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A Survey of Indigenous Knowledge on Poultry Ethnomedicinal Plants in Masaka District, Uganda

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Abstract: The objective of this field survey was to identify and document knowledge about the plants which are used in the prophylaxis and treatment of poultry diseases in Kyanamukaka and Buwunga sub-counties of Masaka district of Central Uganda. Focus group discussions and key informant interviews were conducted. Plants were ranked according to the frequency of use. Fifty nine plant species from 33 families were found to be used in the treatment of a variety of poultry diseases in this area. Family Asteraceae had the highest number of plant species used (30%) and leaves were the most commonly used parts of the plants (80%). The most frequently used plants were *Cannabis sativa* and *Nicotiana tobaccum*. Most of the plants were used for prophylaxis (68%) and the oral route was the most preferred route of administration (96%). The results of this study will contribute to ensuring that this knowledge is passed on to other generations and will serve as a basis in the search for newer pharmaceuticals.

Key words: Prophylaxis, Masaka district, *Nicotiana tobaccum*, administration, pharmaceuticals

INTRODUCTION

Herbs and herbal medicine preparations have been used to treat ailments throughout the history of humanity (Iqbal *et al*., 2006). Plant species may have different uses in different countries as well as different areas of the same country. In spite of such a rich cultural heritage and relatively rich flora, the number of scientific ethnobotanical field surveys, at least published in the international journals, among the regional communities is very low (Yesilada and Sezik, 2003).

Livestock owners have an excellent knowledge of ethnoveterinary practices which has formed the basis for screening plant materials as potential sources of medical drugs (Matekaire and Bwakura, 2004). In a survey of ethnomedicinal practices among free-range poultry farmers in Central and Eastern Uganda, about 80% of the farmers used medicinal plants as alternative remedies for poultry diseases (Bukenya, 2007). Despite the widespread practices, very little of this traditional knowledge has been documented in developing countries and ethnoveterinary knowledge has had no place in mainstream veterinary medicine (Matekarire and Bwakura *et al*., 2004). This wealth of information has slowly vanished with the influencing factors of modernization, i.e., urbanization, migrations, development of roads and communication media, easier access to orthodox medicine and drugs (Yesilada and Sezik, 2003).

In developing countries modern veterinary medicine can not deliver complete coverage in preventive and curative health care practices because of inadequate labor, logistic problems and an erratic supply of drugs.

Consequently, the majority of those raising stock in rural areas are far from the site of veterinary stations and those who have access may not be able to afford their services (Sori, 2004). Therefore, conservation of indigenous knowledge, skills and resources will contribute to the promotion of the poultry industry. The main objective of this study was to identify and document the indigenous knowledge on medicinal plants used by poultry farmers in Kyanamukaka and Buwunga sub-counties of Masaka district.

Study area: This was a descriptive survey aimed at collecting information from respondents on medicinal plants used to treat poultry diseases. The study was conducted in Kyanamukaaka and Buwuunga sub-counties of Masaka district of Uganda. These sub counties were chosen purposively because of their proximity to water bodies (i.e., they border Lake Victoria) and swamps which act as rest and breeding areas for wild birds. Such areas are prone to poultry diseases due to interactions between the domestic and wild birds. In addition, these areas are remote from veterinary centers and farmers tend to use indigenous knowledge for therapy and prophylaxis of poultry diseases.

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MATERIALS AND METHODS

Workshops were held with purposively selected farmers in 9 focus group discussions each comprising of 20 farmers while interviews were held with 20 key informants identified during focus group discussions. Important information was documented on the use and application of medicinal plants to poultry in the prevention and treatment of diseases. The study also involved observations of the actual resources used and actual participation to learn how farmers process these medicinal resources. Note was taken of the plant part used, methods of preparation, medicinal uses and routes of administration. The frequency of use of the medicinal plant was later computed.

RESULTS AND DISCUSSION

The study identified fifty nine plants which were used by poultry farmers for medicinal purposes in Masaka district (Table 1 and 2). These were used mostly as herbs and sometimes as concoctions that are personally known by farmers or by consultation with neighbors. All in all the plants belonged to thirty three different families. Family Asteraceae had 30% of plants registering the highest frequency followed by family Solanaceae with 18% of the plants and family Euphobiaceae with 15% of the plants. The most widely used plants were *Cannabis sativa*, *Capsicum annum*, *Nicotiana tobaccum* and *Momordica foetida* among others (Table 1 and 2).

