

Original Research Article

SAME VEGETABLE DIFFERENT USES: CASE STUDY OF AFRICAN NIGHTSHADES (*Solanum nigrum* L.) SPECIES AMONG THREE KENYAN COMMUNITIES



Abstract

In Kenya, the African nightshades (ANS) (*Solanum nigrum* L.) are among the most widely distributed and consumed traditional vegetables. The current study was conducted to better understand the cultural variability in use patterns and values of these vegetables. The study was conducted in Kisii, Kakamega and Nakuru counties of Kenya. Data was collected on ANS utilization using a survey of 630 ANS farmers, 6 focus group discussions and 9 key informant interviews. The results indicated that the main producers of ANS are women (80% in Kisii, 78% in Kakamega and 75% in Nakuru) and the vegetable plays an important role in the communities as food (100%), medicine (78%) and spiritual (9%) use. As medicine, 75-85% of the respondents used the ANS to treat worms, stomach ache, diarrhea and ulcers. Additionally, ANS was used to treat eye infections (65%), boils and wounds (57%) and constipation (54%). The plant parts used for medicinal purposes were leaves (90%) shoots (66%), fruits (35%) and roots (25 %). These findings demonstrate that ANS is an important vegetable with multiple uses across the counties surveyed. This study underscores the need to document and preserve knowledge on utilization of ANS for promotion in conservation and commercialization, and future scientific research on the plants' efficacy and safety.

KEYWORDS: African nightshade, Utilization, Kenyan communities, Conservation, Commercialization

INTRODUCTION

In Kenya, the African nightshades (ANS) (*Solanum nigrum* L.) are among the most highly distributed and widely consumed traditional leafy vegetables (TLVs) (Fundio, 2006). However, they have other uses depending on the community. Shei (2008) working on native west African vegetables found out that they have profound nutritional, economic and medicinal potential which if well exploited would possibly open up new markets for the global commercialization of the vegetables, encourage the local and global cultivation, consumption and conservation of especially those which are presently facing the threat of

extinction. Two thirds of the Kenyan population live in rural areas and depend directly on well-functioning ecosystems and biodiversity. The current study was conducted to document local uses and traditions related to African nightshades to better understand cultural variability in use patterns and use values of these vegetables for conservation and commercialization.

METHODS

Study sites and sample selection: The study was carried out in representative counties, Kisii, Kakamega and Nakuru, of Kenya. Kisii and Kakamega counties lie in the south Western and western parties of Kenya respectively and is home to the populous Abagusii and Abaluyhia communities. Nakuru County is home to the Kalenjin Community of the Rift Valley. The communities, across the counties, are predominantly small scale farmers. The study entailed a survey of 630 ANS farmers (210 farmers in each of the three counties) randomly sampled from producer groups in purposively selected sub-counties in each of the three counties. These sub-counties were Kisii Central and Gucha in Kisii County; Shinyalu and Navakholo in Kakamega County, and Molo and Nakuru West in Nakuru County. The 210 farmers interviewed in each county consisted of men, women and youth and the aim of the interviews was to document local uses and traditions related to African nightshades.

Survey approach: In addition, a qualitative approach constituting of focus group discussions and key informants across the three counties of Kakamega, Nakuru and Kisii was also used. The aim of this approach was to complement the survey by attempting to understand ANS utilization through the eyes of the main actors, namely, producers and consumers in order to document the application of indigenous knowledge in the utilization of ANS.

The focus groups were derived from existing ANS production and consumers groups. The focus group discussion process involved a facilitator using a focus group discussion guide to moderate the discussion with a rapporteur writing notes. The facilitator used the Kiswahili language and the participants responded in Kiswahili. In Kakamega, the focus group constituted six participants all men who produced and marketed ANS together. They were all literate, aged between 28 and 61 years, and were all from Shinyalu Sub-county. The participants had been producing ANS for over ten years by the time they participated in the focus group discussion. In Nakuru, the focus group discussion process was the same as in Kakamega. The group was composed of nine members all women aged between 40 and 65. In Kisii, the focus group was composed of six participants all women aged between 42 and 63.

