

Sensory Preference of Processed Anchote (*Coccinia Abyssinica*) Tubers in Debrezeit Agricultural Research Center, Bishoftu, Ethiopia

Abune Gudeta, Truayinet Mekuriaw

Agricultural Extension and Communication Research, Debrezeit Agricultural Research Center, Bishoftu, Ethiopia

Email address:

abuneudeta2006@gmail.com (Abune Gudeta)

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Abstract: *Anchote* [*Coccinia abyssinica* (Lam.) Cogn.] is a tuber crop cultivated for human consumption in the South-western areas of Ethiopia. The most economical part of *anchote* that is the tuberous root with diversified potentials for food, animal feed, medicinal and starch production, that will contribute towards food security, income generation, and resource base conservation. Despite its food and nutrition security and other functional potentials, *anchote* has not much studied and popularized well. The study was conducted to identify sensory preference of processed *anchote* food (*Coccinia Abyssinica*) tubers in order to develop preparation manuals of the most preferred *anchote* dish for information delivery services. The processed *anchote* dishes were served to consumers. Data was collected using questionnaire. The collected data was analyzed using Statistical Package for Social Science (SPSS) version 23. Frequency and percentages were employed. Majority of the consumers (66%) preferred *anchote* wot/stew prepared with pepper in terms of its taste and color followed by chips. The least preferred *anchote* dish was boiled/murmura. Almost all participants 96% indicated the importance of *anchote* for food. Based on the findings, the authors recommended that extension service delivery and information dissemination on the crop generally and more specifically for Central part of the Country is needed. Promotion and popularization *anchote* can contribute for food security improvement.

Keywords: Anchote, *Coccinia Abyssinica*, DebreZeit, Ethiopia, Preference

1. Introduction

Ethiopia is the center of origin and diversity for *Anchote* (*Coccinia abyssinica*) (Lam.) (Cogn.) where it has been cultivated by farmers for centuries specifically in south and southwestern parts of Ethiopia [2, 4]. *Anchote* is found both as cultivated and in wild form with sporadic distribution [9, 10, 14]. The plant is adapted to grow in an altitudinal ranging from 1300 to 2800 meter above sea level with an estimated annual precipitation range of 762- 1016 mm [3]. *Anchote* is however cultivated mainly in Western part of Ethiopia in Oromia Region for long time and has diversified uses as a traditional and medicinal plant [16] as cited by Ayalew, Y. [5]. In Western Oromia Zone, *Anchote* is one of the major root and tuber crops cultivated on nearly 300 ha of the land yielding on average 10-15 t ha⁻¹ and produced for food, cultural, social and economic purposes for the communities [1, 15].

According to the research of Desta, F., the most economical

part of *Anchote* that is the tuberous root with diversified potentials for food, animal feed, medicinal and starch production, that will contribute towards food security, income generation, and resource base conservation [8]. Women also have a big role in preserving the seeds in good condition without deterioration of the quality of seeds. In Oromo society, women store the seed of *Anchote* in either clay or wooden pots. This will have an advantage for maintaining the shelf life of the seed as per desired level. Usually, women have an exclusive role in production and postharvest handling of the crop during harvesting, seed extraction, storage, and making it available for sowing in the next growing season [2]. According to the existing tradition, the suitable production area of *Anchote* is believed to be the home garden which strategically reduces the burden for women who are actively engaged in the cultivation of *Anchote* [14]. Appreciating the importance of *Anchote* for women, Abera. H. brought forward that woman in rural community get monetary terms as well as

entrepreneurial terms in decision making and management from *anchote* cultivation [2]. An improved understanding of the production, utilization, and estimated future economic importance of these crops has potentially far-reaching implication in research and development areas at both the international and, national levels [5]. Two *anchote* cultivars are known locally as red and white, based on the tuber colour [13].

Anchote [*Coccinia abyssinica* (Lam.) Cogn.] is a tuber crop cultivated for human consumption in the South-western areas of Ethiopia. *Anchote* belongs to the *cucurbitaceae* family and *conccinia* genus having over 30 *species*, about eight of which are believed to occur in Ethiopia. [6, 11, 20, 21]. *Anchote* dish is known for its cultural food in South Western and Western region of Ethiopia. On occasion like celebration of Ethiopian Meskel Holiday (the finding of True Cross), and other holidays *anchote* food is the first to be served in the town and rural communities of the South and South Western regions of Ethiopia [18]. *Anchote* being among few indigenous vegetable crops in Ethiopia has not studied much and is not well developed and popularized, despite its food and nutrition security and other functional potentials [11]. While there are many research findings in agronomic and physiological aspects of cereal crops, limited number of researches were conducted and little information has been generated on indigenous root crops such as *Anchote* and others [20]. *Anchote* is subsistence crop widely grown to fill food security during hunger months. Unlike many other crops, *anchote* can be grown with minimal inputs and it is able to produce reasonably well under unfavorable conditions such as low soil fertility, acidic soils or drought and under intercropping with cereals [7].

