

Assessing Ethnophysiological Use of Spices and Condiment in Prepared Dishes in Bahir Dar city, Bahir Dar, Ethiopia: Ethnophysiological Qualitative Study

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Abstract

Background: Spices and condiments are substances added to foods to enhance aroma and taste. Traditional preparation of spice and condiments increase food flavors and give value for indigenous knowledge.

Methods: One hundred sixty nine informants were selected by using random sampling technique. Semistructured interview and prepared Question are were employed to collect pertinent data on the local use of spice and condiments. The data obtained were analyzed by using analytical tools commonly ordered in ethnobiological studies like preference ranking, direct matrix ranking and paired wise compression.

Result: Twenty four species of spice were found in the market. Eight condiments were identified in routinely prepared dishes. From the result of Paired comparison *Allium sativum* scores the highest use value in the preparation of spice and condiments. Preference ranking result also indicated that Red pepper is the most preferred condiment by the inhabitant of local community. This study also indicated that the indigenous knowledge in the preparation of spice vary with age groups with the elder more knowledgeable than youngsters. The indigenous knowledge also under threat as the young are not interested in the domestic activities.

Conclusion: There is knowledge limitation (deterioration) in the younger generation. The younger generation keep to learn, preserve and maintain their ancestral wisdom with respect to the indigenous use of spice and condiments in the local resident.

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Background

Spices and food condiments are linked historically, chemically and their physiological effects on human bodies [1,2]. A spice is a dried seed, fruit, root, rhizome, bark or vegetable substance which is characterized as “strongly flavored for aromatic substance of vegetable origin [1]. Those spice are either used for the prepara-

tion of condiment or directly add in to foods as a flavoring agent for the purpose of increasing its taste and identifying the nature of the chemical released as sensory transduction through the nasal cavity or taste buds [1-3]. Spices to have health benefits as antioxidant, antibiotic, antiviral, anticoagulant, ant carcinogenic, and anti-inflammatory agents [3-4]. Spices are important

for both domestic consumption and export [5]. Spice also functional for those physiological point as analgesic, anti-inflammatory, anti-malarial, hepatoprotective, hepatomodulatory, antioxidant, antitumor, hypolipidemic and antihelminthic activities of phytochemicals which regulate different systems [6]. Condiments are prepared from compounds containing one or more spice extracts to enhance the flavor of the food [7]. Condiments can be both simple (celery salt, garlic salt, onion salt) and compound chili, mitmita, meat sauce, mint sauce prepared mustard and siljo traditionally prepared condiments give ethno biological values by using indigenous knowledge [5,7,8].

Indigenous Knowledge has many applications, including law, governance, social work, health and medicine, philosophy, education, and the environment. This traditional knowledge emerges from the relationship between human beings and their surroundings and is manifested in acts and practices. This knowledge guides actions, which provide feedback regarding local knowledge in the community, which evolves that the information is transmitted from our ancestral social group to the next generation through the interaction between individuals [9-12].

This study document data related to the ethno biological and skill of traditional use of spice and condiments in routinely prepared dish in the study area. The study is the way through which people share their indigenous knowledge as one part of the community to promote the establishment of local and cultural knowledge to create awareness for the younger generation with respect to the indigenous use of spice and condiments.

This study also used as a source of information, encouraging, and documenting the indigenous knowledge by conducting how the people use spices and condiments traditionally and give more focus for IK (Indegenious Knowledge) to the society.

Methods

Study Designs and Data collection instruments

Ethnobiological study was conducted to assess use of spices and condiment preparation related to indigenous knowledge in Bahir Dar city market. The study was conducted in three markets (kebele 16, Kebele 11 and kebele 04) of the seventeen kebeles market from January

2019 to February 2019. Based on the data of Bahir Dar city administration office Bahir Dar encompasses 17 kebel during a time of data collection. Data on indigenous knowledge use for spices and condiments preparation were collected by employing questionnaires, semistructured interview and observation. Local preference value of spice and condiments were determined. The local preference value were indicated by the community as the most preferred and the least preferred value of spice and condiments by ranking the spice and condiments commonly used for preparation of dishes.

