Journal of Animal & Plant Sciences (J.Anim.Plant Sci. ISSN 2071-7024)
Vol.67(2) : 13310 -13325 https://doi.org/10.35759/JAnmPlSci.v67.3.2

Endogenous knowledge used for the treatment of diarrhoea in poultry farms in the Nando and Guiriko regions of Burkina Faso.

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Keywords: Veterinary pharmacopoeia, digestive parasites, poultry, Burkina Faso

Submitted 12/02/2026, Published online on 30th April 2026 in the *Journal of Animal and Plant Sciences (J. Anim. Plant Sci.) ISSN 2071 – 7024*

1 ABSTRACT

The purpose of this study was to contribute to the knowledge of traditional care methods used by poultry farmers and to document the local knowledge used in the Nando and Guiriko regions of Burkina Faso for the treatment of parasitic diseases. The information collected through a semi-structured survey form made it possible to record the sanitary and feeding practices of poultry farmers among 146 poultry farmers, 88.36% of whom were men and 11.64% women from the two regions of Burkina Faso. The dominant age group of poultry farmers is between 36-50 years old (73.29%) while 64.39% are illiterate. The respondents have already received technical training (90.41%) and mainly practice agriculture (82.19%). The most numerous were small-scale local chicken farmers with fewer than 50 birds (48.19%). Poultry farmers generally had chicken coops or shelters built of banco (44.52%) and fed their chickens with grains. The results show that 75.34% of poultry farmers primarily use traditional medicine to treat sick poultry. The traditional treatments used to combat parasitic diseases in poultry are primarily composed of local plants and include 26 species belonging to 16 botanical families. *Khaya senegalensis* (caïcédrat)(45%) was the most cited plant by respondents, followed by *Pterocarpus erinaceus* (venne)(13%), *Parkia biglobosa* (néré)(8%), *Azadirachta indica* (nimier) (4%), and *Cissus quadrangularis* (liane)(4%). The remedies are mostly prepared in the form of maceration.

2 INTRODUCTION

In Burkina Faso, the poultry sector has a population of nearly 47 million birds (MRAH/DGESS, 2019). It is an essential source of animal protein and income for rural populations in Burkina Faso (Dione *et al.*, 2025). However, this sector faces numerous health challenges (Ouédraogo, 2024) including enteric diseases that manifest as diarrhea, which are often associated with significant economic losses and high mortality in birds (Grace *et al.*, 2024). Avian diarrhea can be a symptom of various bacterial or parasitic infections, hindering nutrient absorption, reducing growth performance and egg production, and promoting the spread of diseases within flocks (Makouloutou-Nzassi *et al.*, 2024). To address these health challenges, farmers widely use antibiotics to prevent or treat diarrhea and other avian infections (Marshall & Levy, 2011). The use of these drugs for prophylaxis, treatment, or even as growth promoters has become a common practice in production systems, often without precise diagnosis or strict veterinary control (Pashaei *et al.*, 2024). However, the excessive and uncontrolled use of antibiotics in poultry farming is now recognized as a major cause of antibiotic resistance, which undermines the effectiveness of treatments and poses a threat to animal health, as well as public health (Eckert *et al.*, 2010). Pathogenic bacteria are increasingly emerging with multiple resistance profiles, making infections difficult to treat and posing a risk of transferring resistance genes to other bacteria (Abou-Jaoudeh *et al.*, 2024). With the rise of resistance, non-antibiotic alternatives are gaining scientific and practical interest. Traditional medicinal plants contain bioactive metabolites that have been shown to have antimicrobial, immunomodulatory, and gut health-promoting effects in poultry in several recent studies (Kamagaté *et al.*, 2017; Pashaei *et al.*, 2024). In Burkina Faso, traditional medicine is widely practiced for cultural and effectiveness reasons (Yaméogo, 2020). Many poultry farmers use it to treat their animals (Hien *et al.*, 2009). Previous studies have been conducted on the health practices of traditional poultry farming in the Oubri, Djoro, and Bankui regions (Yaméogo, 2004) Da *et al.,* 2025).

This study aimed to inventory medicinal plants and the various remedies used by poultry farmers for the treatment of avian diarrhea in the Nando area (Poa commune) and the Guiriko area (Bama commune).