The information about the plant parts used, their methods of preparation, routes of administration and medicinal uses is shown in Table 3 and 4. For 80% of the plants, leaves were used to make the drug preparations while for some either the roots or the bark or the bulbs or the whole plant or the seeds were used. About 71% of the plants were prepared as juice by poultry farmers. The other methods used were making decoctions, making powders and burning the plant material to aerate the housing. Three different administrative routes were used for different plant preparations and these were oral route, topical route and inhalation after burning of the plant parts to aerate the housing. Total 96% of the plants were administered orally. About 68% of the plants were used for prophylaxis. The rest of the medicinal uses of the plants were prophylaxis, immune boosting, treatment of fever, diarrhea, respiratory infections, deworming and as acaricides.

The plants were also used as concoctions. The five most commonly used concoctions were observed and are shown in Table 5. Most of these concoctions were used for the purpose of treating fever and *Aloe vera* and *Vernonia amygdalina* were the most commonly used plants in the preparation of these concoctions. Leaves of the plants were the most commonly used parts in the concoctions although in some cases roots were also used.

Table 1: Most frequently mentioned plants

Family name	Species name	Local name	Frequency
Cannabaceae	*Cannabis sativa*	Enjaga	153
Solanaceae	*Capsicum annuum*	Kamulali	147
Solanaceae	*Nicotiana tobaccum*	Taaba	138
Cucurbitaceae	*Momordica foetida*	Ebombo	101
Asteraceae	*Vernonia amygdalina*	Omululuuza	87
Amaranthaceae	*Chenopodium opulifolium*	Omwetango	69
Asteraceae	*Vernonia cineria*	Kayayaana	67
Asteraceae	*Senecio cydoniifolius*	Kivuuvu	63
Asteraceae	*Aspilia africana*	Makayi	59
Solanaceae	*Solanum mauritianum*	Ssetaaba	56
Mimosoideae	*Albizia coriaria*	Mugavu	53
Cucurbitaceae	*Conyza floribunda*	Kafumbe omussajja	52
Abiatae	*Tetradenia riparia*	Mulavumba	52
Liliaceae	*Aloe vera*	Ekigagi ekinene	49
Lauraceae	*Persea americana*	Ovacado	47
Papilionaceae	*Desmodium salicifolium*	Enkolimbo yokunsiko	47
Acanthaceae	*Justicia betonica*	Naloongo	47
Euphobiaceae	*Jatropha curcas*	Ekiloowa	45
Lamiaceae	*Leonotis nepetifolia*	Kifumufumu	45
Papilionaceae	*Phaseolus lunatus*	Kayindiyindi	45
Verbenaceae	*Lantana trifolia*	Kayukiyuki akasekera	45
Malvaceae	*Sida cuneifolia*	Akeyeeyo	45
Clusiaceae	*Garcinia buchananii*	Omusaali omuganda	44
Meliaceae	*Azadirachta indica*	Nimu tuli	43
Myrtaceae	*Syzygium cuminii*	Jambura	43
Agavaceae	*Agave sisalana*	Ekigoogwa	41
Asteraceae	*Bidens pilosa*	Ssere	41
Moringaceae	*Moringa oleifera*	Muringa	40
Rubiaceae	*Rubia cordifolia*	Kasalabakesi	40
Solanaceae	*Datura stramonium*	Maduudu	40
Caricaceae	*Carica papaya*	Eppappali	40

