



Inventory of Ethno-Botanical Knowledge and Indigenous Perception of Plants used in Poultry Farms in the Maritime Region of Togo.

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Abstract: This study aimed at making an inventory of the plants used in poultry farming for nutritional and/or sanitary purposes. The research was conducted in the maritime region of Togo. Semi-structured questionnaires through individual and focus groups interviews, complemented by field observations were used to collect data from 175 poultry farmers. The study revealed 08 uses (pathological and nutritional) of plants in poultry farming. To fight these diseases, 50 plant species of 32 families were identified. Plant leaves were mostly used at a frequency of 60%. Eight preparation methods were identified, with maceration (51%) being the most commonly used. The sources of ethno-medicinal knowledge (veterinary) were mainly through heritage (37.79%) and training (35.47%). This study defined the basic indigenous knowledge of plants which are used in the feeding and treatment of avian pathologies. The inventory showed that Newcastle diseases and bacterial diseases are the most common in poultry and that requires immediate action. Furthermore, farmers inherited most of these recipes from their parents and they use them because of their effectiveness.

Keywords: Bird, Ethno-medicine, Nutritional, Pathologies, Survey

1. INTRODUCTION

Livestock production is one of the main activities undertaken by man to address the issue of food security. It contributes to the global economy in general, and to that of African countries in particular (Ogni et al., 2014). In Togo, it contributes more than 40% to the total Gross Domestic Product (GDP). There are 95.8% of agricultural households, 70.1% of which are simultaneously engaged in agricultural household and livestock farming. Throughout the Togolese national territory, extensive poultry farming is more practised by the population and account for 43.18% of the animals raised (MAEP, 2013).

Unfortunately, the development of poultry farming in Africa in general, and in Togo in particular, is confronted with several constraints of pathological nature (Newcastle, infectious bronchitis, Gumboro, coccidiosis, fowlpox, and avian influenza) and sanitary nature (non-existence of biosecurity measures in poultry farms) (Boko et al., 2015). Farmers find it difficult to address these constraints due to the inaccessibility of veterinary products, their high costs, effectiveness and use (Dassou et al., 2014). Thus, farmers living with their animals and having always observing their behaviours, have been able to establish over time the traditional veterinary ethno-medicine (Upadhyay et al., 2011).

With a view to enhancing the value of plant species in Togo poultry farming, research was carried out on *Carica papaya* L. (Dassidi et al., 2020), *Manihot esculenta* Crantz (Ngueda djéuta et al., 2020), *Moringa oleifera* Lam, (N'nanle et al., 2020) and *Vernonia amygdalina* Delile (Tokofai et al., 2020). All these works have been focused on the incorporation of plant organs in poultry feed, with good results. However, these studies were limited to only a few nutritional, parasitic and anticoccidial plants, furthermore they do not take into account all the practices of the traditional pharmacopoeia.

In the field of traditional pharmacopoeia, the knowledge is related to recipes which is transmitted orally from generation to generation within society and remains a heritage for either the family or a particular

social group in the village or region (Dassou et al., 2014). Thus, the risk of disappearance of this endogenous knowledge is very high, if it is not documented (Devendrakumar et al., 2012). It is within this framework that the present work enrolls the overall objective which is to make an inventory of ethno medical veterinary knowledge and the endogenous perception of the use of plants in poultry farms in the maritime region of Togo.

2. MATERIALS AND METHODS

2.1. Environment Study

Togo is a West African country located between 6° and 11° North latitude; 0° and 12° East longitude. It has five regions, including the maritime region. The maritime region is located in the south of Togo, on the edge of the Atlantic Ocean. It extends between 6°00' and 6°50' North latitude; 0°25' and 2°00' East longitude (figure 1). Its surface area is 6395 km, i.e., 11.30% of the national territory.

