Nigerian J. Anim. Sci. 2021, 23 (1): 86-94

A survey on phytogenic extracts commonly used in the control of Newcastle disease in indigenous chickens raised in Yewa South local government area of Nigeria

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***Target Audience:** Farmers, Researchers, Poultry farmers, and Feed millers.*

Abstract

Newcastle disease remains one of the major diseases ravaging the poultry industry in Nigeria. This study was conducted to determine the medicinal plants used as a cure for Newcastle disease in indigenous chicken in Yewa South Local Government, Ogun State, using semi-structured questionnaires. One hundred questionnaires were randomly administered. However, ninety-nine (99) were retrieved. Data were collected on socio-economic characteristics of respondents, distribution of villager's ownership to indigenous chicken in accordance to disease recognition and cure of Newcastle disease. Results showed that female respondents (57.58%) were mainly involved in rural poultry production than their male counterparts (42.42% %). Most indigenes in the locality raised their birds on a semi-intensive system (92.93%) of management. Poultry birds were raised for mostly household consumption (37.37%) and income (29.29%). Results further revealed that 37.37% of the farmers are very familiar with the Newcastle disease, also, 37.37% of the farmers know a bit about the disease. Most farmers believe that bitter leaf (Vernonia amygdalina) and Christmas melon (Cucumis melo) serve as a cure to prevent Newcastle disease. The study concluded that bitter leaf and Christmas melon are the most frequently used phytogenic plants used as a cure for Newcastle disease in Yewa South Local Government.

***Keywords:** Poultry; indigenous chicken; Newcastle disease; Bitter leaf; Phytogenic; ethno-veterinary*

Description of Problem

In most developing countries like Nigeria, the poultry industry is saddled with the responsibility of boosting animal protein. Poultry production has a quick return on investment when compared to other sectors of animal production (1). According to FAO (2) poultry population is estimated to be about 180 million in the industry, consisting mainly of chickens, turkeys, quails, guinea fowl, geese and ducks in the world. In Nigeria, poultry production contributes to about 9-10% of the total agricultural GDP (3) raising the net worth of about 250 billion in Nigeria. This sector is characterised by quite a range of constraints ranging from decreased weight gain, management problems, and infectious diseases.

Indigenous chicken is mostly preferred among the local indigenes of Nigeria, this breed of chicken is characterised based on the plumage colour, body structure, (such as naked neck, dwarf types, and colour variants (such as black, white, brown, mottled, etc.) (4). The importance of Indigenous chickens in the production of protein food and household income cannot be overlooked. Local chicken production serves as an income revenue to local farmers and helps in bridging protein malnutrition.

In poultry production, antibiotics have been the major remedy to solve the challenges

posed by different infections, this usually results in increased cost of production and ultimately reducing the net returns (5). Antibiotics as additives in poultry in most developed countries have been banned by the European union in 2006, this is majorly due to its antibacterial resistance in birds which invariably has it effect on human health (6). Poultry researchers are therefore considering an alternative means of enhancing growth and improving the health status of poultry birds without the use of antibiotics. More attention is given to indigenous medicines such as phytogenic materials that can be used in preventing and curing certain diseases in poultry (1).

Researches on herbs as a form of food safety measure in order to prevent/reduce the negative impact of drugs of synthetic origin on animal and human health and the environment at large is ongoing (7). These herbs are generally referred to as phytogenics. Phytogenics are of plant origin incorporated into either feed or water of the birds to enhance productivity, nutrient absorption, and elimination of pathogens in the gut of the birds (8). They serve as traditional treatments in the treatment of most poultry diseases. Phytogenics are relatively new feed additives, knowledge about their modes of action and the aspects of application is still rather limited (9). Phytogenic plants have been reported to possess bioactive compounds such as steroids, saponins, flavonoids, phenols, and so on. These bioactive compounds play a role in the strengthening of the immune system, increase feed palatability and feed intake, stimulation of digestive enzymes, stabilization of the intestinal microflora, and prevention of some diseases microbiota (10). Bitter leaf (*Vernonia amygdalina*) and Christmas melon (*Cucumis melo*) are important phytogenic considered in curing infectious diseases in poultry production.

Bitter leaf (*Vernonia amygdalina*) is one of the most famous plants in Africa and Asia, it is one of the most prominent species of family Asteraceae that had been studied in Africa (11; 12; 13; 14; 15). Bitter leaf (*Vernonia amygdalina)* is a shrub and it's one of the edible vegetables in Nigeria. It can be described as a medicinal plant which can be used for different therapeutic purposes in human (16). In livestock production, the bitter leaf has been reported to be beneficial in the management of poultry diseases serving as an anti-bacterial, anti-parasitic, anti-coccidiosis, and also enhancing the gastro-intestinal enzymes thereby promoting feed efficiency and growth (17; 18; 19; 20).