3 MATERIALS AND METHODS

3.1 Study Area: The study was carried out in the commune of Poa (Nando region) (12° 10' 34.608" N 2° 21' 23.641" W) and in the commune of Bama (Guiriko region) (11° 6' 39.715" N 4° 19' 23.232" W). Nando is characterized by a hot, dry desert climate. The average annual temperature is 28.4°C, and the average annual rainfall is 758.5 mm. The region is characterized by natural vegetation mainly composed of savannah and classified forests. It has enormous economic potential due to its geographical location, favorable for commercial exchanges (Figure 1A). The regional capital is a hub for the trade of agricultural products with the rest of Burkina Faso on one hand, and neighbouring countries on the other. Bordering countries like Côte d'Ivoire, Ghana, and Mali represent a huge potential market for its agricultural products. (INSD, 2023). The climate of Guiriko is characterized by the alternation of two distinct seasons: a dry season lasting 4 to 6 months, during which the Harmattan blows (November-April), and a relatively long rainy season of 6 months (from mid-October), dominated by the humid monsoon winds. Minimum and maximum temperatures range between 21 and 33 °C, and the average rainfall is 900.8 mm. The vegetation is characterized by wooded and shrubby savannahs, open forests, and gallery forests along rivers. The economy of Guiriko is mainly based on agriculture, livestock, industry, handicrafts, trade, transportation, tourism, and hospitality (INSD, 2023) . The Guiriko Region is home to the second-largest

metropolis and the economic capital of Burkina Faso (Figure 1B).

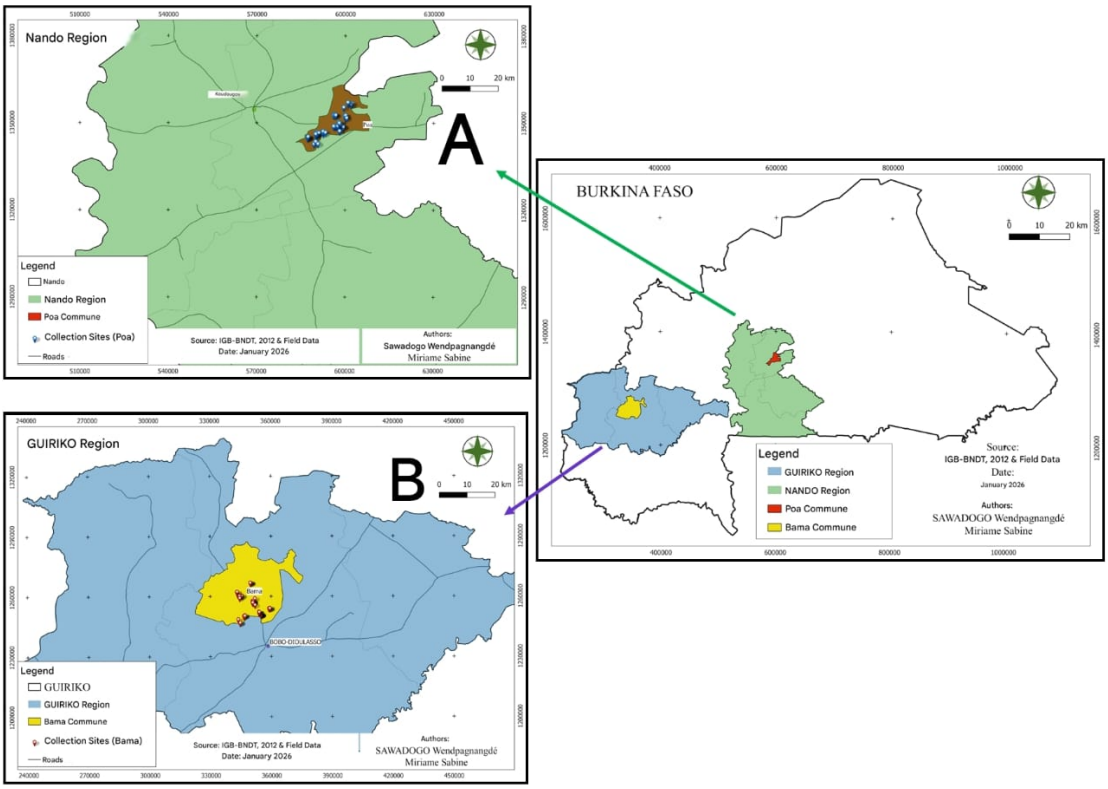

Figure 1: Study areas A: Nando, B: Guiriko

32 Study population: The ethno-veterinary survey was conducted with 146 poultry farmers in the Nando and Guiriko regions. It concerned farmers practicing extensive poultry farming in the Nando and Guiriko areas of Burkina Faso. Farmers who had local breed chickens with more than ten (10) heads were included in this study. Farmers whose flocks included exotic breeds were excluded.

3.3 Ethno-veterinary survey: An individual questionnaire was used from November 2024 to March 2025, providing information on the farmer's identity, farming practices, traditional health and feeding practices. GPS coordinates were recorded using mobile phone geolocation. The surveyed municipalities were selected based on the concentration of poultry farmers. Poultry farmers were chosen based on their practice of traditional poultry farming and their willingness to participate in the survey. At the end of this survey, the socio-demographic characteristics of the poultry farmers were defined. The rate of poultry farmers using traditional medicine, as well as the identification and use of plants in the treatment of diarrhea, were identified.

