Knowledge and adoption of Wild sunflower *Tithonia diversifolia* as sustainable feed resource in Ibarapa East Local Government Area of Oyo State, Nigeria

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Abstract

Alleviating feed cost in animal production through the introduction of non-conventional feedstuffs can favourably supplement protein and energy sources which currently plays the dual roles of feeding man and his livestock. Wild sunflower (Tithonia diversifolia) is one of the new foliages which qualify as cheap feed resource in many African countries. Therefore, this study was conducted to ascertain knowledge and adoption of wild sunflower as feed resource in the area. The study was conducted in Ibarapa East Local Government Area of Oyo State, Nigeria. The area is located between latitude 70.15¹ N and 70.55¹ N and longitude 30E and 30.30¹E. A sample of 150 small ruminant farmers was purposively selected. The main instruments used for data collection was questionnaire. The outcome of the level of awareness and adoption of sunflower plant parts indicated that majority (67%) of the respondents were aware while about 50% of the respondents will be willing to adopt the leaf parts as feed resource. Further studies were therefore suggested to be carried out on sustainable availability, multiplication and the best processing methods that will enhance optimal utilization of sunflower plant parts vis-à-vis evaluating its actual feeding value.

Keywords: sunflower, small ruminant, feed resource, Ibarapa, awareness

Introduction

Small ruminants are the principal domesticated animals in terms of total numbers and production of food and fibre products. This attribute may partly be due to their lower feed requirements compared to cattle, because of their body size (Okunlola *et al*., 2010). Lower feed and of course the lower capital requirement in small ruminant production allows their easy integration into different farming systems (Hirpa and Abebe, 2008; Pollot and Wilson, 2008). Small ruminants have served as means of ready cash and reserve against economic and agricultural production

hardship (Hamito, 2008). Several authors have reported the nutritional values of different edible leaf meals that are used in Nigeria. Some of these vegetables have been found to have high crude protein contents.

Wild sunflower (*Tithonia diversifolia*) is one of the new foliages, which is considered by many to be valuable green manure. It has proper foliage nutritional value (Ibrahim *et al*., 2005) and may accumulate as many proteins in its leaves (up to 33%) as legumes. It has high values of phosphorus, high DM digestibility and oils in the leaves and flowers. It has about 39.8 percent of total sugars. Sunflower is of high nutritional value, containing all the essential amino acids. It is rich in minerals and vitamins especially the B-complex vitamins (Day and Levin, 1954).

NRC (1984) quoted sunflower seed meal figures 23.3 % protein, 31.6 % crude fibre, 1 % lysine, 0.5 % methionine and 1543 Kcal/Kg metabolizable energy. Reft (1997) reported that the major nutrient in sunflower seeds include protein, thiamine, vitamin E, iron, phosphorus, potassium, calcium and essential fatty acids such as linoleic and oleic acid. Odedire and Oloidi (2011) reported 35.3g/100g DM for NDF and ADF respectively. The low content of tannin reported for Tithonia foliage (Wambui *et al*., 2006) supports the idea that the protein may well be highly soluble with poor " bypass" characteristics (Preston and Leng, 1987). The presence of some essential amino acids such as aspartic acid, glutamic acid, serine, histidine, glycine, threonine, arginine, alanine, tyrosine, cysteine, valine, methionine, phenylalanine, isoleucine, leucine, lysine, and proline in sunflower products has also been reported (Karangwa *et al*., 2015). Sunflower seed also contained some anti-nutritional factors which include tannins and phytic acid (Khare, 2000; D' Mello, 2000 and Matyka *et al*., 1993).

There is need to sensitize livestock keepers to adopt the utilization of parts forest trees, shrubs and plant resources for livestock feeding particularly in Ibarapa Area. Many of which are allowed to waste away without being properly harnessed and utilized as livestock feed. Before livestock farmers can be convinced to adopt the utilization of wild sunflower parts, they must be enlightened about the chemical composition of different parts in order to avoid nutritional error or problems. This study therefore was designed to study small ruminant farmers' awareness and adoption of wild sunflower as livestock feed resources.