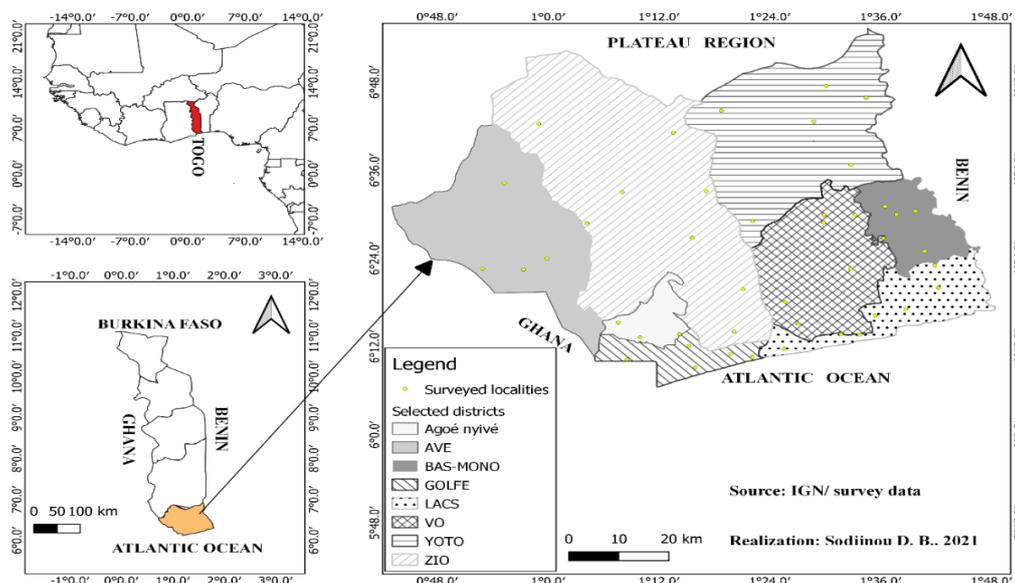


Figure 1. The Map of the maritime region of Togo showing the investigation area.

2.2. Data Collection

Data was collected from 175 poultry farmers (traditional and modern) in the maritime region. The interview was conducted with the poultry farmers after the objectives of the work had been explained to the local authorities (canton chiefs, village chiefs, etc.). The survey was carried out in 44 villages evenly distributed in the diction. Semi-directive ethnobotanical surveys through individual and focus groups interviews with poultry farmers, complemented by field observations (Péréki et al., 2012) were the methodology adopted. The questionnaire addressed aspects such as: socio-demographic characteristics, plant names, plant organs used and there uses, origin of ethno-veterinary knowledge. After the collection and sampling of plants, mentioned by the respondents, the identification was carried out by the research team of the Laboratory of Botany and Plant Ecology (LBEV), University of Lome, Then the plants families were then searched using analytical flora of Benin by Akoègninou et al., 2006).

2.3. Statistical Analysis

The data collected was encoded in Excel 2013. Histograms were made with GraphPad Prism software, version 5.0.0.288 (28/08/2018).

3. RESULTS

3.1. Frequency of use and Ethno-Veterinary Knowledge of Plants and their Organs

Figure 1 (a) shows the rate of respondents who use the plants in poultry farming. It was found that the frequency of farmers using the plant is 97.71% against 2.29% for those who do not use plants in poultry farming. As for the frequency of use of plant organs (Figure 1b), it indicates that leaves of the plants are more used (59.68%). They are followed by stem bark (26.61%). Among the organs that are rarely used in poultry farming, we can mention Flowers (0.81%) and roots (1.61%). Regarding the method of preparation (Figure 1c) shows six (6) modes of preparation of which the most applied in poultry farming

is maceration (51.33%). The preparation methods, Crushing and powdering are moderately cited with a percentage of (0.88%) each. Taking into account the poultry counted (Figure 1d), Local hens (57.14%) are the highest, followed by laying hens (35.43%). Pigeons (2.86%) are kept in the minority. Figure 1e shows that intestinal wounds remain the most treated disease by poultry farmers with a percentage of (17.12%). Among the uses that have a percentage lower than 2%, we can mention scabies, bio-vaccine, etc. This study also looked at the origin of ethno veterinary knowledge (Figure 1f). The analysis of this figure shows that the main source of ethno veterinary knowledge is heritage (37.79%). This is followed by the training of poultry farmers (35.47%).