Christmas melon is a rough-skinned variety of Muskmelon (*Cucumis melo L.*), belonging to the Cucurbitaceae family. Others belonging to this variety are; Cantaloupe and Persian melon. There is also the smooth-skinned variety which includes; Honeydew, Crenshaw, and Casaba (*C. melo var. inodorous*), and another variety which is used when they are immature as vegetables like Barattiere, Carosello, and Armenian Cucumber (*Cucumis. melo* var. flexuosus) (21). Christmas melon is of great economic importance and it is largely cultivated in Africa and Europe.

An important viral disease in the poultry industry is Newcastle disease. It is an acute viral disease that affects all forms of poultry and can lead to drastic economic loss in commercial poultry farming (22; 23; 24; 25). Newcastle disease has a wide range of hosts which comprises about 241 species of 27 orders, of the 50 known orders of birds. Newcastle disease in poultry is majorly characterised by respiratory and nervous breakdown (26). Over the years, vaccines have been developed to combat the virus which ranges from the use of life to inactivated vaccines (27). The objective of this study was to determine the commonly used phytogenic plant in curing Newcastle disease in indigenous chicken in Yewa South local

government of Ogun state, Nigeria.

Materials and Methods

A total number of one hundred (100) indigenous poultry owners in Yewa South Local Government Areas of Ogun State were surveyed in respect of their perceptions of the status of poultry health delivery in their areas. The target respondents which were adults and who keep poultry were selected at random at Yewa South Local Government. A Multi-stage sampling technique was used to select the respondents for the study. The selection was as follow:

Stage 1: Out of the blocks in Yewa South Local Government Area of Ogun State, five (5) villages were selected randomly from each of the blocks.

Stage 2: Twenty (20) respondents from each of the villages were randomly selected. Making a total of 100 respondents.

Stage 3: One hundred (100) samples of questionnaires were prepared for those villages in Yewa South Local Government Area of Ogun State.

Table 1: Distribution of socioeconomic characteristics of the respondent

Variables	Frequency	Percentage
Age		
20 to 30	8	8.08
31 to 40	25	25.25
41 to 50	30	30.3
51 to 60	20	20.2
>60	16	16.16
Total	**99**	**100**
Sex		
Female	57	57.58
Male	42	42.42
Total	**99**	**100**
Education Level		
No formal Education	8	8.08
Primary	23	23.23
Secondary	49	49.49
Tertiary	19	19.19
Total	**99**	**100**
Reason for Raising Indigenous Chicken		
Consumption	37	37.37
Consumption & Cultural	18	18.18
Consumption & Profit	29	29.29
Consumption, Cultural & Profit	11	11.11
Cultural & Profit	4	4.05
Total	**99**	**100**

Source: Field Survey, 2020

Data Analysis

The data collected from this study were subjected to descriptive statistical analysis using Statistical Package for Social Sciences (SPSS). Descriptive statistic such as percentage, mean and frequency distribution was used to describe the socio-economic characteristics of the villagers in this study.

Results and Discussion

The Socio-economic characteristics of the respondent in Yewa South Local Government are presented in Table 1. The result revealed that 8.08% of respondents were between ages 20 – 30, 25.25% of the respondents were between ages 31 – 40, 30.3% of respondent were between age 41 – 50, 20.2% of respondent were between age 51 – 60, 16.16% of respondent were between age >60. The study recorded a higher percentage of indigenous poultry farmers to be female (57.58%) compared to their male counterparts (42.24%). The larger percentage of female livestock farmers indicates the dominance of gender in the poultry business since women and children play a key role in the management of homes and the marketing and processing of farm produces. This result is in line with the reports of (28; 29 and 30). Chicken husbandry is mostly practiced by women in most developing nations and it is mostly raised on small scale and so required less labour (31; 32). The level of education was on the average with about 49.49% attaining secondary education, 23.23% attained primary education, and 19.19% attained tertiary education, the implication of these findings is that majority of the respondents might have acquired knowledge and skills involved in poultry production through various forms of education during schooling, this result also agrees with the findings of Ekunseitan (29).

Table 2: Distribution according to disease recognition

Variables	Frequency	Percentage
Newcastle Knowledge		
Know a little bit	37	37.37
Know it really well	37	37.37
Know more than some	2	2.02
Know nothing at all	15	15.15
Know some	8	8.08
Total	99	100
Risk of Newcastle Knowledge		
Know a little bit	37	37.37
Know it really well	37	37.37
Know more than some	2	2.02
Know nothing at all	15	15.15
Know some	8	8.08
Total	99	100
Prevention of Newcastle Disease		
Know a little bit	37	37.37
Know it really well	37	37.37
Know more than some	2	2.02
Know nothing at all	15	15.15
Know some	8	8.08
Total	99	100
Effect of Newcastle		
Know a little bit	37	37.37
Know it really well	37	37.37
Know more than some	2	2.02
Know nothing at all	15	15.15
Know some	8	8.08
Total	99	100

Source: Field Survey, 2020

According to this study, a higher percentage (37.37%) of the sampled population raised indigenous birds for the primary purpose of consumption, while 18.18% raised for consumption and cultural purpose, 29.29% primarily keep indigenous chicken for consumption and profit. This is similar to the findings of Ekunseitan (29) who reported that poultry farmers in Odeda and Ifo Local Government of Ogun state majorly were influenced by culture, religion, food, and monetary gains. These factors are social elements governing the sustainability of family poultry. Since chicken is a rich source of quality protein, minerals, and vitamins, village chicken production plays a significant socio-economic role to farmers and people in developing countries in meeting their protein requirement as shown in the percentages obtained in this study, they also provide regular household revenue through sales and as a starting capital for young people and petty cash for livestock farmers (33; 34).