Materials and Methods
Study Area
The study was conducted in Ibarapa East Local Government Area of Oyo State, Nigeria. The area is located between latitude 70.15^1 N and 70.55^1 N and longitude 30E and 30.30^1E. it is located approximately 100km north of the coast of Lagos and about 95km West of the Oyo State capital and neighbouring city of Ibadan.

Sampling Procedure of the study area
The target population was all small ruminant farmers within Ibarapa East Local Government area of Oyo State, Nigeria. A sample of 150 small holder small ruminant farmers was purposively selected from the population of small ruminant farmers within the study area.

Data collection instrument and methods

The main instruments used for data collection were questionnaire and interview schedules. Questionnaire and interview schedules were used to retrieve information from farmers. Questionnaire and interview schedules were structured with both open ended questions. Instruments of data collection were pre tested on a group of 10 respondents to ensure reliability and validity revising before embarking on the actual survey.

Data processing and Analysis

All questionnaire and interview schedules were sorted and coded before inputtings in the appropriate software. Data was analysed using Statistical Package for Social Sciences (SPSS) version 17.0 and Ms-Excel. Descriptive statistics such as simple percentages was used.

Results and Discussions

Respondents Characteristics

Socio-economic characteristics of respondent were revealed in table 1. From the table, majority (90%) of the respondents were male with only 10% being female, these results showed that male dominated sunflower awareness and adoption. These findings comply with that of Stephen (1992) who argued that though most technologies are considered gender neutral, they are often gender biased during their introduction and use by societies. Furthermore, Uaiene (2011) concluded that males are more likely to adopt improved technology than female; this is because sunflower is mainly produced for commercial purposes. The studies have always indicated that men tend to adopt technologies of a particular crop if it is more of the cash value to the households than for family consumption.

About 75% of the respondents were between the ages of 41 and 60 with a quarter (25%) of the respondents being between the ages of 21 and 40. The age is good enough to have gained experience needed for decision making. In general, this result shows that respondents were elderly. This conforms to the demographic structure of South Africa where most of the elderly are found in the rural areas and young people in the urban areas (Pilay and Maharaji, 2013).

A large proportion (84%) of them were from nuclear family with majority (83%) having a household size of between 1 and 5 members. Large proportions (42%) of the respondent were graduates with about 28% having their post graduate degrees. More so, education is said to bring desirable changes in the behavior of any people, so, educated person tends to keep himself equipped with the latest knowledge about the change taking place around him. Hence educated individual are expected to have more favourable attitude towards agricultural innovations (Hassan, 1991). The level of education therefore, affects awareness and adoption of sunflower as a feed resource. These results are in line with those of Hayat (1982), Malik *et al* (1992), Hassan *et al* (2002), Butt (2002) and Siddiqui (2006) who reported significant relationship of education with adoption. Other studies have shown that higher education levels increase the chances of adopting because educated farmers are more likely to easily understand and be receptive to new technology or innovations (Knowler and Bradshaw, 2007; Nyambose and Jumber, 2013).

Table 1: Socio-Economic characteristics of respondents

		Frequency	Percentage
Gender	Male	135	90
	Female	15	10
Age	≤20	0	0
	21-40	38	25
	41-60	112	75
	≥61	0	0
Occupation	Student	5	3
	Artisan	6	4
	Self employed	24	16
	Civil Servant	78	52
	Others	37	25
Family Size	Nuclear	126	84
	Extended	24	16
Household size	1-5 member	124	83
	6-10 members	26	17
	11-15 members	0	0
Level of Education	No Formal Education	5	3
	Primary	10	7
	Secondary	30	20
	Graduate	63	42
	Post Graduate	42	28

