

Traditional herbal preparations for indigenous poultry health management in Western Kenya

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Abstract

Conventional disease prevention methods are geared towards birds in confinement and not free range in an indigenous poultry production system. However, the existing indigenous technical knowledge inherited from past generations has sustained the local poultry production system. This knowledge is passed on verbally and is hardly documented. The study reportedly collected information on traditional preparations (e.g herbs) in Kimilili and South Wanga of Bungoma and Butere/Mumias districts respectively. Its objective being to document existing plant material (herbs) and any other traditional preparations used for poultry health management in rural poultry production systems.

The study confirmed the existence of vast local knowledge for indigenous poultry health management. The preparations are usually more than one-plant parts whose amounts are not specific. They usually target symptoms of diseases, which were encoded into specific diseases. *Aloe Vera*, pepper, sisal and neem were the most used medicinal plants. Parts used included leaves, barks, and roots. Some specific concoctions were said to prevent or treat specific diseases. For example *Aloe Vera* was said to treat Newcastle, *Croton megalocarpus* was said to treat coryza sinusitis, *Combretum mole* was said to treat intestinal worms.

Key words: Herbs, poultry health management

Introduction

Diseases are the main constraints of indigenous poultry production in western Kenya; where Indigenous poultry farming is an integral part of mixed farming. The birds are raised mostly on low input extensive free-range system of production. Farmers usually have to start with new flock after heavy losses incurred due to disease outbreaks. The existing conventional disease control programs favor the high investment intensive systems of production with birds in confinement and not small-scale farmers with less than 100 birds.

Due to high cost of conventional medicines and vaccines coupled with the lack of knowledge on their use, these drugs are usually out of reach of the small-scale farmers. There is therefore need for cheap easy to use and sustainable local poultry disease control programs.

Since ancient times, plants and plant parts have an indispensable source of medicine for indigenous poultry production systems. Although modern medical science has developed to a great extent, many farmers in western Kenya depend on plant parts and herbal remedies for indigenous poultry health management. Unfortunately, local medical traditions are being lost because they are communicated orally from generation to generation and are largely undocumented. Very little has been done to verify and validate information gathered.

The study reportedly collected information on traditional preparations (e.g herbs) with the objective of documenting existing plant material (herbs) and any other traditional preparations used for poultry health management in rural poultry production systems.

Materials and methods

An ethno botanical survey was conducted in Kimilili and South Wanga divisions of Bungoma and Butere/Mumias districts respectively. Indigenous knowledge (ITK) on medicinal herbs and trees used for poultry health management was documented after interviews, observations and group discussions with herbalists, farmers and other stakeholders.

A check list used to collect information sought indigenous knowledge on common diseases or selection of disease symptoms and pests of local poultry, the clinical signs of the diseases, plants and plant parts used for prevention or treatment, local names of concoctions, parts used for each ingredient, preparation of concoction and administration of the concoctions.

The ITKs were ranked based on frequencies from the number of times each herb, plant or plant part was mentioned in all interviews.

During group discussions, symptoms described by farmers, herbalists were encoded into suspected diseases by subject matter specialists (SMS- Veterinary officers) and other stakeholders. Diseases/symptoms targeted by herbs, plant parts were encoded into possible target diseases by SMS's

The extracts from approximately 14 different traditional medicines were prepared to investigate the antimicrobial activities against poultry disease-related bacteria. Extracts were obtained using water and methanol extraction methods (Watai 2003). Bacteria used for testing were commercial stocks of *Escherichia coli* (gramme negative rod); *Staphylococcus aureus* (gramme positive cocci) and *Salmonella tympfi*.

Wells were made in nutrient broth (Agar) in petri dishes. Extracts were then dropped into wells. Bacteria were then grown at 37⁰c for 24 hours. Inhibition was determined by bacterial growth closer/away from wells with extracts

Results

The major indigenous poultry diseases.