3.4 Statistical analyses: The survey form was created using Word Office and then exported to the Kobocollect software. The data were collected with the Kobocollect software, then exported, coded, and entered into Excel

2016. They were subjected to principal component analyses to determine the averages and frequencies using R software, followed by multiple correspondence analyses for qualitative variables. The citation frequency (CF) of the plant species used was calculated according to the formula:

$$FC(\%) = \frac{N_P}{N_t} \times 100$$

With Np: number of times the species was mentioned, Nt: total number of mentions.

4 Sc of the respondents This study showed that traditional poultry farming is a predominantly male activity (88.36%) and is practiced by individuals aged 36 to 50 years (73.29%). The results indicate that medium-sized poultry farmers (with flocks of 51 to 100 local chickens) make up the largest category (34.96%), followed by small-scale farmers (with flocks of 10 to 20 chickens) in the study area. Traditional poultry farmers mainly engage in agriculture (82.19%), compared to 7.53% whose main activity is trade and 4.79% who primarily engage in livestock farming. More than half of the respondents (56.85%) do not belong to a poultry farmers' group or association. They have a high percentage of illiteracy (64.39%) but most have already received training in poultry farming, as shown in Table 1 below.

Table 1: Socio-economic characteristics of poultry farmers.

Variables	Modalities	Nando	Guiriko	Total	P-value
Age	25-35	0.68	3.42	4.1	0.41
	36-50	30.14	43.15	73.29	
	+51	10.27	12.39	22.66	
Sex	Female	4.11	7.53	11.64	0.60
	Male	36.99	51.37	88.36	
Marital Status	Single	0.68	0.68	1.36	0.47
	Married	40.41	56.85	97.26	
	Widowed	0	1.36	1.36	
Education	None	27.40	36.99	64.39	0.89
	Primary	9.59	15.07	24.66	
	Vocational	1.37	1.37	2.74	
	Secondary	2.74	4.79	7.53	
	University	0	0.68	0.68	
Livestock Count	-10	2.74	4.79	7.53	0.39
	10-20	7.79	13.01	20.8	
	21-50	7.53	12.33	19.86	
	51-100	15.75	19.18	34.93	
	+100	10.27	9.59	19.86	
Main Activity	Agriculture	36.99	45.20	82.19	0.3044

	Commerce	1.37	6.16	7.53	
	Poultry farming	2.05	2.74	4.79	
	Salaried work	0	0.68	0.68	
	Craftsmanship	0.68	4.11	4.79	
Poultry farming training	No	7.53	2.05	9.58	0.002724
	Yes	33.56	56.85	90.41	
Group or association	No	19.18	37.67	56.85	0.03799
	Yes	21.92	21.23	43.15	

4.1 Management of poultry farming and the rate of poultry farmers using traditional medicine: In the study area, 44.52% of local chicken farmers use coops built with local materials, generally of small size. Furthermore, most of these facilities had farming installations (natural ventilation system: 89.04% and lighting system: 91.78%). In all the farms visited, the chickens obtain most of their food from the natural environment. Farmers generally supplement this diet with corn or small millet grains (75%), bran (28%), and insects (32%) one to four times a day. In addition, 50% of farmers use feed produced by feed manufacturing units. Farmers also mix vitamins (57%) and minerals (43%) into the supplements provided. The results obtained show that 75.34% of the poultry farmers surveyed mainly rely on traditional medicine to treat their sick animals. However, 54.48% also use veterinary services in addition to traditional treatment. According to the respondents, the reasons for these observations include the high cost of veterinary drugs, limited access to veterinary services, and the lack of knowledge of certain traditional remedies.

4.2 Traditional treatments against poultry diarrhoea: Thirty (30) traditional remedies for poultry diarrhoea have been prescribed by poultry farmers as being effective against poultry diarrhoea. Table 2 presents these remedies. From an analytical perspective, they are mainly composed of plants and are prepared immediately at the time of use. Single-plant recipes account for more than 90%. Ingredients such as salt, potash, and soap are sometimes added. In general, 26 plants species belonging to 16 botanical families have been identified.