Source: Field survey 2022

The outcome of the level of awareness on the utilization of sunflower parts (table 2) revealed that majority of the respondents (67%) have the knowledge of the use of these feed resources in the study area, only 25% were not aware, while 8% were not sure of the use of sunflower parts as feed resources in the study area. The outcome therefore necessitates the need to intensify studies on chemical properties on sunflower parts and performance response to domestic animals on the utilization of sunflower since sundried milled sunflower can be used as an alternative ingredient which when included in the ration of rabbits up to 25%, compares well with conventional ingredients in growth and carcass performance irrespective of the sex (Foku *et al*. 2019). This indicates that the respondents are more informed about feeding values of sunflower parts in

livestock production through their personal research (41%), online (25%), somewhere (24%) and through print media (8%).

Awareness of the proximate composition of sunflower revealed that high proportion (76%) of the respondents are aware of the nutrient composition of the plant leaving only about 24% not aware of the nutrient composition of the feed resource. About 34% of the respondents agreed that sunflower contains anti-nutritional factors which can inhibit feed efficiency of animals consuming the feed resource; however, about 58% agreed that sunflower may be consumed by animals without any deleterious effects on such animal.

Table 2: Level of Awareness on Utilisation of Sunflower parts in the study area

	Response	Frequency	Percentage
Awareness of wild sunflower as feed resource	Yes	100	67
	No	38	25
	May be	12	8
Source of Awareness	Online	38	25
	Research	61	41
	Print media	12	8
	Television	3	2
	Somewhere	36	24
What part of sunflower plant?	Leaf	61	41
	Seed	12	8
	Flower	2	1
	All	75	50
Are you aware of proximate composition of sunflower?	Yes	114	76
	No	36	24
Are you aware of anti-nutritional factor in sunflower	Yes	65	43
	No	58	39
	May be	27	18
Anti-nutritional factor can improve rumen microbes	Yes	78	52
	No	36	24
	May be	36	24
Sunflower can be fed to small ruminant without a deleterious effects	Yes	87	58
	No	25	17
	May be	38	25

Source: Field Survey (2022)

The result of willingness to adopt the utilization of sunflower parts as livestock feedstuffs are presented in table 3. The results indicated that greater proportion of the respondent (80%) in the

study area are willing to feed their domestic animals with sunflower parts if found suitable as livestock feed. About 50% are willing to adopt the use of leaf, 40% will be willing to adopt all parts of sunflower while only 9% will be willing utilize its seed only as feed resource.

Fewer respondents (16%) were not sure they will adopt the use of sunflower parts while only (4%) of the respondents will not accept the use of sunflower plant parts as feed resource. This outcome therefore suggests that farmers to intensify efforts in sunflower production and not only depend on the availability of wild sunflower that may be low in supply as great number of people begin to adopt the use of sunflower plant parts in the study area. This work corroborates the work done by Augustine *et al* (2018) which revealed the willingness of people of Mubi to adopt the use of *Gmelina arborea* as livestock feed. In their work majority (72.50%) showed willingness to feed their animals with gmelina fruits and leaves.

Table 3: Respondents willingness to adopt the use of sunflower parts for feeding livestock

	Response	Frequency	Percentage
Given that sunflower contains 20%CP, 18%CF, 4%EE and 41%NFE, will you be willing to adopt sunflower as feed resource	Yes	120	80
	No	6	4
	May be	24	16
Which part of the plant will you adopt?	Leaf	75	50
	Seed	14	9
	Flower	0	0
	All of the above	61	41

Source: Field Survey (2022)

Conclusion

The findings of this study revealed that sunflower plant parts have good nutritional potentials as feed material for livestock in general and small ruminants in particular. However, there are toxic components inherent in them which are referred to as anti-nutritional factors, which may limit their utilization as feed resources for livestock. The outcome of the level of awareness and adoption of sunflower plant parts indicated that majority of the respondents are aware and will be willing to adopt the plant parts as feed resource. Further studies are therefore suggested to be carried out on the best processing methods that will enhance optimal utilization of sunflower plant parts vis-à-vis its evaluation and actual feeding value.

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