The distribution according to disease recognition in Yewa South Local Government is presented in Table 2. It can be observed that 37.37% of the respondent have prior knowledge of Newcastle disease, 37.37% of the population are well informed about the disease, and 2.02% of the respondent has an average knowledge of Newcastle disease while 15.15% of the respondent has no prior knowledge about Newcastle disease. More than half of the sampled population are aware of the risk and prevention of Newcastle disease.

Table 3: Distribution according to signs noticed in the indigenous chicken

Variables	Frequency	Percentage
Twisting of neck		
Yes	99	100
No	0	0
Total	99	100
Greenish Diarrhoea		
Yes	7	7.07
No	92	92.93
Total	99	100
Paralysis		
Yes	75	75.76
No	24	24.24
Total	99	100
Circling		
Yes	89	89.90
No	10	10.10
Total	99	100
Drooping wings		
Yes	23	23.23
No	76	76.77
Total	99	100

Source: Field Survey, 2020

Table 4: Distribution according to cure of Newcastle disease

Variables	Frequency	Percentage
***Vernonia amygdalina* as cure**		
Yes	46	46.46
No	53	53.54
Total	99	100
Other Herbals		
Neem leaf	2	1.06
Scent leaf	9	9.43
Christmas melon	23	23.04
Scent leaf and Christmas melon	15	15.14
None	4	4.87
Total	53	53.54
Part of *Vernonia amygdalina* used		
Leaves	40	86.96
Bark	6	13.04
Total	46	100

Personal communication during the administration of the questionnaire revealed some common diseases that occurred within their flock in Yewa South Local Government whereby the prevalence is Newcastle disease (NCD) and had been observed as one of the major constraints to family poultry. This is avowed by (35) who attributed a higher percentage of loss to diseases (36.70 %). Newcastle disease is the most widespread disease in Africa (36) and has been identified and implicated as the major problem in village poultry production resulting in nearly absolute (100%) mortality in severe cases (37; 38). Since birds are reared on a semi-intensive and extensive system of management, they are never vaccinated and only received little care when infected.

The distribution according to the signs noticed in the indigenous chicken in Yewa South Local Government is presented in table 3. Twisting of the neck was observed to be the most frequent symptom observed by the respondents (100%), only a few respondents observed greenish diarrhoea (7.07%) in the birds, while 75.76% of the respondent noticed paralysis in the bird infected with Newcastle disease. The cyclic movement was also one of the symptoms exhibited by the birds according to the respondents (89.90%) and 23.23% of the respondent noticed dropping of wings. This result indicated the prevalence and recognition of the disease among the indigenous people of Yewa South. The majority of the respondent identifies twisting of the neck, circling has a major symptom observed in birds infected with Newcastle Disease Virus and about 75.76% record paralysis in this birds.

The distribution according to the cure of Newcastle Disease in indigenous chicken in Yewa South Local Government is presented in table 4. It revealed that 46.46% of the respondent make use of bitter leaf (*Vernonia amygdalina)* as a cure of Newcastle Disease, about 86.96% of the respondent make use of the leaf part of the plant while 13.04% make use of the bark part. Another commonly used phytogenic among the rural indigenes of Yewa south local government was Christmas melon (locally known as Tangiri), about 42.42% of the respondents were reported to use this plant in curing Newcastle disease in indigenous chicken. Neem leaf and scent leaf were observed to be the least commonly used phytogenic in the treatment of Newcastle disease among the indigenes of Yewa south local government (2.02 and 18.18% respectively). Indigenous poultry farmers in Yewa South local government area used ethno-veterinary interventions at every given

opportunity, the wealth of plants within their communities occasioned the use of traditional remedies in controlling diseases predominating in village poultry production where drugs and vaccines are not available or seen as expensive (29). Phytogenic plants are ecologically friendly and their influence on the health of birds makes them rank first as the first option at the onset of infection or in the treatment of diseased birds. About 46.46% of the respondents believe the use of bitter leaf (*Vernonia amygdalina*) is a cure, while 42.42% used Christmas melon as a cure for Newcastle disease in indigenous poultry.

Other plants mentioned by the villagers include Scent leaf 18.18%, a combination of Scent leaf and Christmas melon 28.28%. A higher percentage believed bitter leave serve as a cure to Newcastle disease in indigenous chicken.

Conclusion and Applications

1. Bitter leaf is the most frequently used phytotherapeutic in rural poultry health management and as a treatment for Newcastle disease in indigenous birds.
2. Bitter leaf (Vernonia amygdalina) and Christmas melon (Tagiri) are believed to serve as a cure for Newcastle disease among the rural dwellers of Yewa South Local Government of Ogun state.

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