Table 2: Least frequently mentioned plants

Family name	Species name	Local name	Frequency
Euphobiaceae	*Ricinus communis*	Ensogasoga	35
Gramineae	*Digitaria abyssinica*	Lumbugu	33
Liliaceae	*Aloe ferox*	Akagagi akatono	27
Fabaceae	*Tephrosia vogellii*	Muluku	23
Liliaceae	*Allium sativum*	Katungulu chumu	23
Tropaolaceae	*Tropaeolum majus.*	Nasitanziya	17
Urticaceae	*Fleurya aestuans*	Munyango	16
Asteraceae	*Symphytum asperum*	Ekisunsa kyenkoko	15
Solanaceae	*Solanum nigram*	Ekitengotengo	15
Asteraceae	*Venonia auriculifera*	Ekikokooma	14
Myrsinaceae	*Maesa lanceolata*	Kiwondo wondo	12
Meliaceae	*Melia azedarach*	Mutankuyege	11
Crassulaceae	*Kalanchoe glaucescens*	Kiyondoyondo	9
Euphorbiaceae	*Tragia brevipes*	Kamyu	8
Spigeliaceae	*Spilanthes mauritania*	Kado kanamunye	7
Solanaceae	*Solanum incanum*	Mukutiza ngalabi	6
Convolvulaceae	*Ipomea batatas*	Lumonde omuganda	5
Brassicaceae	*Brassica oleracea*	Embogga	4
Euphobiaceae	*Euphobia hirta*	Akasandasanda	3
Asteraceae	*Artemesia annua*	Anteneziya	2
Oxalidaceae	*Oxalis corniculata*	Mukuuta sente	2
Asteraceae	*Tithonia diversifolia*	Kitungotungo	1
Asteraceae	*Tagetes minuta*	Kawunyira	1
Apocynaceae	*Catharanthus roseus*	Sipurinko	1
Euphorbiaceae	*Euphorbia heterophylla*	Kisandasanda	1
Fabaceae	*Abrus precantorius*	Obuusiti	1
Zingiberaceae	*Curcuma longa*	Ebinzaali	1
Lamiaceae	*Ocimum basilicum*	Kafumbamwanyi	1

Table 3: Usage of frequently mentioned plants

Plant	Parts used	Preparation	Route	Use (s)
Cannabis sativa	Leaves	Juice	Oral	P
Capsicum annuum	Seeds	Powder	Oral	Di, R
Nicotiana tobaccam	Leaves	Juice	Oral	P
Momordica foetida	Leaves	Juice	Oral	P, R
Vernonia amygdalina	Leaves	Juice	Oral	F
Chenopodium opulifolium	Leaves	Juice	Oral	Di, F
Vernonia cineria	Leaves	Juice	Oral	P
Senecio cydoniifolius	Leaves	Juice	Oral	P
Aspilia Africana	Leaves	Juice	Oral	P
Solanum mauritianum	Leaves	Juice	Oral	P
Albizia coriaria	Bark	Decoction	Oral	P
Conyza floribunda	Leaves	Juice	Oral	P
Tetradenia riparia	Leaves	Juice	Oral	P
Aloe vera	Leaves	Juice, decoction	Oral	P, F
Persea americana	Leaves	Juice	Oral	P
Desmodium salicifolium	Leaves	Juice	Oral	P
Justicia betonica	Leaves	Juice	Oral	F
Jatropha curcas	Leaves	Juice	Oral	P
Leonotis nepetifolia	Leaves	Juice	Oral	P
Phaseolus lunatus	Leaves	Juice	Oral	P
Lantana trifolia	Leaves	Juice	Oral	P
Sida cuneifolia	Leaves	Juice	Oral	Di
Garcinia buchananii	Leaves	Decoction	Oral	P, R
Azadirachta indica	Leaves	Juice, decoction	Oral	P, F
Syzygium cuminii	Bark	Decoction	Oral	P
Agave sisalana	Leaves	Juice	Oral	P
Bidens pilosa	Leaves	Juice	Oral	P
Moringa oleifera	Leaves	Juice	Oral	P
Rubia cordifolia	Leaves	Juice	Oral	P
Datura stramonium	Leaves	Juice	Oral	P
Carica papaya	Leaves, seeds and roots	Powder and decoction	Oral	P, De

P = Prophylaxis, Di = Diarrhea, De = Deworming, F = Fever, R = Respiratory infections