65 Key informant interviews were conducted in the three counties with a view to bring in
66 knowledgeable producers and community leaders including traditional healers, agricultural
67 extension officers and teachers. The process entailed using a checklist of questions covering
68 production, crop management and seed practices, postharvest handling and utilization to
69 guide the interview, but remaining open enough to capture opinions, deep-rooted beliefs and
70 practices. In Kakamega a male traditional healer, an agricultural officer and a female
71 vegetable vendor in Shinyalu Market were the key informants. In Nakuru, an agricultural
72 officer, a male ANS producer and a vegetable trader were interviewed. In Kisii a male
73 producer and consumer aged 92, a female vegetable vendor and a male retired teacher were
74 interviewed.

75 **Data analysis**

76 The quantitative data were statistically analyzed for means and frequencies using SPSS
77 version 15.0(SPSS, 2006). Qualitative data analysis in this study entailed examining the text
78 produced from each key informant and focus group discussion for key themes and patterns
79 that brought out the knowledge on ANS utilization in the respective communities. The idea
80 was to bring out what Silverman (2003) calls ‘cultural stories’ namely retrieving the
81 rhetorical force of what interviewees say. This meant taking the interviewees’ descriptions
82 and statements beyond conventional meanings into contextual constructions that reflect the
83 social and cultural meanings of ANS in the farm, plate, market and ritual. This line of
84 analysis followed Richardson’s (2003) argument that ‘language does not reflect social reality,
85 but produces meaning, creates social reality. Therefore the language and discourse in which
86 ANS was presented offered varying and often competing meanings of the vegetable. The
87 search for themes and patterns was carried out manually through reading and mapping the
88 text data that emerged from the conversations and discussions involved in data collection.
89 Once these themes and patterns were teased out they were compared across counties and
90 cultures and the various meanings they encapsulated discussed. Vignettes from the corpus of
91 data are used to illustrate themes or bring out emerging meanings and understandings.

92 **RESULTS AND DISCUSSION**

93 **Gender perspective in African nightshade utilization**

94 The results indicated that in all the three counties, majority (75-80%) of the ANS growers
95 were women (Table 1). The women were the main determinants on whether a family
96 produced or consumed the vegetables as they were involved in harvesting and preparation for
97 consumption.

The production and use of these vegetables is part of the culture of many communities in Kenya that play a role in maintaining a balance within the family structure as their use and conservation depends largely on the activities of women. These results are in line with studies by Abukutsa-Onyango (2007) working in Western Kenya (Kisii, Luo and Luhya) communities who found out that women are actively involved in the cultivation, processing and marketing of African Leafy Vegetables.

Uses of African nightshades (ANS)

The qualitative data revealed a number of ANS uses i.e. food, medicinal and spiritual (Table 2). Across the three communities, ANS was mainly used as food (100%), while 84% (Nakuru), 87% (Kisii) and 65% (Kakamega) of the respondents used ANS for medicinal purposes. Besides, 14% (Nakuru), 13% (Kisii) and 1% (Kakamega) used it for spiritual purposes.

The household uses of ANS in the three communities under study were in a state of flux because of social change. The ‘traditional’ household that stuck together and consumed food from the same kitchen (Guyer, 1981) has largely given way to a ‘confederation of households’ (Alderson-Smith, 1984) where households coalesce from time to time to share in production and consumption. A more accurate presentation of the character of households nowadays is one of ‘virtual households’, where some members are on the farm offering labour and management, and other cities within the country and abroad providing capital, technical skills and valuable information; and sharing in the consumption of farm produce. Therefore, the uses of ANS in the three communities have to be analysed and understood in the context of ‘virtual households’. This concept of ‘virtual households’ implies that preparation and conservation of ANS leaf for consumption depends significantly on where household members are located spatially on the globe. If some of the members are located in urban areas such as Nairobi, fresh ANS leaf are delivered by courier to them once or twice a week. If however, these members are located in Europe, Asia or North America, indigenous methods of preparation and preservation are summoned and the leaf is dried, packed and shipped abroad to the household members (personal communication during focus group discussions). The rest of this sub-section looks at the specific uses of ANS in the three communities and discusses the extent to which indigenous knowledge comes to play.