Table 1 lists 10 common diseases and pests cited by farmers. The most common disease for small-scale indigenous poultry farmers in western Kenya was Newcastle disease (*lukuzu*). Symptoms were described as whitish diarrhoea associated with the dry seasons and very high mortality.

Table 1. Common symptoms cited by farmers and suspected diseases

| Symptoms described | Local name | Suspected disease | Rank |
|---|------------|-----------------------------|------|
| 1. Whitish diarrhoea that is associated with dry seasons, after purchases from market and festivities, accompanied by high mortality and survivors became crazy | Lukuzu | Newcastle disease | 1 |
| 2. Noisy breathing and coughing, nasal discharge, watery eyes which spreads slowly within a flock | Malole | Chronic respiratory disease | 2 |
| 3. Whitish diarrhoea in chicks less than 2 weeks old with high mortality | | Pullorium | 3 |
| 4. Pox lesions on combs and wattles | Kihundu | Fowl pox | 4 |
| 5. Coughing, gasping in young chicks and sneezing. | | Infectious bronchitis | 5 |
| 6. Swollen heads and eyes | | Infectious coryza | 6 |
| 7. Bloody diarrhoea | | Coccidiosis | 7 |
| 8. Feather picking and extreme sand bathing | Inda | Poultry louse | 8 |
| 9. Scaly bleeding legs | Kiromboto | Mites | 9 |
| 10. Reddish insects on eyes and ears | | Fleas | 10 |

The second common disease problem mentioned by farmers was described symptomatically as a one with noisy breathing and coughing accompanied with nasal discharge and watery eyes. This was interpreted as chronic respiratory disease.

Warts on the naked parts of the comb and wattle were cited and interpreted as fowl pox.

Sharp coughs, sneezing and gasps culminating in difficulty in breathing especially among young birds were interpreted to be Infectious bronchitis.

Chickens with swollen heads were interpreted to suffer from infectious coryza. Bloody diarrhoea was interpreted to be coccidiosis.

Parasites among them lice, mites and fleas were cited but ranked low because farmers did not realize many losses due to these problems.

Figure 1 presents a dozen plant species cited by farmers to have medicinal properties and used for indigenous poultry health management

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In addition to those on the figure, other plants cited included *Esibeyamare*, *liruelola*, *likonyera*, *Lipaipai*, etc. Frequencies showing the number of times these plants and plant parts were mentioned throughout the survey showed that the most sought for plants for local poultry health management in that order were Aloe spp (*Eshikaka*), Pepper (*pilipili*), Sisal (*likonge*), Lilokha, Neem (*Mwarubaini*), *Omusirangokho* and *kumukimilia*. Most of the plants used were herbs.

Control and treatment of poultry diseases

Table 2 lists a selection of symptoms treated by the most commonly used plant species. These symptoms were encoded into specific target diseases. Most of the concoctions involved more than one ingredient and these were mainly leaves and roots in the case of herbs, shrubs and barks in case of trees. Some of the trees whose barks were used include *Omutsuitsui* (*Croton megalocarpus*), *Kumukimilia* (*Combretum molle*) and *Neem* (*Azandrachlia indica*).

Table 2. Disease symptoms treated with the 12 priority medicinal plants

| Local name | Botanical name | Parts used | Selection of disease symptoms treated | Possible target diseases |
|------------|----------------|------------|---------------------------------------|--------------------------|
| Aloe | Aloe Vera | Leaves | Diarrhoea(Whitish,greenish,bloody) | Newcastle |