Table 4: Usage of least frequently mentioned plants

Species name	Parts used	Preparation	Route	Use (s)
Ricinus communis	Seeds	Powder	Oral	P
Digitaria abyssinica	Roots	Decoction	Oral	P
Aloe ferox	Leaves	Juice and decoction	Oral	P, F
Tephrosia vogellii	Leaves	Powder	Oral and Topical	De, A
Allium sativum	Bulbs	Juice	Oral	P
Tropaeolum majus.	Leaves	Juice	Oral	I
Fleurya aestuans	Leaves	Juice	Oral	P
Symphytum asperum	Leaves	Juice	Oral	I
Solanum nigram	Roots	Decoction	Oral	P
Venonia auriculifera	Leaves	Juice	Oral	P
Maesa lanceolata	Leaves	Juice	Oral	De
Melia azedarach	Leaves	Powder	Oral	P
Kalanchoe glaucescens	Leaves	Juice	Oral	P
Tragia brevipes	Leaves	Juice	Oral	P
Spilanthes Mauritania	Leaves	Juice	Oral	P
Solanum incanum	Whole	Aeration	Inhalation	P
Ipomea batatas	Roots	Decoction	Oral	P
Brassica oleracea	Leaves	Juice	Oral	I
Euphobia hirta	Leaves	Juice	Oral	P
Artemesia annua	Leaves	Juice	Oral	P
Oxalis corniculata	Leaves	Juice	Oral	P
Tithonia diversifolia	Leaves	Juice	Oral	P
Tagetes minuta	Leaves	Juice	Oral	P
Catharanthus roseus	Leaves	Juice	Oral	P
Euphorbia heterophylla	Leaves	Juice	Oral	P
Abrus precantorius	Seeds	Powder	Oral	De
Curcuma longa	Bulbs	Decoction	Oral	F, Di
Ocimum basilicum	Leaves	Juice	Oral	F

P = Prophylaxis, Di = Diarrhea, De = Deworming, F = Fever, R = Respiratory infections, I = Immune booster, A = Acaricide

Table 5: Frequently used concoctions

Plants used	Mode of preparation
Concoction 1 *Aloe vera* *Vernonia amygdalina* *Vernonia cineria* *Jatropha curcas*	In a container, five leaves of *Aloe vera* and handfuls of *Vernonia amygdalina* and *Vernonia cineria* leaves plus ten leaves of *Jatropha curcas* were put in 7 L of water. These were then squeezed to produce juice. The juice was decanted and packed and the leaf particles left behind for disposal. The juice was stored in a cool dry place. This concoction was used for prevention of all poultry diseases
Concoction 2 *Sida cuneifolia* *Momordica foetida*	In a big container, handfuls of *Sida cuneifolia* and *Momordica foetida* leaves plus ten tea spoons of ash were squeezed in 5 L of water. The juice was decanted off and stored in a cool dry place and the leaf particles left behind for disposal. This concoction was used for treatment of fever in poultry
Concoction 3 *Aloe vera* *Bidens pilosa* *Vernonia amygdalina*	In a sauce pan, five leaves of *Aloe vera* and handfuls of *Bidens pilosa* and *Vernonia amygdalina* leaves were put in fifteen cups of water and left to boil until at least five cups of water evaporated off. It was then left to cool to room temperature, sieved and the juice kept in a cool dry place. The residues were disposed of. This concoction was used for treatment of fever in poultry
Concoction 4 *Aloe vera* *Capsicum annum* *Jatropha curcas*	In a sauce pan, five leaves of *Aloe vera* and half a handful of *Capsicum annum* plus ten leaves of *Jatropha curcas* were put in fifteen cups of water and left to boil until at least five cups of water evaporated off. It was then left to cool to room temperature, sieved and the juice kept in a cool dry place. The residues were disposed of this concoction was used for treatment of fever in poultry
Concoction 5 *Aloe vera* *Vernonia amygdalina* *Vernonia cineria* *Carica papaya*	In a big sauce pan, five leaves of *Aloe vera* plus handfuls of *Vernonia amygdalina* and *Vernonia cineria* leaves plus five roots of the male plant of *Carica papaya* were put in fifteen cups of water and left to boil until at least five cups of water evaporated off. It was then left to cool to room temperature, sieved and the juice kept in a cool dry place. The residues were disposed of. This concoction was used for treatment of fever in poultry

In some concoctions non-plant materials such as ash were added. Majority of the concoctions prepared were not boiled.

In developing countries, low-income farmers and people of native communities use folk medicine for the treatment of common infections (Rojas *et al*., 2006). This study documented medicinal plants used by poultry farmers in Masaka district of Uganda including plant parts used, methods of preparation and administration as well as medicinal uses. Fifty nine plants were identified to be used by poultry farmers for medicinal purposes. Results of this study are similar to previous studies which indicate that some of these species of plants are used in treatment of poultry diseases in other parts of Uganda (Saimo *et al*., 2003; Olila *et al*., 2007; Bukenya, 2007).