Table 2: Traditional remedies recommended by poultry farmers for treating diarrhoea in poultry

Species	Species Family	Name in French	Local name	Treated diseases	Parts used	Administration method	Preparation method
Faidherbia albida Del	Mimosaceae	Balazan	Zanga	Newcastle	Bark	Force-feeding	Maceration
Acacia nilotica (L) Willd. Ex Del.	Mimosaceae	Mimosa	Peg-nenga, Bagana	Gastrointestinal infections, Diarrhea	Fruit, Leaves	Force-feeding, To nibble	Maceration
Afzelia africana Smith ex Pers.	Caesalpiniaceae	Lengué	Kankalga	Gastrointestinal	Bark	Force-feeding	Infusion
Aloe vera	Aloeaceae	Aloe vera	Aloe vera	Prevention	Pulp	Force-feeding, To nibble	Mix with water
Annogeissus leuocarpus (DC) Guill et Perr.	Caesalpiniaceae	Bouleau d'Afrique	Siga	Gastrointestinal infections	Bark, Leaves	Force-feeding	Infusion in addition with the leaves of *Detarium microcarpum*, heat the leaves
Azadirachta indica (A. Juss)	Meliaceae	Nimier	Neem	Gastrointestinal infections Breathing problems	Leaves, Bark	Force-feeding	Maceration
Balanites aegyptica (L)	Balanitaceae	Dattier du désert	Kielga	Gastrointestinal infections	Fruit	Force-feeding	Infusion
Capsicum frutescens (L)	Solanaceae	Piment	Tchiparé	Resistance to all diseases	Fruit	Force-feeding	Maceration
Cissus quadrangularis(L)	Vitaceae	Liane	Wob-zare	Gastrointestinal infections Newcastle	Roots	Force-feeding	Maceration
Citrus aurantiifolia	Rutaceae	Citronnier	Lemisga/ lemoyiri	Prevention	Leaves	Force-feeding	Maceration
Daniella Oliveri (Rolfe) Hutch	Caesalpiniaceae	Santan	Aonga Wenga	Gastrointestinal infections	Bark	Force-feeding	Maceration
Détarium microcarpum (Guill. et Pers.)	Caesalpiniaceae	Petit détar	Kagedega	Gastrointestinal infections	Bark	Force-feeding	Maceration
Diopyros mespilfromis (Hochst ex A. DC)	Ebenaceae	Ébène africain	Ganga	Gastrointestinal infections	Bark	Force-feeding	Maceration
Ficus carica	Moraceae	Figuier	Kankanga	Gastrointestinal infections	Bark	Force-feeding	Maceration

Khaya senegalensis (Desr) A. Juss	Meliaceae	Caïcedrat	kuka, Djalayiri, kahal	Gastrointestinal infections Newcastle; Gomboro, Dewormer, Loss of appetite; Internal parasites, Breathing problems	Bark	Force-feeding	Maceration
Lannea acida (A. Rich)	Anacardiaceae	Raisinier sauvage	Sampilgou/ sanbtoulga	Prevention	Bark	Force-feeding	Maceration
Leptadénia hastata	Apocynaceae	Forme de liane	Loelonga	Gastrointestinal infections	Leaves	Force-feeding	Maceration
Mangifera indica (L)	Anacardiaceae	Mangue	Mangui	Skin disease,	Leaves	Application	Powder Reduction
Moringa oleifera	Moringaceae	Moringa	Arzantiga	Prevention	Leaves		Maceration
Parkia biglobosa (Jacq.) R. Br. Ex G. Don	Mimosaceae	Néré	Rouanga	Gastrointestinal infections Internal parasites	Farine	Force-feeding	Maceration**,** Infusion with the addition of ash or salt
Pterocarpus erinaceus (Poir.)	Fabaceae	Venne/Bois Rose	Noeega	Gastrointestinal infections	Bark	Force-feeding	Maceration in addition to the chili
Sclerocarya birrea (A. Rich) Hoschst	Anacardiaceae	Prunier d'Afrique, Noisetier marula	Noabga	Prevention	Leaves	Force-feeding	Maceration
Solanum torvum	Solanaceae	Aubergine sauvage	Nonroago Kumba	Gastrointestinal infections, Colds	Seeds Leaves	To nibble, Force-feeding	Maceration
Vitellaria paradoxa	Sapotaceae	Karité	Tanga	Skin disease, External parasites	Bark	Application Force-feeding	Maceration in addition with the caícedrat barks
Ximenia americana	Olacacae	Citronnier du désert	Tenguè ou Tonguè	Prevention	Leaves	Force-feeding	Maceration