3.2. Description of Recipes by Poultry Farmers in the Maritime Region

At the end of the survey, fifty (50) plants were inventoried for pathological and nutritional uses (Table 4). Eight (08) uses were counted, among them were pathological uses (infectious diseases, parasitic disease, viral diseases etc.) and nutritional uses. Concerning nutritional use, twelve (12) plants were cited by the respondents. These include *Gliricidia sepium*, *Ocimum gratissimum*, *Moringa oleifera*, *Manihot esculenta*, *Leucaena leucocephala*, etc. These plants are generally dried and incorporated inside food to overcome nutritional deficiencies. As for viral diseases, seven (07) plants were identified, as used to treat Newcastle and Gomboro. Among these plants are *Launea taraxacifolia*, *Nicotina tabacum*, *Bridelia ferruginea* etc. The back of the stems and leaves are the most used organs to treat these viral pathologies. Concerning parasitic pathologies, eight (08) plants were listed by the respondents. Among these plants were *Azadirachta indica*, *Vernonia amygdalina*, *Carica papaya*, *Cassia alata*, *Ensete gillettii* and *Dioscorea praehensilis*. The leaves of these plants were the most commonly used organs in the treatment of parasitic diseases. In the case of infectious diseases, fifteen (15) plants were identified. These plants are *Heliotropium indicum*, *Khaya senegalensis*, *Ocimum basilicum*, *Talinum triangulare* and *Abus precataurius*. The leaves are the most used organs in the treatment of bacterial diseases.

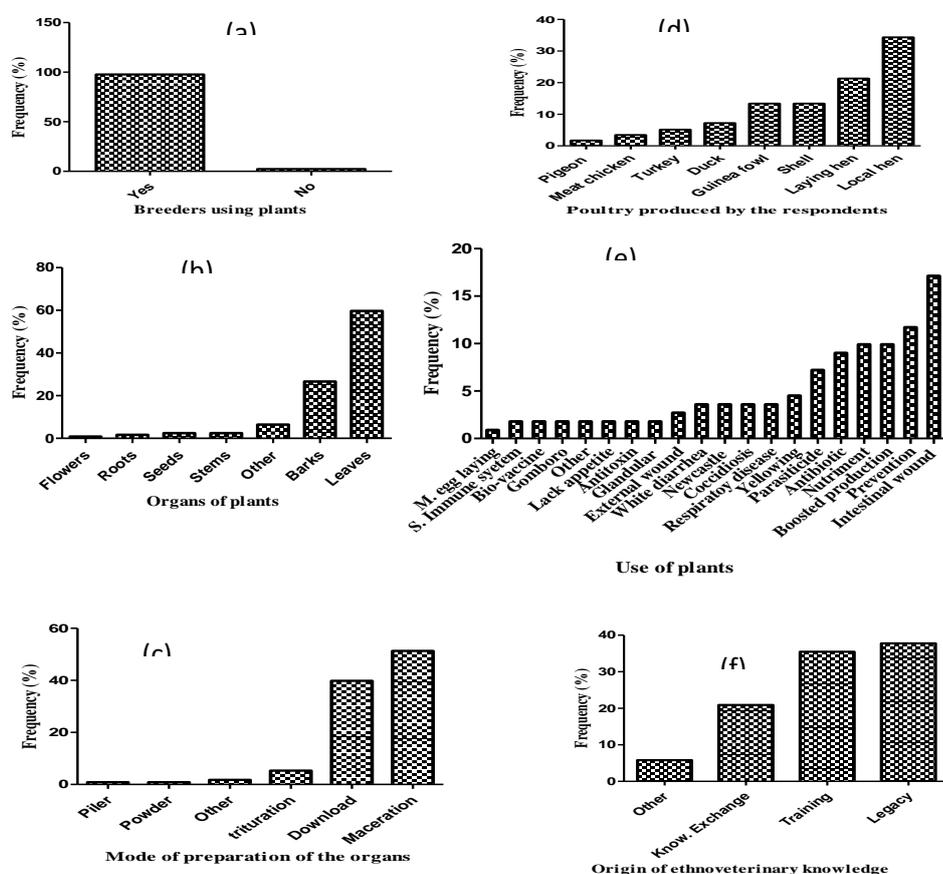


Figure 2. Frequencies of plant use (a); Frequencies of plant organ use (b); Frequencies of preparation methods (c); Frequencies of poultry rearing recorded (d); Frequencies of plant use (e); Origin of ethno veterinary knowledge (f).