| | | | | |
|--|---------------------|------------------------|--|---|
| (<i>Eshikakha</i>) Pepper (<i>Pilipili</i>) | Capsicum | Fruit | Coughing, gasping, noisy breathing | disease Respiratory diseases |
| Sisal (<i>Likonge</i>) | | Leaves | Diarrhoea, unthrift ness, drooping wings | Gastrointestinal diseases |
| Lilokha | | Leaves | Diarrhoea | Gastrointestinal diseases |
| Neem (<i>Mwarobaini</i>) | Azadirachta indica | Leaves, bark | Whitish diarrhoea, pox lesions, scaly legs | Viral diseases and external parasites |
| Omusirangokho | | Roots | | Respiratory diseases |
| Kumukimilia | Combretum mole | Leaves, bark | Gasping, coughs ,foamy diarrhoea | Respiratory diseases and intestinal worms |
| Omut suitsui | Croton megalocarpus | bark | Swollen heads, Foamy diarrhoea, unthrift ness | Coryza, Intestinal worms |
| Khasanda kwata | | Leaves | Diarrhoea, unthrift ness, drooping wings | Respiratory diseases |
| Amavinzo | Tithonia | Leaves | Diarrhoea (foamy), coughing, unthrift ness, drooping wings | Gastrointestinal diseases and worms |
| Imbululusi | | Leaves, bark and roots | Diarrhoea, unthrift ness, drooping wings | Gastrointestinal diseases |
| Lukosekose | | Leaves | Diarrhoea, coughing | Respiratory diseases |
| Musembe | Endatta abysinica | Bark | Cough, gasps and diarrhoea | Respiratory diseases |

The amounts of ingredients used in concoctions were not specific although in most instances a 1 kg tin of water was used as a measure for daily administration. Birds were usually given the concoction to drink throughout the day with fresh concoction is provided daily.

Specific concoctions were prepared for specific diseases. For example *Aloe Vera* was said to prevent Newcastle, *Croton megalocarpus* was said to treat coryza sinusitis, *combretum mole* was said to treat intestinal worms.

Other concoctions were prepared for general ailments classified into gastrointestinal diseases, respiratory diseases, cutaneous diseases and parasitic diseases. For example Pepper (*capsicum*), *Khasanda kwata*, *imbululusi* concoctions were prepared for control and treatment of respiratory

diseases, Sisal (*Likonge*), *Omusirangokho*, *tithonia* concoctions were prepared for gastrointestinal ailments, neem (*azadirachta indica*) was known to prevent viral ailments.

Farmers used repellants such as Mexican marigold *Tegetes minuta* and *tephrosia vogelia* as insect repellants in poultry houses. Other times they were used in treatment against mites.

Table 3 presents antimicrobial activities of extracts of several medicinal plants. Extracts of *Aloe spp*, *Lilokha*, and *Azandrachta indica* exhibited significant antimicrobial activities against *Salmonella tympfi*, *Staphylococcus aureus* and *Escherichia Coli* whereas the extracts of *Imbululusi* exhibited antimicrobial activities against *Salmonella tympfi* and *Staphylococcus aureus*.

Table 3. The inhibition of growth of *salmonella spp*, *Staphlococcus spp* and *Escherichia coli* by extracts of commonly used medicinal plants

| Local name | Botanical name | Parts extracted | Inhibition | | |
|-------------------------------|------------------------------|------------------------------|------------|----------------|------------------|
| | | | Salmonella | Staphylococcus | Escherichia Coli |
| Aloe (<i>Eshikakha</i>) | Aloe Vera | Leaves | +ve | +ve | +ve |
| Pepper (<i>Pilipili</i>) | Capsicum | Fruit | -ve | -ve | -ve |
| Sisal (<i>Likonge</i>) | | Leaves | | | |
| Lilokha | | Leaves | +ve | +ve | +ve |
| Neem (<i>Mwarobaini</i>) | Azadirachta <i>indica</i> | Leaves ,bark | +ve | +ve | +ve |
| Omusirangokho | | Roots | -ve | | -ve |
| Kumukimilia | Combretum mole | Leaves, bark | -ve | -ve | +ve |
| Omutsuitsui | Croton megalocarpus | bark | | | |
| Khasanda kwata | | Leaves | | +ve | |
| Amavinzo | Tithonia | Leaves | | | +ve |
| Imbululusi | | Leaves, back and roots | +ve | +ve | |
| Lukosekose | | Leaves | | | |
| Musembe | Endatta abyssinica | Bark | | +ve | |
| Mukombero | Mondia whytei | Root | +ve | | +ve |