Consumption

Overall, it was commonly agreed across the three counties that ANS consumption was more prestigious than for instance kale or cabbage consumption. This is because kale was mass produced and not preferred by most adults who in the words of one key informant from Kisii County ‘felt that it was forced on them because it was available in abundance’. ANS was generally said to be more palatable for adults and especially the aging. Besides being palatable ANS was harder to produce and thus more expensive than kale or spinach in the market. The finding that ANS consumption is considered more prestigious and preferred in all three communities under study contradicts Ambrose-Oji’s (2009) that African indigenous leafy vegetables were mostly associated with ‘hunger’ or ‘famine’ foods and that it was considered humiliating to eat them.

Preparation methods for consumption

Different cooking methods were used by the three communities involved in the study (Table 3). In Nakuru, it was mainly boiled, fried with onions and tomatoes, and added milk and cream then served as stew. The consumers in Kakamega (62%) and Kisii (49) largely used the modern cooking method that entails boiling and frying of the vegetable compared to 23% in Kakamega and 44% in Kisii who used the traditional method that involves boiling the vegetables and adding milk (Table 3). The consumers in Nakuru were largely cosmopolitan with 54% boiling and adding milk to the vegetable while 30% boiled and fried the vegetables before consumption. A key informant from Nakuru County indicated that some of the consumers especially diabetics used more indigenous methods such as boiling and adding milk, and therefore did not fry nor add salt as they were advised against that on medical grounds.

The variety of ways in which *Solanum* leaf was cooked (Table 3) was discussed in the focused groups in which the use of potatoes, tender gourds, pumpkins and blood to alleviate bitterness was indicated to be practiced in Kisii County practices that did not show up in the survey. Except for boiling, and boiling and adding milk/cream the rest of the methods of ANS leaf preparation revealed in the discussions revolved around frying and were thus relatively recent and hence considered modern. This could be due to little knowledge being passed from the old who are more knowledgeable to the young who are less knowledgeable in the traditional cooking methods.

In Kakamega County, focus group discussion participants summarised the preparation of ANS for food as follows:

161 *People prepare ANS leaf for consumption in a variety of ways depending on the*
 162 *resources at their disposal. Those who have resources boil, fry with onions, tomatoes*
 163 *and spices and add milk and salt to taste. Most local consumers boil and add salt and*
 164 *milk only. However, most men prefer the bitter dark variety boiled and add salt to*
 165 *taste. They eat it that way as it relieves them from craving for it and also in that form*
 166 *it defies any poor appetite.*

167 The foregoing vignette brings out three important points on ANS as food among the Luyhia
 168 of Kakamega County. First, that preparation of the vegetable for consumption follows social
 169 status characteristics with those less endowed with resources eating it more or less plain and
 170 the more advantaged putting more additives to the ANS pot. Nonetheless, the vegetable was
 171 available for food to people of all walks of life. Second, ANS preparation also followed a
 172 gender character in which, men prefer to eat the bitter variety and choosing to deliberately
 173 retain the bitterness on their palates. This preference brings out the inclination of rural men in
 174 the county to underscore their “macho” character and differentiate themselves from women.
 175 Third, ANS as consumed by the men was a response to a certain kind of craving and only a
 176 particular variety could answer to that. Additionally, fact that it defied poor appetite means
 177 that it was good for people suffering from malaria or recovering from that disease, implying
 178 the medicinal value to vegetable.