Inventory of Ethno-Botanical Knowledge and Indigenous Perception of Plants used in Poultry Farms in the Maritime Region of Togo.

Tableau1: Description of Recipes by Poultry Farmers in the Maritime Region.

Specific uses	Scientific name	Organs	Preparation methods	Dosage and methods of treatment	
Nutrients	<i>Adansonia digitata</i> L.,	Leaves	Drying	Put in poultry feed	
	<i>Ficus platyphylla</i> Delile	Leaves	Drying		
	<i>Gliricidia sepium</i> (Jacq.) Kunth et Walp.,	Leaves	Drying	Attached to the henhouse, then birds will peck	
	<i>Gomphrena celosioides</i> Mart.,	Leaves	Drying		
	<i>Irvingia gabonensis</i> (Aubry Lecomte) Baill.	Leaves	Drying	Put in poultry feed	
	<i>Launea taraxacifolia</i> (Willd.) Sch. Bip.	Leaves	Drying		
	<i>Leucaena leucocephala</i> (Lam.) De Wit.	Leaves	Drying	2% of leaves in feed	
	<i>Manihot esculenta</i> Crantz,	Leaves	Drying	1-1,5% of leaves in feed	
	<i>Tridax procumbens</i> L.,	Leaves	Drying	Put in poultry feed	
	<i>Moringa oleifera</i> Lam.,	Leaves	Drying	2% of leaves in feed	
	<i>Ocimum gratissimum</i> subsp.	Leaves	Drying	Put in poultry feed	
	<i>Solanum torvum</i> Sw.,	Leaves	Drying		
Bacterial diseases	<i>Adansonia digitata</i> L.,	Leaves	Drying	Put in poultry feed	
	<i>Tridax procumbens</i> L.,	Leaves	Drying	Put in poultry feed	
	<i>Amarantus spinosus</i>	Leaves	Maceration	Give drinking water to poultry at will, repeat the treatment	
	<i>Bridelia ferruginea</i> Benth.	Barks	Maceration		
	<i>Jatropha curcas</i> L.	Stem	Maceration		
	<i>Khaya senegalensis</i> (Des.) A. Juss.	Barks	Maceration		
	<i>Mangifera indica</i> L.	Barks	Maceration	Give drinking water to poultry at will, repeat the treatment	
	<i>Ocimum basilicum</i> L.,	Leaves	Drying		Put in poultry feed
	<i>Heliotropium indicum</i> L.,	Leaves	Trituration Maceration		Use the aqueous extract to water the poultry for 3 days. Repeat the treatment
	<i>Chromolaena odorata</i> (L.) R. M. King & H. Rob	Leaves	Maceration		Give drinking water to poultry at will
	<i>Holarrhena floribunda</i> (G.Don) Durand & Schinz,	Leaves/ Barks	Maceration		Give drinking water to poultry at will
	<i>Kalanchoe crenata</i>	Plant	Trituration		Use the aqueous extract to water the poultry at will
	<i>Parkia biglobosa</i> (Jacq.) Benth.	Barks	Maceration		Give drinking water to poultry at will, repeat the treatment
	<i>Portulaca oleracea</i> L.,	Barks	Maceration		

Inventory of Ethno-Botanical Knowledge and Indigenous Perception of Plants used in Poultry Farms in the Maritime Region of Togo.

