Use of Ethnoveterinary Medicine in Family Poultry Health Management in Botswana: a Review

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Abstract

A review of the utilization of ethnoveterinary medicine (EVM) for health management of family poultry in Botswana was undertaken. The use of ethnoveterinary medicine in the management of animal healthcare is as old as the domestication of various livestock species. Compared to Western modern medicine, EVM is widely utilized by the family poultry rearers across the country. In Botswana, the common traditional remedies used to control and treat diseases were Aloe spp., potassium permanganate and Nicotiana tabacum. Aloe spp. and N. tabacum were also used against internal parasites while wood ashes, especially those from Peltophorum africanum and Combretum imberbe were used against external parasites. Because of its unpleasant and strong smell, Thamnosma rhodesica leaves were placed in chicken shelters in order to repel external parasites. This review suggests the need to conduct field surveys in order to document ethnoveterinary practices in Botswana.

Keywords: Diseases, family poultry, herbal plants, parasites, traditional remedies
**Introduction**

Ethnoveterinary medicine (EVM), which is also known as traditional animal health care practices, is defined as local or indigenous knowledge and methods for caring, healing, and managing livestock (Guèye, 1999). It is the study of indigenous knowledge system of animal health care. The EVM drugs are used in the management of bacterial, viral, protozoan, fungal, parasitic and non-infectious causes of diseases. According to Sri Balaji and Vikrama Chakravarthi (2010), ethnoveterinary practices concern to animal health care is as old as the domestication of various livestock species. They comprise beliefs, knowledge, practices and skills pertaining to health care and management of livestock. Worldwide the people have traditionally relied on a whole range of indigenous practices to keep their flock healthy and to treat them when they are sick (Anon, 1996). Medicinal plants have for several centuries been widely used as a primary source of prevention and control of livestock diseases (Hoareau and DaSilva, 1999). In the opinion of Guèye (1997), EVM is usually the only alternative for most of the resource-poor family poultry farmers, particularly in rural and hilly areas because there are almost no veterinarians working in such areas.

According to Wanzala et al. (2005), the discovery of all the medicinal uses of plants must have occurred in a number of ways, not only by the principle of trial and error mechanism. Some of these ways include watching animals treat themselves by eating and rubbing themselves with special plants when ill (zoopharmacognosy) and subsequent adoption of the same remedies, communicating and interacting with the visiting traditional medical specialists from other communities and borrowing their traditional remedial ideas, inheriting the healing powers and magic from parents, buying the healing and magic powers from experienced traditional medical specialists and deliberate experimentation to help select those remedies that work. Guèye (2002) and Masimba et al. (2011) pointed out that ethnoveterinary knowledge was mostly in the custody of older men and women who passed it orally to younger generations by word of mouth.

Interest in EVM has resulted primarily from the increasing cost of livestock maintenance and the introduction of new technology in the production of veterinary medicines and vaccines (Hoareau and DaSilva, 1999). In Kenya, Lagu and Kayanja (2010) reported that traditional healers play limited roles in treating local chickens as many farmers collect, concoct and administer the local herbs themselves. Many of the plants used to prepare indigenous medicine contain valuable active ingredients. Previous study by Moreki et al. (2010) showed that 86.7% of family poultry rearers used EVM, whereas the remainder used modern medicines (vaccines and drugs).

Resource-poor farmers in rural and peri-urban areas have limited access to veterinary care in terms of support services (from state and private veterinarians and animal health technicians), information about the prevention and treatment of livestock diseases, and preventative and therapeutic veterinary medicines (Dold and Cocks, 2001). Also, the resource-poor family poultry farmers do not have money for, or access to cost-intensive management systems including chemical medicine (Guèye, 2002).

The indigenous traditional knowledge of medicinal plants of various ethnic communities, which has been transmitted orally for centuries is fast disappearing from the face of the earth due to the advent of modern technology and transformation of traditional culture (Sandhya et al., 2006). Therefore, the paper reviews published researches on the use of EVM in family poultry with particular reference to Botswana.