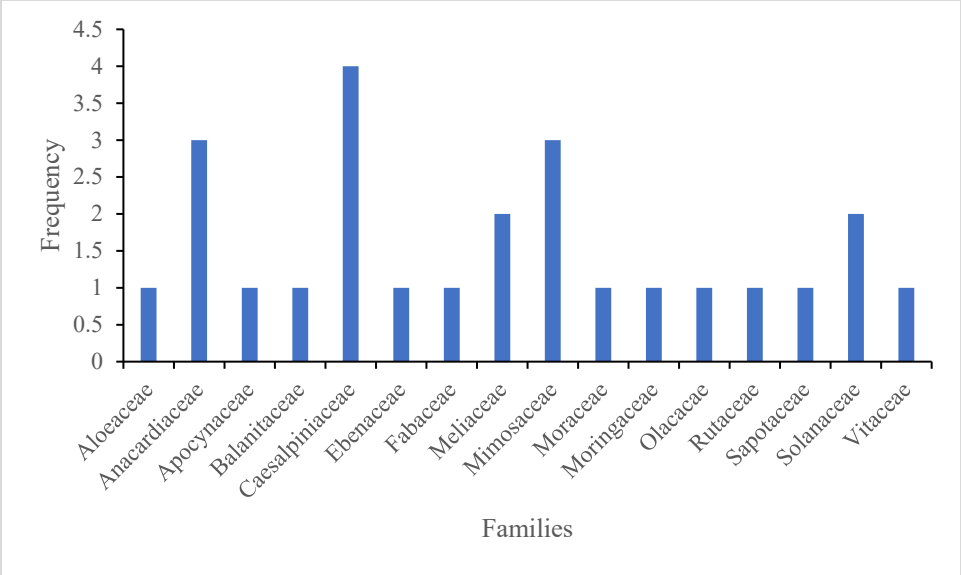

Figure 2: Distribution of plant families

Khaya senegalensis (45%) was the most cited plant by respondents, followed by *Pterocarpus erinaceus* (13%), *Parkia biglobosa* (8%), Azadirachta indica (4%), and *Cissus quadrangularis* (4%) (Figure 3).

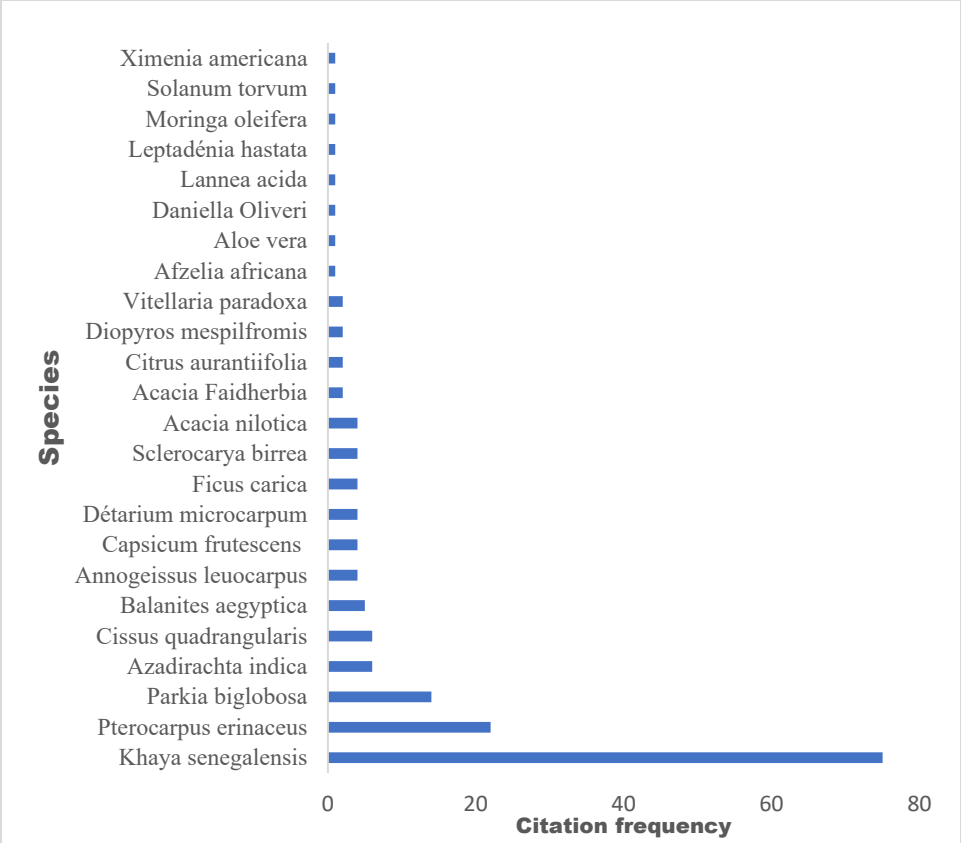

Figure 3: Citation frequency of species

The main parts used in the preparation of remedies are the bark (41%), the leaves (35%), and the fruits (10%) (Figure 4).