Specific uses	Scientific name	Organs	Preparation methods	Dosage and methods of treatment
	<i>Psidium guajava</i> L.,	Leaves	Maceration	
	<i>Talinum triangulare</i> (Jacq.) Willd.,	Rootless plant	Drying	Put in poultry feed
	<i>Urera obvata</i> Benth.	Leaves	Maceration	Give drinking water to poultry
	<i>Urtica sp</i>	Rootless plant	Drying	Attached to the henhouse, then birds will peck
	<i>Abrus precataurius</i> L.	leaves	Trituration	Use the aqueous extract to water the poultry at will
Newcastle	<i>Hyptis suaveolens</i> (L.) Poit., + <i>Pupalia lappacea</i> (L.) juss.,	Barks	Maceration	Given as drinking water to poultry at will
	<i>Bridelia ferruginea</i> + <i>Vitellaria paradoxa</i> C. F. Gaertn. Subsp.	Barks	Maceration	
	<i>Ocimum canum</i> Sims	Barks	Maceration	
	<i>Parkia biglobosa</i> (Jacq.) Benth.	Barks	Maceration	
Parasitic disease	<i>Alstonia bonei</i>	Barks	Maceration	
	<i>Azadirachta indica</i> A.Juss	Leaves	Maceration	Given drinking water to poultry at will
	<i>Carica papaya</i> L.	Seeds/Leaves	Drying	Put in poultry feed
	<i>Combretum micranthum</i> G.Don	Plant	Rinsing	Directly to poultry
	<i>Dioscorea praehensilis</i> Benth.	Leaves	Maceration	Give drinking water to poultry at will
	<i>Ensete gillettii</i> (De Wild.) Cheesman	Dry leaves	Maceration	
	<i>Urena obvata</i> Benth.	leaves	Maceration	
	<i>Vernonia amygdalina</i> Delile	leaves	Drying	Put in poultry feed
Gomboro	<i>Launea taraxacifolia</i> (Willd.) Sch. Bip.	Barks	Maceration	Give as drinking water to poultry at will for 3 day
	<i>Nicotina tabacum</i> L.	leaves	Maceration of the leaves in litres of water for 24 hours	Give as drinking water to poultry at will for 3 or 4 day
Antitoxin	<i>Imperata cylindrica</i> (L.) P.Beauv	Roots	Maceration	Give drinking water to poultry at will: Use after administration of <i>Nicotina tabacum</i> .
	<i>Ocimum basilicum</i> L.,	leaves	Drying	Put in poultry feed

4. DISCUSSION

Our results show that poultry farming is the second main activity after agriculture. This can be explained by the low level of schooling of the respondents, who do not have a diploma or certificate qualified to follow technical and vocational training. Thus, they quickly abandon their studies to please with their heritage, which is farming. However, the lack of education of individuals does not affect their indigenous knowledge (Ogni et al., 2014). The majority of respondents according to the data collected were male, although some women are involved in the activity this proves that poultry keeping is not in

specified gender. The same observation were made by Ohouko et al., 2020 in Benin. In addition, ethno veterinary knowledge was much more common among males (Houdje et al., 2016). The majority of the surveyed population practiced traditional ethno veterinary medicine, whose average age was approximately 48.47 ± 13.25 years. Our results are in agreement with (Klotoé et al., 2013) who stipulate that ethno-veterinary knowledge is held by the elderly but also increasingly passed to the younger generations in charge of animal care.

At the end of our survey, fifty (50) plants were documented for avian pathologies and nutritional use among them are : *Mangifera indica*, *Adansonia digitata*, *Heliotropium indicum*, *Carica papaya*, *Leucaena leucocephala*, *Azadirachta indica*, *Parkia biglobosa*, *Moringa oleifera*, *Nicotiana tabacum*, *Urtica* sp, *Amaranthus spinosus*, *Gomphrena celosoides*, *Alstonia bonei* and *Holarrhena floribunda*. Zabouh et al., In 2018 36 plants were indentified in the savanna regions of Togo. Among these plants were, *Mangifera indica*, *Parkia biglobosa*, *Khaya senegalensis*, *Azadirachta indica*, *Vitellaria paradoxa*, *Nicotiana tabacum* and *Vitex domiana* which were identified in this study as well. This testifies the veracity of the information on the use of these plants in the treatment of avian pathologies.