179 In Kisii County, the Abagusii generally had very many ways of treating bitterness in all
 180 indigenous vegetables and especially ANS. A key informant said that after boiling ANS any
 181 of the following could be added to make it more palatable – boiled sweet potato tubers, milk,
 182 boiled pumpkin, immature gourd or blood. Traditionally, the results indicated that raw blood
 183 was the most commonly used to make ANS more delicious and only the poor who did not
 184 have cattle whose veins they could rapture with arrows and drain blood were unfortunate
 185 enough to eat ANS plain or with less prestigious additives. Nowadays, people who fry ANS
 186 may feel as privileged as those who used blood in ANS preparation in the past. Therefore, the
 187 issue of social status has always been critical in the preparation of ANS for consumption.
 188 Either the more affluent among the Abagusii have always dominated the discourse around
 189 how best to prepare vegetables whether it was about using blood or cooking oils, their way
 190 of preparing it has always been the standard and thus what the majority aspired to achieve.
 191 Whatever the explanation, cooking oil had largely replaced blood as the most prestigious
 192 additive among the relatively affluent in Kisii County.

Vegetables are mainly cooked before consuming to improve palatability, texture and taste (Migliot et al. 2008) as well as to eliminate potential pathogens or to neutralize poisonous or irritating substances (Martin and Meitner, 1998). Cooking methods used are mainly based on convenience and taste preference rather than nutrient retention (Gaofeng et al. 2009). Some cooking methods such as those used by the communities in this study may oxidize antioxidants (Shahnaz et al., 2003) and affect the vegetable nutrient retention.

Medicinal uses

In terms of medicinal uses, the three communities identified the use of ANS to treat stomach ache, ulcers, worms, constipation, diarrhea, boils, wounds, swollen glands and eye infections (Figure 1). Majority of the respondents (75-85%) used the ANS to treat worms, stomach ache, diarrhea and ulcers (Figure 1).

Among the Abagusii one of the focus group discussion participants described use of *Sesuvium* as follows:

*“The leaves of the traditional variety of *Sesuvium* known as Oara whose leaves are dark green and rough are used in treating some fungal skin infections. The leaves are dried under a shade or indoors and then burnt out in a pot until it forms ash. The ash is mixed with Night rose Baby Jelly (a commercial body cream) and applied on affected skin”.*

In another focus group discussion in Kisii county the participants indicated that: *“consumption of the Oara type of ANS reduces stress and malaria patients use it as it is bitter and they prefer it as they recuperate with low appetite”.*

Overall, among the Abagusii ANS was physically applied to cure fungal skin diseases (e.g. *Psoriasis versicolor*); although the process of preparation of the medicine implies that the potency of the ANS is activated through burning it into ash. The ash ought to be tested in a laboratory to reveal the properties therein and determine whether or not they have any bearing in dealing with active fungi on the human skin. While this possibility exists, the healing power of the ash was explained in terms of ‘feeding the skin’ to rejuvenate it. This implies that the application was founded more on belief than actual chemical property known to work on the fungi. In terms of reducing stress the key attribute in the ANS celebrated as working on stress was its bitterness. It was the case also with regard to its use by recuperating malaria patients. The bitterness helped patients overcome nausea which they said was aggravated by sweetness in food.

224 Participants in the Kalenjin focus group discussion argued as follows:

225 *“The bitter dark green and rough leaf of the ANS is tough on alcohol related*
 226 *hangover. The leaves are boiled with salt and pepper without any oil and the dark*
 227 *soup given to the person to drink and “he goes to work fresh”. The soup also relieves*
 228 *joint pains”.*

229 Therefore, the Kalenjin like other African communities did not use ANS only for food; they
 230 explored its medicinal uses and were not disappointed.

231 The use of different traditional vegetables for medicinal purposes has been reported in Kenya,
 232 with some of the vegetables indicated to cure more than one ailment (Kimiye, 2007). For
 233 example some communities have indicated that spider plant (*Cleome gynandra*) can relieve
 234 constipation and facilitate child birth (van den Heever and Venter, 2007) while African
 235 nightshade (*Solanum scabrum*) can be used to cure stomach ache (Adesina and Gbile, 1984).