The highest number of medicinal plants used belonged to the families Asteraceae, Solanaceae and Euphobiaceae. The most frequent use of plants belonging to these families can be attributed to their being widespread and easily accessed. Previous studies have

reported that plants in these families have important pharmacological activities. Falsetto (2009) has reported that members of family Asteraceae have antiseptic, anti-inflammatory and soothing properties to the skin and digestive system. The methanolic extracts and aqueous extracts of the leaves of *Aspilia africana* have exhibited antibacterial activities on both Gram-positive and Gram-negative bacterial species (Macfoy and Cline, 1990; Adeniyi and Odufowora, 2000). *Apiria africana* is also used in Africa to stop bleeding, to promote wound healing, to treat cardiovascular diseases (Dimo *et al*., 2002) to treat stomach troubles (Okwu and Josiah, 2006) and in treatment malaria infection (Waakoa *et al*., 2005; Okokon *et al*., 2006). It has been reported that the crude root of *Vernonia amygdalina* has antimicrobial properties (Tella, 1976; Kaufman *et al*., 1999; Okigbo and Mmeka, 2008). *Bidens pilosa* was found with high activity against Gram-positive bacteria (Rabe and van Staden, 1997) and flavonoids found in this plant have anti-inflammatory activity (Geissberger and Sequin, 1991). The ethanolic leaf extract of *Tithonia diversifolia* has antibacterial activity (Liasu and Ayandele, 2008). *Vernoni cinerea* relieves asthma and has anti-inflammatory activities (Iwalewa *et al*., 2003).

Cannabis sativa, *Capsicum annuum*, *Nicotiana tobaccum* and *Momordica foetida* were the most widely used plants. This study is in line with earlier studies which have reported that these same plants are used by farmers in other parts of Uganda to treat poultry diseases (Bukenya, 2007; Saimo *et al*., 2003; Olila *et al*., 2007). Previous studies have also reported that *Capsicum annuum* has good medicinal properties (Elujoba *et al*., 2005) while *Momordica foetida* has good antibacterial activities (Olukayode and Adebola, 2008). This may explain the claims of the medicinal effects of these plants and their frequent use by farmers in treatment of poultry diseases.

Most of the plants were used for prophylaxis purposes and this could be attributed to the fact that very few farmers can access vaccination services in rural areas. Furthermore, previous studies have shown that many diseases occur in free ranging smallholder poultry, since diseases are easily contracted under free-range conditions due to poultry scavenging habits and the fact that disease control is very difficult to carry out under unconfined management (Ahlers, 1999; Christensen, 2000; Permin and Bisgaard, 1999). Due to this high exposure to diseases, small scale, resource poor farmers probably find it more cost effective to prevent disease using medicinal plants.

It is also important to note that when using these medicinal plants, farmers are more interested in treating specific symptoms of the diseases like fever, diarrhea and respiratory symptoms but not specific diseases. This is probably because farmers are unable to accurately diagnose the specific diseases though with time and through experience, they have learnt that these plants are good at treating specific symptoms manifested during infection by these diseases. These symptoms are however manifested in a variety of poultry diseases (Kahn and Scott, 2005) which commonly affect poultry like Newcastle disease (Byarugaba, 2007).

Farmers use the oral route most frequently because drugs are easy to administer this way and requires less skills. In addition most of the dosage forms prepared by the farmers are more appropriately administered orally through drinking. Leaves were the most cited plant parts used by the farmers for the preparation of traditional medicines. This finding is in line with the results of other ethnomedicinal studies (Olila *et al*., 2007; Yineger and Yewhalaw, 2007; Pradhan and Badola, 2008) who reported that leaves were the most cited plant parts used in remedy preparations. Most plants were prepared as juice using water and probably this was because it requires less time and skill to make juice preparations. This research also agrees with Bukenya (2007) who reported that the most common way of preparing and administering of the medicine to poultry is simply to crush the plant material, add water to make a juice and administer the concoction orally.

CONCLUSION

This study showed that farmers in Masaka district carry out various indigenous practices and use a number of medicinal plants to prevent and treat poultry diseases. This knowledge was documented and the identified plants could offer possible alternatives to Western medicine in treatment of poultry diseases and therefore improving poultry production while also limiting presence of antibiotic residues in poultry products and their associated effects on public health. The documentation of this information will contribute to ensuring that this indigenous knowledge is passed on from generation to generation and will serve as a basis for further research on the clinical efficacy of these medicinal plants and on the identification of bioactive compounds present in these plants in the search for newer pharmaceuticals.

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