Despite its importance and functional potentials, *anchote* production and consumption is not well popularized in central and South eastern parts of Ethiopia. D- 01 *anchote* variety was released at Debrezeit Agricultural Research center during 2018. This particular *anchote* variety is two-to-three-fold high yielder than the local variety. There are anecdotal evidences that cooking *anchote* is complex and time consuming, others suspect as if *anchote* food preparation is difficult without butter. The purpose of this work was to identify the preferred *anchote* food item based on the consumer taste so as to develop *anchote* food preparation manual in local languages *Afaan oromoo* and *Amharic*. The aim of the current work went further to answer the consumers' questions and to show that *anchote* food preparation simply. This in return promote the production and consumption habit of the users.

2. Materials and Methods

D-01 *anchote* variety which was released by the year of 2018 at Debrezeit Agricultural Research Center, and multiplied in 2022/2023 cropping season at research site of horticultural crop at the same research center, Debrezeit Agricultural Research Center, Ethiopia. This *anchote* variety D-01 was released and answered the limitation raised by (Habtamu, F. and Kelbesa, U.) which explained the low

attention given to this important root crop. The authors listed major limiting factor of production of tuber crops like *anchote* are displacement by other crops, little research attention, drought, short shelf life, shortage of planting materials, limited knowledge of youth, and pests [16]. Freshly harvested *anchote* tuber was sorted and washed with clean water all together, boiled before peeling to the optimum level using fire wood. The boiled *anchote* tuber was peeled and sliced by using stainless steel knife and grouped into three. One for *anchote* wot which is called *itto* in Afan Oromo, the second group to be eaten as it is which is called *murmura* in Afan Oromo and *kikil* in Amharic and the third group was to be used for making chips.

Following the necessary steps and using essential additives butter, spices and green pepper for *kochkocha* (grounded green pepper with coriander, ginger, garlic, salt,) and colorants like turmeric powder and pepper for colour preference. These three types of *anchote* food were prepared. These are *wot/itto*, *murmura* and chips. The prepared *anchote* dishes were served to the staffs of Debrezeit Agricultural Research Center and to all the guests of that day at the Center, questionnaire was distributed to 55 consumers to fill their perception and taste preference immediately after the meal. out of 55 questionnaire 50 were filled and responded. The response rate was 90.9%. The collected data was analyzed using SPSS version 23. Percentage and frequency were used for analysis. The tuber was boiled before peeling based on the findings of (Fekadu. H.) which confirmed that boiling before peeling was preferred by the panelists during their investigation on evaluation of bioavailability and Sensory preference of processed *anchote* [12]. The author identified the taste of processed *anchote* boiled before peeling and processed *anchote* after peeling and concluded that *anchote* food boiled before peeling is preferred by the taste participants. Similarly, (Girma. A and Hailu. G.) confirmed that peeling *anchote* tuber causes 5% loss of Calcium, 8% loss of potassium, 16% loss of phosphorous, 16% loss of Iron and 19% loss of Magnesium [14]. According to Melese et al, the substitution of *Anchote* flour to wheat flour for cookies making is an important avenue toward economic utilization of this crop and can be important for celiac diseases prevention due to the fact that *Anchote* is gluten -free tuber crop [17]. But the current work was to identify the preference and perception of consumers of *anchote* food item which was processed from *anchote* tuber boiled before peeling preferred be it by taste or by colour so as to develop preparation manuals for the preferred food type which means *anchote* dish and to expand the released variety along with the developed manual for end users in order to popularize and promote *anchote* production and consumption to each and every corner of the country in general and to the Central and South Eastern part specifically.

3. Results and Discussion

3.1. *Anchote* Food Consumption and Processing Experience

The results in table 1 below indicated that majority of the

respondents 78% have experience of consumption habit of *anchote* dish followed by 32% have *anchote* food preparation experience while 22% had no food habit of *anchote* dish and 68% of the respondents had no processing experience of *anchote* dish. The questionnaire asked further about the place from where they have eaten *anchote* dish before and the results indicated that most of them 48.7% ate *anchote* dish for their work place/ workers cafeteria, 28.2% from hotel, 23.07% from their own home. The food item or dish type the participants ate before were 66.7% *anchote* wot, 12.8% boiled/murmura, 10.3% chips and 10.3% had ate all type of *anchote* dish.