**Merits and demerits for the use of ethnoveterinary medicine**

Guèye (1997) stated that the use of EVM is sustainable and ecologically sound, as plant products with recognised medicinal properties are far more accessible to the villagers than Western medicine. The merits and demerits for the use of EVM are presented in Table 1.
Table 1: Merits and demerits for the use of ethnoveterinary medicine

<table>
<thead>
<tr>
<th>Merits</th>
<th>Demerits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost effective</td>
<td>Difficulty of getting plants at certain times of the year.</td>
</tr>
<tr>
<td>Local medicines are effective</td>
<td>Delays in the recovery of the birds post herbal drug administration.</td>
</tr>
<tr>
<td>Readily accessible</td>
<td>Difficulty in preservation of the herbal concoctions.</td>
</tr>
<tr>
<td>There is no eminent resistance</td>
<td>Ineffective concoctions, unknown dosages and therefore not standardized.</td>
</tr>
<tr>
<td>No transport costs are incurred</td>
<td>May be harmful to persons preparing them</td>
</tr>
<tr>
<td>It is easy to administer</td>
<td>The tedious process of preparing herbal concoctions for many birds.</td>
</tr>
<tr>
<td>There is minimal risk of drug overdose</td>
<td>There are no known dosages.</td>
</tr>
<tr>
<td>When prompt treatment is administered, the birds get healed and the birds benefit from supplementation from vitamins.</td>
<td>Not sure of the diseases being treated because of poor diagnosis, which only identifies symptoms and not the underlying cause.</td>
</tr>
</tbody>
</table>

Source: Matekaire and Bwakura (2004); Lagu and Kayanja (2010).

**Medicinal plant parts used**

The distribution of medicinal plants in poultry health management by parts utilized for EVM is shown in Figure 1. The most used part is the root and the least used part is the wood. In their study, Bodeker et al. (2005) reported that the destructive harvesting methods (roots, whole plants, bark, stem, rhizomes and wood) and non-destructive methods (fruits, seeds, leaves and flowers) accounted for 72% and 28%, respectively of plants parts used in EVM. Sri Balaji and Vikrama Chakravarthi (2010) stated that all plant parts including leaves, bark, fruits, flowers and seeds are used in medicinal preparations.

![Distribution of medicinal plants by parts used](image)

**Fig. 1:** Distribution of medicinal plants by parts used. Source: Bodeker et al. (2005)

**Preparation and application of herbal medicines**

Plants are the most commonly utilized ingredients in the preparation of EVM. Masika et al. (2000) noted that medicinal plants have various methods of preparation and application such as concoction, decoction, powder, and crushed and homogenized in water for different types of ailments. Preparation can be made from single plant or from a range of plants depending on the disease treated. The preparation and application methods vary based on the type of disease treated and the
actual site of the ailment. The medicinal plant preparations are applied through different routes of administration such as oral, topical or dermal, and nasal routes.

The most common forms of EVM preparations are powders, poultice, ointment, decoction, infusion, cold ware extract, tincture and fumigation (Toyang et al., 2007; Sri Balaji and Vikrama Chakravarthi, 2010). A study by Masika et al. (2000) in South Africa, reported that a concoction constituted 26.1% of preparation form, followed by crushed and homogenized in water (20%) and powder form (16.1%). The authors observed that oral application was the most (50.43%) commonly used route followed by topical or dermal application (23.48%).

Ethnoveterinary medicines can be administered in many different ways including drenching, bath, fumigation, spray, injection and topical application (Toyang et al., 2007). Drenching is applying medicine in liquid form through the mouth using a spoon, dropper or sorghum straw; on skin application a poultice, soft heated preparation (applied to a sore or abscess using wet cloth), warm stone or direct application; fumigation (the use of smoke to kill insects); steam (applied to affected part); hanging bouquet (when plants parts are bound in to a bouquet and hanged inside poultry house); in the eye application (medicine is dropped into the eye of the bird) and lastly medicine can be applied through feeds or water by mixing them with medicine.