236 Besides, they are known to contain substantial amounts of antioxidants that scavenge for and
 237 bind to harmful radicals, which have been linked to ailments such as cancer, diabetes and
 238 cardiovascular diseases (Abukutsa-Onyango, 2011, Onyango et al. 2012). The current study
 239 also found out that ANS were used by the communities not only as food but also for medicine
 240 and health benefits. This is important for interventions focussed on encouraging communities
 241 to increase the consumption and utilization of indigenous leafy vegetables as well as analysis
 242 of the vegetable for the medicinal properties

243 Different parts of the vegetable were used for the treatment of the ailments. Majority (90%)
 244 of the people interviewed used leaves, 66% used shoots, 35% used the fruits and 25 % used
 245 the roots (Figure 2).

246

The use of different plant parts for medicinal purposes is an old practice among different communities in Kenya and most parts of the world (<http://www.biodiversityinternational.org/>). Otieno and Analo (2012) reported that local people mainly use leaves, roots and barks for the treatment of ailments using plants. Medicinal properties from plants can be obtained from many different parts of a plant; leaves, roots, bark, fruit, seeds and flowers. The different parts of a plant can contain different concentrations or active ingredients. Hence, one part could be toxic while another part of the same plant could be harmless. (<http://www.fs.fed.us/wildflowers/ethnobotany/medicinal/parts>).

Spiritual use

The Abaluyhia of Kakamega County had a unique use for ANS. Participants in a focus group discussion in the county narrated:

“When a male elder wants to pronounce a curse on an offender, they boiled leaves from the dark bitter variety of Solanum adding nothing to it except water. Once it was well boiled and ready for consumption and cooled off well, the elder put some of the vegetable and its dark bitter soup in the mouth and confronted the offender pronouncing the curse with stuff still in his mouth. Once done with pronouncing the curse, he spat the contents off and walked away without looking back. This works as long as the elder deploying the curse is avenging a real offence on himself or somebody else, and not acting maliciously”.

The primacy of ANS in deploying a curse among the Luyhia of Kakamega implies that the vegetable transcends its normal physical nature to enter the spiritual realm in order to provide the necessary medium for transmitting the curse. When the physical form recedes to give way for the spiritual, the elder deploying the curse also apparently transforms and is momentarily consumed into the spiritual world until the function of deploying the curse is completed. It would also appear from the evidence adduced in the vignette that the spiritual potency in ANS leaves is dependent on the genuineness of the offence being avenged and thus could not be summoned for witchcraft which usually constitutes malice and envy. One can also argue that since offences on a third party can be avenged, ANS as a tool for spiritual combat may be out-sourced by women to males to avenge for them.

While it is difficult to ascertain the science in the claims made, the fact that the ANS worked for communities in the manner described shows that the utility of the vegetable was beyond

its known food value and that the intentions of the cultivators are varied and all valid according to their knowledge bases and needs.

CONCLUSIONS

African nightshades play an important role in the communities being used as food, medicine and spiritual purposes. There exists knowledge albeit diverse on utilization of African nightshades (*Solanum nigrum* L.) among the Abagusii, Abaluhya and Kalenjin communities. This knowledge is, however, being lost as it is not documented and only passed on to younger generations by the older members of the society. This study underscores the need to document and preserve knowledge on utilization of traditional vegetables such as African nightshades for promotion in conservation and possible commercialization, future scientific research on the plants' efficacy and safety. Further, the knowledge will be used in extension, promotion and conservation of the vegetable.

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TABLE 1: The distribution by gender (%) of ANS growers in Nakuru, Kisii and Kakamega Counties (N = 210)

County	Gender (%)	
	Male	Female
Kisii	20	80
Kakamega	22	78
Nakuru	25	75

331 **Table 2: Main uses of African nightshade in Kisii, Kakamega and Nakuru Counties**
 332 **(N=210)**

County	Indigenous uses (% use)		
	Food	Medicinal	Spiritual
Nakuru	100	84	14
Kisii	100	87	13
Kakamega	100	65	1
All Counties	100	78	9