Data Collection and study population

The source populations were all population in Bahir Dar city. The study population were 169 in the three market corresponding to the three kebeles (kebele 16, kebele 11 and kebele 04) in the age range of 18-60 years. From each market equal proportion respondent were selected by lottery methods until the respondent number reaches 169 with equal to number of sample size. All subjects were selected as a study group in age range 18-60 years were interviewed by random sampling technique. Through interviews with the respondents at different levels age range information was obtained with regard to spice and condiment preparation in the local community.

Trained interviewer gather the relevant information basically related to condiment preparation context by using structurally prepared questions, are in order to identify the type of spice and condiment prepared and consumed in the local community.

Sampling size and technique

Bahir Dar city contains 17 kebeles. Bahir Dar city markets (kebele 16, Kebele 11 and kebele 04) of the seventeen kebeles were selected for ethnobiological study and the informants get informed consent and were interviewed by using random sampling technique until sample size was saturated. All the respondents are females and males with age range 18- 60 years. Population sizes in Bahir Dar city market which use commercial exchange of spice is approximately 300, considering a confidence interval of 5% ,sample size become one hundred sixty nine[22,24]. A structured questionnaire was prepared in English and translated into Amharic language a and was re-translated back to English by linguistic to

ensure accuracy and consistency. The entire interview would be held in Amharic language. Each respondents' was informed about the objective of the study and the benefit associated with indigenous knowledge commonly used in the community.

Data Analysis

Data were edited, coded, entered and analyzed by SPSS version 20. Descriptive statistical methods were used to analyze and summarize the inhabitant's sociodemographic characters. Preference ranking, paired comparison and direct matrix ranking commonly employed in ethnobiological research were used to analyze data of spices and condiments preparation with associated to indigenous knowledge.

Results

Socio Demographic Information

Socio-demographic characteristics include, age, sex, educational status were formed on the basis of socio-demographic variables. The contributions devoted to socio-demographic characteristics provide an overview of available survey (Table1).

Variable	Frequency	Percentage (%)
Age in years		
18-30	53	31.36
31-45	61	36.09
46-60	55	32.55
Sex		
Male	74	43.78
Female	95	56.22
Educational status		
Illiterate	24	14.20
Read & write	41	24.26
Primary education(1-8)	31	18.34
Secondary education (9-12)	45	26.64
Above 12th grade	28	16.56

Table 1: Socio-demographic characteristics among inhabitants give response related to ethnobiological study in Bahir dark city market, Northwest Ethiopia, 2018. (n=169).

Ethnobiological Use on the Preparation of Spice and Condiments

The ingredient added to each spice and condiments. In this study eight condiments were assessed in the local community with regard to what kind of spice is added to prepared condiments. Most respondent gave response responding to the condiment with the most important spice added to the prepared condiment (table 2).

No.	Condi-ments	Spice as Ingredients add to condiment preparation
1	Mekalesha	Cinnamon, clove, ginger, cardamom, fennel and black pepper
2	Shiro	Fever tea, thyme, rosemary, cardamom, caraway, and fennel
3	Red pepper	Red pepper, garlic ,ginger, cardamom, Basil funnel, rosemary, thyme
4	Data	Green chili paper
5	Mitmita	Garlic, coriander, rosemary, Basil ,fennel
6	Bekolt	Bean ,garlic ,coriander, chilli, onion, garlic
7	Siljo	Black mustard, safflowers, bean flour, salt, fennel, garlic.
8	Nitirkibie	Fever tea, Basil, cardamom, cinnamon, clove, fennel, long pepper, cumin, ginger, garlic, turmeric, fenugreek, thyme, caraway, rosemary.

Table 2: Indigenous knowledge information base held by the key informants for routinely prepared condiments added to the main dishes.

Compression Indigenous Knowledge Vs. age in spices and condiments preparation

The use of spice and condiment were indicated (table3) that it is directly proportional to age increment and indigenous knowledge practice on local community. In which elders at a higher age and middle age range reflect more spice and condiments use than youngsters. All informants were found in the second and third age groups. This could have contributed for the identification and association of spices and condiments use knowledge by both second and third age groups as they are more knowledgeable than the people in the

first age groups. Furthermore data collection from the study area by observation and interviews revealed that informants in the first age groups were not conversant enough in providing some ethnobiological information clearly on the used methods of spice and condiments preparation.