**Diseases control and treatment through ethnoveterinary medicine**

Diseases seriously affect family poultry and constitute one of its major threats. Moreki et al. (2010) ascribed losses in family poultry to diseases (36.7%); diseases and parasites (11.1%); predation (8.89%); a combination of diseases, parasites and predation (8.89%). In order of prevalence, the common diseases of poultry in Botswana are coccidiosis, infectious coryza, fowl pox, infectious bursal disease (IBD) and Newcastle disease (NCD) (Moreki et al., 2011). According to Guéye (1999), NCD is the most widespread infectious disease in Africa. Similarly, Moreki (1997, 2010) identifiedNCD to be a major constraint in family poultry, causing up to 100% mortality in unprotected flocks. The study of Badubi et al. (2006) in Botswana estimated deaths due to NCD, predation, other causes and unknown causes to be 40.45%, 53.8%, 3.3% and 2.55%, respectively. Herbal plants used to treat and/or control diseases and parasites are presented in Table 2.

As shown in Table 2, various herbal plants are used to treat, prevent and control diseases in family chickens. The study of Moreki (2003) showed that 87% of respondents used traditional remedies to control diseases compared to 15% that used modern medicines (2% vaccines and 13% drugs). Both human and veterinary medications were used in the treatment of diseases. The three common traditional remedies used by rearers were potassium permanganate, aloes (Aloe spp.) and leaf tobacco (Nicotiana tabacum). The medicinal uses of tobacco have been reported in humans by Charlton (2004). In agreement with Moreki (1997), Deeba (2009) in Pakistan reported the use of N. tabacum in treatment of NCD. Other remedies included Hypagophytum procumbens (tuber), salty water, exudates from eucalyptus (Eucalyptus spp.) leaves, roots from Senna italica, and a decoction of tea leaves (Five Roses Tea brand being preferred) for the treatment of various diseases. Similarly, Ranwedzi (2002) in South Africa reported that family poultry rearers used traditional remedies including Aloe vossii Reynolds and tobacco leaves to treat chickens against NCD. Moreki (1997) attributed the wide use of traditional remedies to lack of knowledge in the use of vaccines, lack of cooling facilities, unavailability of vaccines, and possible effectiveness of the remedies in curing some diseases. In Nigeria, Musa et al. (2008) noted that these remedies that are used by rural farmers may or may not have direct effect on NCD virus but could affect protozoan and helminths parasites of rural poultry by reducing the parasites burden, and boosting the immunity of birds against infection.

In Botswana, Aloe vera and N. tabacum are the most common utilized remedies used against both diseases and parasites. Mwale et al. (2005) reported that A.vera and Aloe spicata were the predominantly used plant species for chicken health management in Zimbabwe. The authors attributed the wide use of A.vera and A. spicata their ease of use and
availability all year round. In agreement with Moreki et al. (2010), Mwale et al. (2005) mentioned that A. vera acts like a broadspectrum antibiotic remedy.

<table>
<thead>
<tr>
<th>Tswana name</th>
<th>English name</th>
<th>Scientific name</th>
<th>Family</th>
<th>Parts used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kwii</td>
<td>Onion</td>
<td>Allium cepa</td>
<td>Liliaceae</td>
<td>Bulb</td>
</tr>
<tr>
<td>Mokgwapha</td>
<td>Burn plant</td>
<td>Aloe spp.</td>
<td>Aloaceae</td>
<td>Leaf</td>
</tr>
<tr>
<td>Sengaparile</td>
<td>Grapple plant</td>
<td>Hypagrophytum</td>
<td>Pedaliaceae</td>
<td>Tuber</td>
</tr>
<tr>
<td>Sebete</td>
<td>*</td>
<td>Senna italica</td>
<td>Fabaceae</td>
<td>Roots</td>
</tr>
<tr>
<td>Mmurubere</td>
<td>Mulberry</td>
<td>Morus alba</td>
<td>Moraceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>Moralala</td>
<td>*</td>
<td>Thamnosma rhodesica</td>
<td>Rutaceae</td>
<td>Roots</td>
</tr>
<tr>
<td>Mosetlha</td>
<td>African wattle</td>
<td>Peltophorun africanum</td>
<td>Caesalpinioideae</td>
<td>Root/bark</td>
</tr>
<tr>
<td>Pebere</td>
<td>Eucalyptus</td>
<td>Eucalyptus spp.</td>
<td>Myrtaceae</td>
<td>Leaf</td>
</tr>
<tr>
<td>Mabolara</td>
<td>Tobacco</td>
<td>Nicotiana tabacum</td>
<td>Solanaceae</td>
<td>Leaf</td>
</tr>
<tr>
<td>Monepenpe</td>
<td>Long-tail cassia</td>
<td>Cassia abbreviata</td>
<td>Fabaceae</td>
<td>Bark/roots</td>
</tr>
<tr>
<td>*</td>
<td>Moringa</td>
<td>Moringa oleifera</td>
<td>Moringaceae</td>
<td>Leaf</td>
</tr>
<tr>
<td>Motswere</td>
<td>Leadwood</td>
<td>Combretum imberbe</td>
<td>Combretaceae</td>
<td>Whole plant</td>
</tr>
<tr>
<td>Pherehere</td>
<td>Pepper/chilli</td>
<td>Capsicum annuum</td>
<td>Solanaceae</td>
<td>Fruits</td>
</tr>
</tbody>
</table>