Extracts of *Mondia whytei* exhibited antimicrobial activities against *Salmonella tympfi* and *Escherichia coli*. Extracts of *Khasanda kwaata* and *Endata abyssinica* exhibited antimicrobial activity against *Staphylococcus aureus*. Extracts from *Tithonia* exhibited antimicrobial activity

against *Escherichia coli*.

Discussion

Although the common belief was that traditional medicine was a secret divulged only to a few, most respondents were open and willing to share information. The information was later discussed in group discussions during the group meetings with farmers.

The most common poultry disease was NCD. This was because the use of conventional vaccines in indigenous chicken production was limited by cost, dose format and lack of thermostability. Because of these reasons rural scavenging chickens were rarely vaccinated and flocks remained highly susceptible to NCD with periodic decimation and economic losses. Other diseases were also rarely controlled. Farmers therefore always had to start with new flocks following outbreaks of diseases (Okitoi et al 2000).

The finding that Aloe spp was the most commonly used herb in rural poultry management was in agreement with a report by Mwale et al (2005) and Grindlay and Reynolds (1986) that it was used in management of a variety of diseases and that Aloe acted as a broad spectrum remedy (Ibrahim et al 1984) in rural poultry health management.

Farmers usually sought plant and plant parts to use in the management of their flocks after a disease outbreak. More often it was symptomatic treatment.

Most farmers tended to use more than one ingredient in concoctions to make the concoction as broad as possible. This is due to the fact that clinical symptoms of many poultry diseases were so closely related that sometimes it was difficult to distinguish between specific diseases. Some clinical symptoms were regarded as diseases themselves and sometimes some local names given to some diseases were based on symptoms. This broad-spectrum approach was similar to the current conventional medicine approach with broad-spectrum antibiotic.

The survey revealed that little planting of medicinal plants was carried out for any of the species. Rather, communities normally relied on supply from the wild. Where farmers had cultivated medicinal plants, they had gotten seedlings from local government or project nurseries. For example the neem tree was only found where the nurseries had been established by projects.

Preparation of concoctions

Control and treatment of poultry diseases was based on concoctions of plant materials. More than one plant part (leaves, barks, roots and tubers) was used in concoctions. The amounts of each ingredient were not known and in most cases were offered in drinking water. Preparations were done by pounding mixtures of the ingredients, adding water, mixing well and allowing it to settle before administration.

Farmers recognized the existence of sexes of plants. This knowledge is used in preparing concoctions. For example preparations involving pawpaw (*lipaipai*) roots, only male plants are

used. Some times the preparations are used in form of paste, for example in the treatment of scaly mites, neem (*Mwarubaini*) mixed with *omushivano* (residue from soaked and filtered ash) and a little water is made into paste and smeared on the scaly legs.

Conclusions

- Small-scale indigenous poultry farmers treasure an intimate indigenous knowledge inherited from past generations to sustain the low input extensive free-range system.
- The wild was the main source of medicinal plants used for medical remedies in an indigenous poultry production system. There was no organized scientific cultivation of medicinal plants
- Respondents had no doubt about the potency of the herbal preparations. But there is no scientific evidence to back this. The fact that more than one plant or plant part is used in the concoctions tells the broad spectrum approach farmers use.
- In conclusion, these findings suggest that herbal extracts may play important roles for antimicrobial activities against poultry disease-related bacteria

Recommendations from the survey

- Priority plants identified should be promoted for planting by farmers
- Farmers be trained and demonstrated on the advantages of cultivating indigenous plants and integrating medicinal plants into existing farming systems.
- Research is needed on the agronomic requirements of these plants. There is need to incorporate such species in an agro forestry system.

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