Age range		Knowledge of informants totally they know about Spice and condiments
1 st Age range	18-30	Less KAP
2 nd Age range	31-45	Excellent KAP
3 rd Age range	46-60	Excellent KAP

Ranking of Spices and Condiments Based on Perceived Importance Preference Ranking

As shown in table 4 below Red peppers, stood first among the sex condiments in the preference ranking methods to know ranks of condiments used in the society. This indicates that the indigenous people through life experience have identified that the best condiments from any others spices that can be used the same action. Score in the table indicates ranks given to condiments based on this personal preference. Highest number indicates the most preferred and the lowest number the least preferred condiments used in society (Table 4) [1, 6].

Condi-ments	Personal preference values of the respondents						Mean	Ranking
	1	2	3	4	5	6		
Mekele-sha	25	17	25	30	35	15	86.50	4 th
Silijo	25	17	8	40	23	14	74.67	5 th
Red pepper	12	13	10	40	30	40	103.67	1 st
Mitimita	5	27	11	16	25	16	62.83	6 th
Datta	3	35	19	26	36	25	94	3 rd
Bekolt	6	12	23	41	25	30	94.67	2 nd

Table 4: Preference rankings of condiments used in the society.

Paired Comparison

For spices that were identified by the informants to be used at their proportions for all values paired comparison was made among the informants to know their ranks. Accordingly, *Allium sativum* stood 1st followed by *Trigonella foenum graecum*. This result indicates that *Allium sativum* is much favored over other plant spices in the study area (Table 5).

Spices	Proportional use value				Mean	Ranking
	1	2	3	4		
Thymus vulgaris	24	30	40	35	86	4 th
Curcuma domestic	14	39	27	41	81.75	5 th
Allium sativum	10	41	41	42	95.75	1 st
Trigonella foenum graecum	13	35	38	41	90.25	2 nd
Capsicum frutescens	19	22	36	36	78.75	6 th
Carum carvi	21	29	35	33	79	7 th
Ocimum bacilicum	12	35	39	39	88.75	3 rd
Sinops alba	20	30	25	21	59.5	9 th
Syzygium aromaticum	25	27	20	19	53.75	10 th
Zingiber officinale	15	33	22	41	77.75	8 th

Table 5: paired comparison of spices in their proportional use (1 = least, 2 = good, 3 = very good, 4 = excellent).

Direct Matrix Ranking

Direct matrix ranking draws explicitly upon multiple dimensions of people perceive after various observations. The result of numerous individuals response can be added together to create a matrix that is representative to the community. Alternatively, direct matrix ranking can be done as a group of exercise in which participants

reach consensus on the ranking of each item or vote according to their individual assessments. *Ocimum bacilicum* is the most important spices in the society (Table 6).

Use	Curcuma domestica	Allium sativum	Ocimum bacilicum	Thymus vulgaris	Trigonella foenum graecum
Color	5	0	0	0	1
Use in meat	1	4	5	1	0
Herbal medicine	2	4	3	4	4
Remembrance	0	3	3	5	4
Ritual	5	1	3	0	1
Smell	4	3	5	0	2
Grand total	17	15	19	10	12
Ranking	2 nd	3 rd	1 st	5 th	4 th

Table 6: Different values of spices used in society as 0= no use, 1 = least, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

Spice Found In the Study Area

As showed table 7 the following list of spice were found in the study area available as for preparation of condiments by local in habitants. (Table 7).

Discussion

Major seed spices are coriander, cumin, fennel and fenugreek. The use of analysis indicates that it is directly proportional to the community used up to date. Spices are important from the point of view of both consumption with food and commercial value [2]. In order to obtain optimal health benefits from vegetables and spices, it is suggested that human should consume a balanced diet with a wide variety of phytochemical sources [3]. This study revealed that the indigenous people have also developed different methods for cultural transmission about the relationship of living beings, strive to make sense of how the natural world behaves and to collecting, processing, using and conserving these valuable plants and/or their products. This support one study done in

Nigeria use of spice and condiments [4-6].