*Name could not be found

Moreeng (2008) reported that feeding chickens a concoction of Moringa (Moringa oleifera) tree leaves is an effective de-worming practice. The use of Moringa oleifera by the rearers is consistent with Yang et al. (2006) who investigated the effects of feeding four levels (0.5%, 1%, 2% and 3% dried leaves) of dehydrated leaves of M. oleifera in the diets of broilers and found that Moringa diets significantly (1) enhanced duodenum traits; (2) increased concentrations of total globulin, γ-globulin and IgA, lymphocyte ratio, antibody titer to sheep erythrocytes, and delayed type hypersensitivity (3) reduced E. coli and increased Lactobacillus counts in the ileum. The authors concluded that M. oleifera leaves are potential plant material to enhance immune responses and improve intestinal health of broilers. The study of Ogbe and Affiku (2011) in Nigeria showed that M. oleifera leaves contained appreciable amounts of carbohydrate, protein and minerals, which are nutritional requirements for poultry. The authors also mentioned that M. oleifera could be useful as feed supplement and as medicine in poultry to improve health and growth performance.

In Botswana, the bursa of fabricius of birds infected with IBD is usually cut and dressed with salt or a mixture of salt and snuff (powdered tobacco) in order to stop bleeding. The practice of trimming bursa of fabricius is common across Botswana as it is said to be effective against IBD (Moreki et al 2010). The study of Simainga et al. (2010) in the Western Province of Zambia reported similar results.

**Parasites control through ethnoveterinary medicine**

The common parasites of family poultry in Botswana are tampans, mites, fowl lice and ticks, whereas the three common remedies used against external parasites control are paraffin, wood ash and Blue Death (a chemical dust used to kill ants) (Moreki, 2003). These remedies are applied on the birds by rubbing. Warm or cold ash is also applied to the floor of the shelters. Moreki (1997) mentioned that although ashes from any tree species could be used, Peltophorum africanaum (African wattle) and Combretum imberbe (lead wood) are preferred. Other traditional remedies used to kill parasites are Aloe spp., Jeyes fluid, potassium permanganate and burning (smoking) in the chicken shelters. It is claimed (Moreki, 1997) that placing the leaves of Thamnosma rhodesica in the chicken...
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shelter repels parasites. Similarly, Lagu and Kayanja (2010) in Uganda reported the use of paraffin against mites and fleas. The authors stated that A. vera was mixed with ash and red pepper (Capsicum annum) before administration while in Botswana an infusion of A. vera is given.

Conclusion

Most family poultry are threatened by disease outbreak, especially NCD. Family poultry is usually owned and managed by resource-poor farmers who are unable to buy expensive vaccines for their flocks. These vaccines require cold chain that is lacking in the village environment. As a result, EVM is crucial in preserving the health of family poultry because it is cheap, readily available and cost effective. The EVM preparation and administration varies from place to place and also differs depending on the diseases treated. Medicinal plants should be conserved, cultivated and harvested strategically to preserve them for future use. Further studies are required in order to document ethnoveterinary practices used for health management of family poultry.

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