333

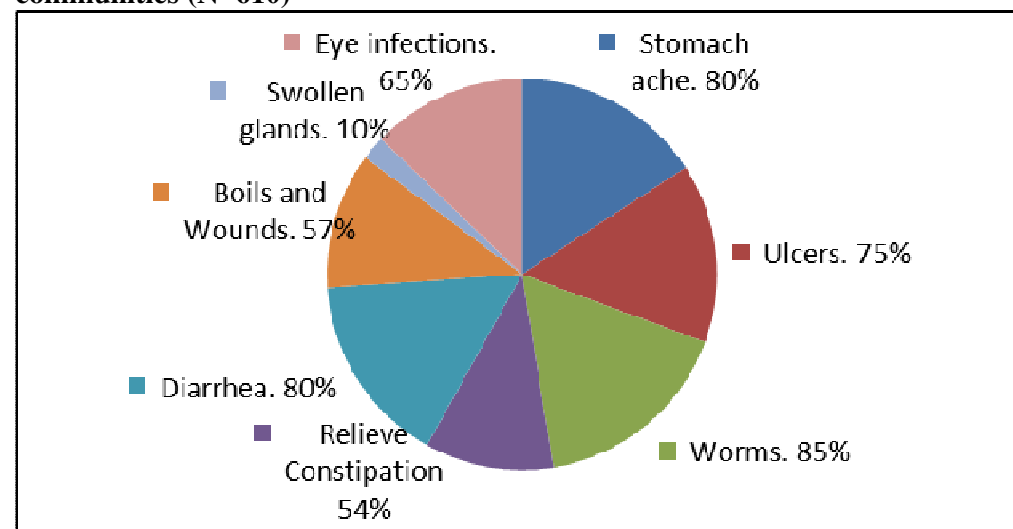
334

Table 3: Methods of preparation of African nightshade for Consumption in Nakuru, Kisii and Kakamega Counties (N=210)

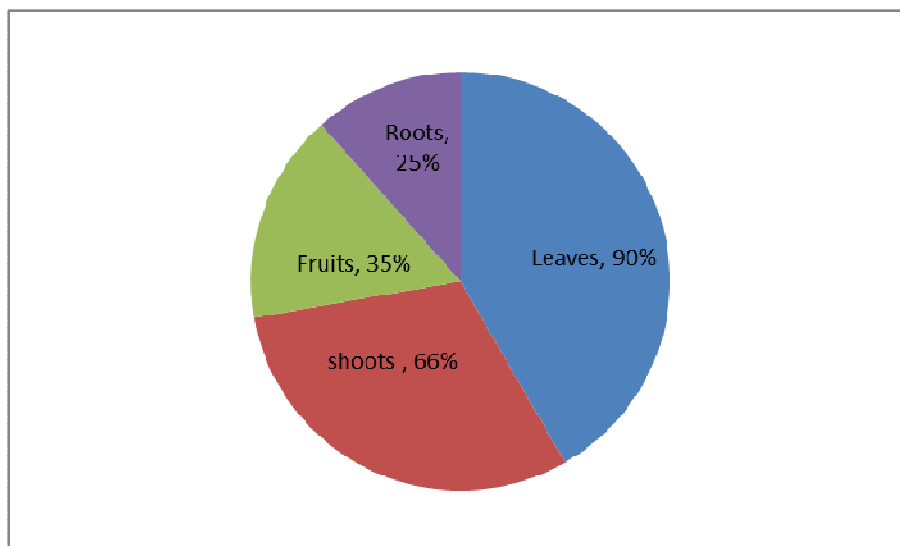
County	Preparation of vegetables for consumption (% respondents)					
	Boil	Fry without washing	Boil & fry	Boil & add milk/cream	Boil, fry & add milk/cream	Wash & fry
Nakuru	3	5	30	54	7	1
Kisii	1	3	49	44	3	0
Kakamega	5	5	62	23	3	2
All counties	3	5	47	40	4	1

LIST OF FIGURES

Figure 1: The different medicinal uses of African nightshades in the three Kenyan communities (N=610)



344 **Figure 2: The parts used in the treatment of different ailments (N=630)**



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