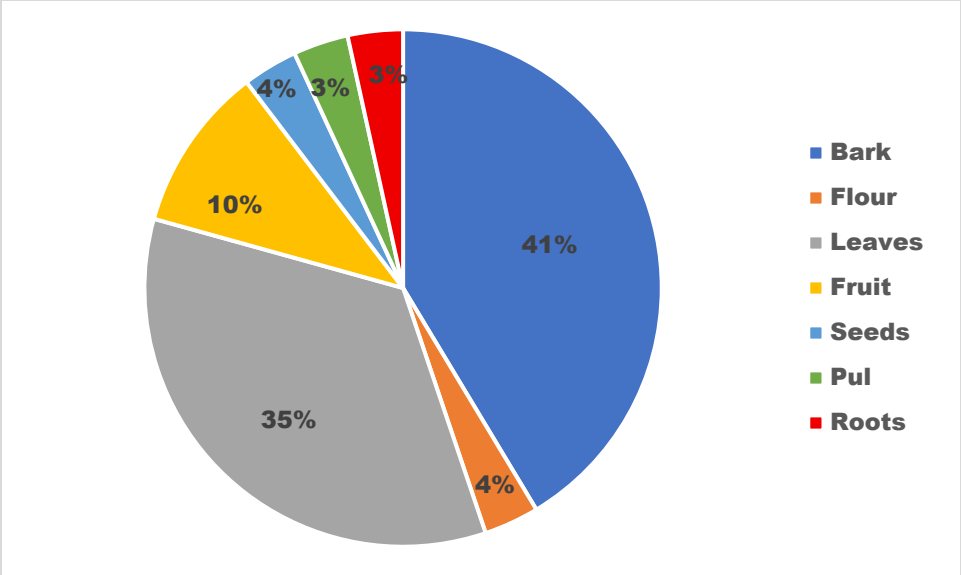

Figure 4: Parts of plants used by poultry farmers.

The most commonly used forms of remedies by poultry farmers are maceration (80%) and infusion (12%). Maceration and infusion are done in improvised containers, gourds, or pieces of canaries. The remedies are mainly administered orally (Figure 5).

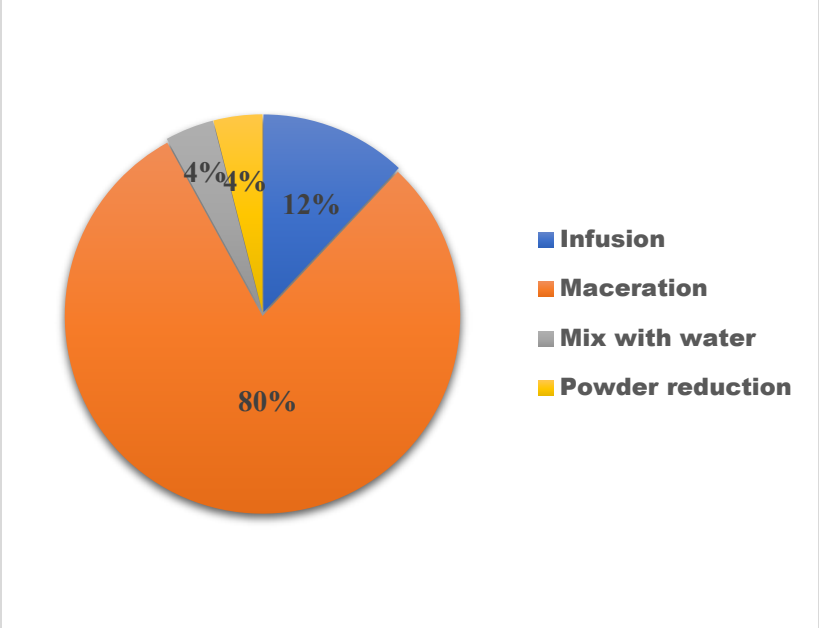

Figure 5: Preparation method

4.3 Sanitary practices of poultry farmers

Table 3: Variable codes and modalities used in the multiple correspondence analysis.

Variable	**Codes**	**Modalities**
Region	Region	CO
		HB
Use of medicinal plants	Plantesmed	plantenon
		planteoui
Use of Caïcédrat	Caïcedrat	caïnon
		caïoui
Use of Néré	Néré	nérénon
		néréoui
Use of Venne	Venne	vennenon
		venneoui
Poultry population	Effectif	moins10
		dixvingt
		21-50
		51-100
		plus100
Vaccination practices	Vaccination	vaccinnon
		vaccinoui
Use of veterinary services	Servicesvete	Regularly
		Sometimes
		No

Of the 10 variables used for Multiple Correspondence Analysis (MCA), 8 showed a significant link between the groups (Plantesmed caicedrat Servicesvete Region Vaccination venne Effectif nere).