In treating parasites, eight plants were cited by the respondents. A study on parasites in Southern Benin, (Attindéhou et al., 2012), identified twenty-two (22) plants to treat parasites. In addition to the species common to this study, we identified six (06) new plants (*Alstonia bonnei*, *Combretum micranthum*, *Dioscorea prahensis*, *Ensete gillettii*, *Urena obvata*, and *Momordica charantia*) that were involved in the treatment of parasites. The farmers revealed the effective action of *Azadirachta indica* on parasites. The same finding was reported by Dassou et al., 2014 and Zabouh et al., 2018 during ethno medicine veterinary studies in North Benin and the savanna region of Togo, respectively. Furthermore, poultry research has proven that extracts of the plants *Carica papaya*, *Vernonia amygdalina* and *Azadirachta indica* are effective on parasites (Al-fifi Zia, 2007), these plants were also identified in our study.

Respondents identified seven plants that were used to treat viral diseases. Among these plants, *Nicotina tabacum* was said to be effective against Gomboro. The effectiveness of *Nicotina tabacum* was demonstrated after several years of experiments in the field by the farmers themselves. On the other hand, to cure Newcastle disease, *Nicotina tabacum* was reported by Dassou et al., 2014 during ethno medicine veterinary research in North Benin. Similarly, Zabouh et al., 2018 had inventoried eight species to treat Newcastle disease of which *Nicotina tabacum*, *Vitellaria paradoxa* and *Parkia biglobosa* were also cited in our study to treat viral diseases including Newcastle. In addition to these three common species, our study identified five other species: *Hyptis suaveolens*, *Pupalia lappacea*, *Bridelia ferruginea* and *Ocimum canum* and *Launea taraxacifolia*. Furthermore, laboratory studies, revealed that *Tridax procumbens* powder was effective against Gomboro disease (Dougnon et al., 2019). In our study, *Tridax procumbens* was identified to infectious diseases. This would explain the essential role of *Tridax procumbens* in restoring the histological structure of the bursa of Fabricius through its chemical constituents on bursal follicles (Dougnon et al., 2019).

At the end of our survey, the respondents had identified nineteen plants that were used for bacterial diseases. Laboratory research proved that most of the plants listed by the respondents during the survey, such as: *Mangifera indica* (Doughari et al., 2018), *Bridelia ferruginea* (Talla et al., 2002), *Heliotropium indicum* (Osungunna et al., 2011) *Jatropha curcas* (Kalimuthu et al., 2010), *Khaya senegalensis* (Ugoh et al., 2014), *Ocimum basilicum* (Sharafati-Chaleshtori et al., 2015) and *Parkia biglobosa* (Abioye et al., 2013) have antibacterial effects. This could be explained by the fact that this ethno medicine knowledge was acquired as a result of repeated field experiences (Ogni et al., 2014).

Our study revealed that about 98% of respondents adopted the use of traditional medicine on their farms. In Benin, only 20% of respondents use traditional medicine (Attindéhou et al., 2012). This difference could be noticed due to the practice of traditional poultry farming in this region where plants would be the first resort for poultry farmers in the absence of orthodox veterinary services. The most commonly used organs on the plants surveyed were leaves and stem bark. The same findings were reported by (Ogni et al., 2014) in Benin. Our study also reveals that maceration and drying were the most used methods of preparation which agrees with the report of (Houndje et al., 2016). It would be important to note that the methods of preparation and the organs of the plants to be used depends on the type of pathology to be treated. The farmers mostly raised local chickens and laying hens. The same findings were reported by Zabouh et al., 2018. Indeed, local chickens were mostly raised because they are more resistant to diseases (Nahimana et al., 2017) and are a means of subsistence for rural populations.

5. CONCLUSION

This study allowed us to know the uses of plants by poultry farmers in the maritime region of Togo. The inventory of current ethno-veterinary knowledge indicates that fifty (50) plant species belonging to thirty-two (32) botanical families have been identified as plants for pathological and nutritional use and are used in the preparation of twenty (20) recipes. It would be important to carry out phytochemical analyses and evaluate the real therapeutic effect of the listed plant species on poultry.

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