Table 1. *Anchote* food consumption and processing experiences.

Consumption habit	Frequency (N)	Percentage (%)
yes	39	78
No	11	22
Type of dish experience		
Wot/ittoo	26	66.7
Murmura	5	12.8
Chips	4	10.3
All types	4	10.3
Food processing experience		
Yes	16	32
No	34	68
Where the dish was eating		
Workplace	19	48.7
Hotel	11	28.2
Own home	9	23
Nowhere	11	22

Source: Demonstration and Survey results of 31/01/2023

3.2. Preference of Processed *Anchote* Dishes

According to the results in table 2 below, the consumer panels were asked to indicate the most preferred *anchote* dish based on its taste and majority (46%) of respondents preferred *anchote* wot followed by *anchote* chips (26%). Some of the respondents (24%) preferred all types which means *wot/ittoo*, chips and boiled/murmura. The least preferred *anchote* dish was boiled/murmura. Based on its colour again *anchote* wot was preferred by 50% of the participants where as both wot and chips were preferred by 28%. (Guma, T., et al.), concluded that colour is an important sensory attribute of any food because it affects acceptability [15]. This implies the most preferred *anchote* dish was wot. *Anchote* was prepared and served by two types with pepper and with turmeric. So, the participants were asked to show their preference from the two types of *anchote* wot and the results indicated that 66% of them preferred *anchote* wot with pepper while some 32% of the participants preferred *anchote* wot with both pepper and turmeric. Only 1 (2%) participant preferred *anchote* wot with turmeric. This suggests that *anchote* food preparation needs different types of additives and colorants which varies based on the consumer preference.

Table 2. Preference of processed *anchote* dishes.

<i>Anchote</i> dishes by taste	Frequency	Percentages
Wot/ittoo	23	46
Chips	13	26

<i>Anchote</i> dishes by taste	Frequency	Percentages
Boiled/murmura	2	4
All types	12	24
<i>Anchote</i> dishes by colour		
Wot/ittoo	25	50
Chips	11	22
Both wot and chips	14	28
Preferred <i>anchote</i> wot with		
Pepper	33	66
Turmeric	1	2
Both pepper and turmeric	16	32

Source: Demonstration and Survey results of 31/01/2023

3.3. Perception on the Importance of *Anchote* for Consumption

The consumer participants were asked to indicate their preference about the importance of *anchote* for consumption and the results showed that almost all 96% of the respondents approved *anchote* food is important while only 4% denied the importance of *anchote* as food. This is in line with the findings of (Girma, A. and Hailu, G,) which revealed the potential of *anchote* with several evidence [14]. The authors found that due to its good vitamin-A content, consumption of *anchote* may help to reduce the problem of vitamin-A deficiency in these regions. Vitamin-C content of whole *anchote* is 10 mg in 100 g serving and thus *anchote* may help to make dietary iron soluble and more bioavailable. A serving of 100 gm of *anchote* per day can fulfil most of the daily requirements of nutrient such as Calcium, Iron, Phosphorous, Potassium and Magnesium. *Anchote* a rich source of crude protein. (Wayessa 2018) stated that tuber crop cultivation, harvesting and consumption practices are regulated by powerful social rules in the areas in which the crop has been popularized, especially in Wellaga Region South Western part of Ethiopia [19].

4. Conclusions and Recommendations

Anchote (*Coccinia abyssinica*) is a valuable food source with multidimensional qualities which makes it one of the most important crops to be further researched for enhanced utilization. It has a potential productivity and nutritional quality which could have advantages in feeding the fast-growing population of the country. *Anchote* can be processed in many forms and used for consumption during the failure of other cereal crops since it can be produced even at poor soil condition and most of the time at backyard. The current work attempted to address anecdotal evidence which perceive as if *anchote* food preparation is impossible without too much butter availability. Although this work focused only on *anchote* tuber, fresh *anchote* leaf is also edible as vegetable and has good flavor and taste. Overall *anchote* dishes include *wot/ ittoo*, boiled/murmura, chips, cookies, soup, biscuit and bread in composite with wheat flour. *Anchote* flour has relatively long shelf life when compared with wheat and barley. The crop needs to be researched and promoted to different areas of the country generally and to Central and Eastern parts of the Country so as to be utilized efficiently and commercialized. It needs policy direction since it has the

potential to contribute for improving food security at all.

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