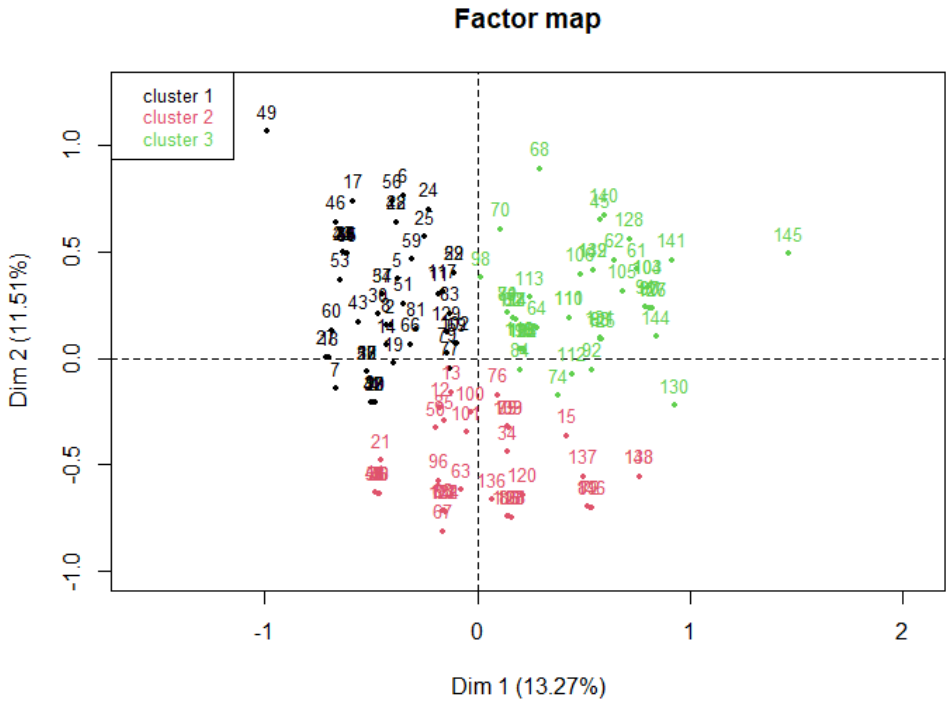

Figure 6: Graphical representation of the groups (clusters) based on axes 1 and 2.

From the analysis of the figure, it appears that the hierarchical classification allowed the distinction of 3 groups (group 1 in black, group 2 in red, group 3 in green). The percentages of the distribution of health parameters were calculated in Table 3. Group 1: Group 1 is mainly composed of large poultry farmers of local chickens in the Nando region (83.3%) with a flock size of over 100 birds. It includes farmers who use medicinal plants more frequently to treat diseases. They use caïcédrat (62.96%), venne (35.18%), and néré (20.37%) for the treatment of avian diarrhea. This group also consists of farmers who use vaccination as a disease prevention method and report having access to veterinary services in these areas. Group 2: Group 2 is dominated by farmers with a flock size of 51 to 100 birds (50%). They practice traditional medicine for the treatment of diseases. The poultry farmers in this group do not have specific health practices and do not have access to veterinary services. Group 3: Group 3 is composed of local chicken farmers from the Guiriko region (97.91%). These farmers have flocks of fewer than 10 birds (14.58%), 10 to 20 birds (33.33%), and 51 to 100 birds (22.9%). They make extensive use of traditional medicine (97.91%). The farmers in this group use caïcédrat (87.50%) to treat diarrhea. These farmers (52.08%) also use vaccination, and 87% report sometimes having access to veterinary services.

Table 4: Distribution of health parameters by type of farmer according to the significance of the modality.

Variable	Modalities	Group 1	Group 2	Group 3
Region	Nando	83.3	-	2.08
	Guiriko	16.67		97.91
Plantesmed	plantenon	0	75	2.08
	planteoui	100	25	97.91
Caïcedrat	caïnon	37.03	100	12.50
	caïoui	62.96	0	87.50
Néré	nérénon	79.62	-	97.91
	néréoui	20.37	-	2.08
Venne	vennenon	64.81	100	-
	venneoui	35.18	0	-
Poultry population	moins10	-	-	14.58
	dixvingt	-	-	33.33
	21-50	-	-	-
	51-100		50	22.91
	plus100	31.48	9.09	-
Vaccination	vaccinnon	0	-	47.91
	vaccinoui	100	-	52.08
Servicesvete	Regularly	88.89	-	4.16
	Sometimes	7.40	-	70.83
	No	-	0	25

5 DISCUSSION

The results obtained during this study showed that traditional breeding of local chickens is an activity predominantly carried out by men (88.36%). This male trend is close to the results obtained by Pindé *et al.*, 2020 , which indicate that in rural areas, the patriarchal management of families in Burkina Faso could be responsible for this high percentage of men in the traditional poultry sector. The low proportion of women surveyed could be explained by the tendency of men to respond to the questionnaire on behalf of their wives, probably in order to limit their interactions with visitors (Pousga & Boly, 2009). The majority of traditional poultry farmers were in the 36-50 age range (73.29%). These results are contrary to those of (Da *et al.*, 2025), who showed a predominance of young people aged 20-39 in 2020. This could be explained by rural exodus, which leads young people to leave for the capitals or mining sites in search of better living conditions. Nearly half of the respondents (43.15%) are members of a livestock group or association and have a high proportion of illiteracy (64.39%). Their level of education is heterogeneous, and most of them (90.41%) have received training in poultry farming. This corroborates the observations made by (Pindé *et al.*, 2020), who state that illiteracy is not considered an obstacle to the improvement of family poultry farming. Most local chicken farmers in the study area have chicken coops or shelters, usually built with mud bricks and of small size. Ayssiwede *et al.*, 2013 ; Yaméogo, 2004 also reported the existence of these same types of coops in traditional farming systems, respectively in Burkina Faso (Ouagadougou and Koudougou) and in Senegal. Farmers reported difficulties in disinfection due to the small size of the coops, which promotes the presence of hiding places favorable to the development of ectoparasites. This observation was also highlighted by El-Yuguda *et al.*, (2007) in Nigeria. Unlike these authors, the chicken coops in our study area are equipped with a ventilation

