land. *Jube Evans Books and Publications,* pp. 80.

[17] Nwankwo, M. O., Etim, E. E. and Ogbonna, I. O. (2018). The lipolytic potentials of leaf extract of *Vernonia amygdalina*, *Newboldia laevis* and *Gmelina arborea* on lard of pork. *Journal of Scientific and Engineering Research,* **5** (8): 30-33.

[18] Oloyede, G. K., Onocha, P. A., Soyinka, J., Oguntokun, O. W. and Thonda, E. (2010). Phytochemical Screening, anti-microbial and anti-oxidant activities of four Nigerian edicinal plants. *Annals of Biological Research* 1 (2): 114-120.

[19] Petrie, A and Watson, P. (2002). Statistics of Veterinary and Animal Sciences , *Blackwell Science Limited,* UK, pp.78-88.

[20] Rodwell, V. W., 2003. Conversion of amino acids to specialized products In: Harper's Illustrated Biochemistry, 26th edition.,*Mc Graw Hill,* London, pp. 264-269.

[21] Saganuwan, A. S. (2009). Tropical plants with anti-hypertensive, anti-asthmatic, and anti-diabetic values. *Journal of Herbs, Spices. Medicinal plants.* **15** (1): 26-48.

[22] Sushil, K. J. and Nishreen, S. B. (2017). Choline metabolic pathway gene polymorphism and risk for Down syndrome: An association study in a population with folate-homocysteine metabolic impairement. *European Journal of Chemical nutrition* **71** (1): 45

[23] Udochukwu, U., Omeje, F. I. , Ulome, I. S., Oseiwe, I. D., (2015). Phytochemical Analysis of *Vernonia amygdalina*, *Ocimum gratissimum* Extracts and their anti- bacterial activity on some Drug Resistant Bacteria. *American Journal of Reserve Communication,* **3** (5): 225-235.

[24 Ukwe, C. V., C. M. Ubaka, and S. U. Obi 2006, The anti-inflammatory effects of aqueous extract of the whole plant of *Phyllantus amarus. Journal of Medicine and Pharmacological Science* **2** (3) : 25-54.

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