system, lighting, and farming equipment (drinkers and feeders). This fairly good adoption of such equipment could be explained by the training received and government subsidies provided to these farmers. Cereals are the main plant-based resources for feeding poultry in both regions. This could be explained by an essentially subsistence-oriented agricultural practice (maize, millet, sorghum) as the primary activity of poultry farmers (MARAH /DGESS, 2021). This supplementary feed is administered to them regularly during the harvest seasons and occasionally during the lean periods. This observation was made by Ayssiwede *et al.*, (2013), who state that households do not have cereal reserves during the rainy season, and that this period is the most difficult for local chickens. In this study, there are also poultry farmers who use feed from industrial production for their young birds. Vitamins and minerals are added to this feed to support chicken growth, egg production, and disease resistance. The composition of fatty acids, minerals, and vitamins is important for egg formation (Bouvarel *et al.*, 2010). Some poultry farmers simultaneously use both modern and traditional treatments (Kabore *et al.*, 2007) but most primarily rely on traditional medicine (75%). This trend is higher than that observed by Ouédraogo *et al.*, (2015), who found that 12% primarily use traditional remedies. The main reasons cited are the inaccessibility of modern veterinary care, the availability, and the high cost of pharmaceutical products. The same observation was made by Tchetan *et al.* (2021), who also note that the low purchasing power of poultry farmers remains one of the main reasons that has encouraged renewed interest in ethnoveterinary practices in livestock farming.In general, twenty-six (26) species belonging to sixteen (16) botanical families used in the treatment of diarrhea were inventoried. The most predominant families are Caesalpiniaceae, Anacardiaceae, Mimosaceae, Meliaceae, and Solanaceae. These results are consistent with the findings of Yaméogo, (2004) ; Da *et al.*, (2025), who revealed that the most represented plant families are also Meliaceae, Solanaceae, Anacardiaceae, Mimosaceae, etc. This predominance can be explained by their pharmacological properties, particularly antioxidant, antiparasitic, anti-inflammatory, antibacterial, and antiviral activities of certain species used in poultry care, as demonstrated by previous studies (Kouadio *et al.*, 2020; Ouédraogo *et al.*, 2024) . The species most cited for the treatment of diarrhea were Khaya senegalensis, Pterocarpus erinaceus, and Parkia biglobosa. The richness of bioactive compounds (polyphenols, saponins, alkaloids) in these plant species has been highlighted in other studies (Dayok *et al.*, 2018; Kagambega *et al.*, 2022; Patil *et al.*, 2025). The most used plant parts are the barks and leaves, as shown by Dassou *et al.*, (2014) in Benin and Da et al., (2025) in Burkina Faso. Tamboura *et al.*, (1998) also found that traditional treatments were based on the indigenous knowledge of the area and were primarily made from plants. Poultry farmers reported that leaves are used because they are easy to harvest and barks because of the speed of regeneration. Maceration and infusion are the most commonly used methods of preparing the plants, as highlighted by Houndje *et al.*, (2016). They are favoured because of the efficiency of their extraction and the ease of their use. Furthermore, there is a predominance of oral administration of the various medicinal plants. This observation is similar to the results of Garba *et al.*, (2019).

6 CONCLUSION

The present study aimed to inventory medicinal plants and the various remedies used by poultry farmers for the treatment of avian diarrhoea in the Nando (Poa commune) and Guiriko (Bama commune) regions of Burkina Faso. Information was collected from 146 poultry farmers. The inventory of knowledge on medicinal plants indicates the use of 26 species in the treatment of avian diarrhea. Among the three groups of farmers identified, it appears that the farmers in the Guiriko region practice traditional medicine the most. It would be very

interesting to experimentally validate the recorded remedies through rigorous scientific protocols. This would allow for proposing effective treatments without any risk of toxicity to poultry, for their future use in a safe framework for poultry farmer.

7 ACKNOWLEDGEMENTS

The authors wish to thank the International Atomic Energy Agency (IAEA) for its material and financial assistance in the context of the BKF5021 project.

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