Scientific name	Local name	Common name
Aframomum corrorima	Korerima	Cardamom
Carthamus tinctorius	Suff	Safflower
Allium cepa	Key shinkurt	Onion
Allium sativum	Nech shinkurt	Garlic
Amomum subulatum	Tikur korerima	Black cardamom
Brassica nigra	Senafich	Black mustard
Bunium persicum	Kemun	Black cumin
Capsicum frutescens	Karia	Chili
Cinnamomum zeylanicum	Quarafa	Cinnamon
Coriandrum sativum	Dimbilal	Coriander
Carum carvi	Nech azmud	Caraway
Cuminum cyminum	Kemun	Cumin
Curcuma domestica	Irid	Turmeric
Foeniculum vulgare	Qundoberbere	Fennel
Lippia javanica	Koseret	Fever tea
Ocimum bacilicum	Besobila	Basil
Piper longum	Timiz	Long pepper
Piper nigrum	Qundoberbere	Black pepper
Rosmarinus officinalis	Tibskitel	Rosemary
Sinapis alba	Senafich	Mustard
Syzygium aromaticum	Quarafud	Clove
Thymus vulgaris	Tosign	Thyme
Trigonella foenum graecum	Abish	Fenugreek
Zingiber officinale	Jinjibil	Ginger

Spice and condiments are unique biologically and culturally. Spices are used for flavor, color, aroma and preservation of food or beverages [7,8]. As culturally the indigenous knowledge is an outcome of model-making about the functioning of the natural world that is way all societies, pre-scientific and scientific of knowledge and beliefs handed down through generations by cultural

transmission to apply (including humans) with one another and with their environment [8,10].

Linear thinking is important to this concept as easily described as elders pass on, we are losing much indigenous knowledge. It is not that I disagree or I grieve in my own life the passing of my grandparents and great-grandparents and the loss of the indigenous knowledge [11,12].

I am saying by using indigenous knowledge to improve ethnobiological health, agriculture, natural environment and resource. This study support the benefit of spice and condiment in ethnobiological context related to culture value. One study in Ethiopia also support the present study of spices are important additives to Ethiopian dishes [13].

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Ethiopians, in their long history, discovered the medicinal properties of many plants with their provinces had the advantage of recording the information for future generations [14,15]. Cross ponding to this study indigenous knowledge practices is important for to control climate change in Ethiopia [16,25]. Other research was also initiated to document indigenous knowledge associated with traditional medicinal plants; specifically to identify the plant parts used for medicinal purposes and soil and water management to support this study [18-20]. After all spice increase food preservation and safety. For example clove is one of the most valuable spices that has been used for centuries as food preservative and also black pepper contains antimicrobial compounds that help keep food fresh [21,23].

Conclusion

Some of the spices are indigenous to Ethiopia or its neighboring countries; now a days the preparation of spice and condiment preparation is undertreat which is less applied by the inhabitants in the local area affected by modernization, civilization and industrialization by means of certain constraints which decrease the application of local knowledge. There is knowledge limitation (deterioration) in the younger generation due to the existence of diverse cultural, traditional and belief system. Modernization, modification of culture and increased business work in the area has played a major role in changing the attitudes of younger generation to ignore the use of traditional (local) knowledge [21-25].

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Availability of data and materials

The data used to support the findings of this study are available from the corresponding author upon request.

Authors Contributions

The principal researcher Dessalegn Demeke contributed to the concept of the study, the first draft of the paper, the field work, data analysis and manuscript preparation. The authors contributed to the final draft of the manuscript. The author also read and approved the final manuscript.

Ethics Approval and Consent Form to Study Participants

The methods of obtaining ethnobiological data followed guidelines set by International Society of Ethnobiology Code of Ethics to this research. Prior this oral and written informed consent was obtained from all study participants [26]. No ethical committee permits were required.

Competing Interests

The authors declare no conflict of interests.

References

1. Singh KMP, Singh D (2014) Performance of coriander, fenugreek and soya as intercrop under gladiolus based intercropping system. Journal of Agri Search 1: 246-250.

2. Siruguri V, Bhat RV (2015) Assessing intake of spices by pattern of spice use, frequency of consumption and portion size of spices consumed from routinely prepared dishes in southern India. *Nutrition journal* 14: 7.
3. Green B, Nworgu F, Obazee M (2012) Spices and food condiments in Niger-Delta region of Nigeria. *African Journal of Biotechnology* 11: 14468-14473.
4. Ndukwu B, Ben-Nwadibia N (2005) Ethnomedicinal aspects of plants used as spices and condiments in the Niger delta area of Nigeria. *Ethnobotanical Leaflets* 2005:10.
5. Panda H (2010) *Handbook on spices and condiments (cultivation, processing and extraction): Asia Pacific Business Press Inc* 2010.
6. Hui-Lin L (1970) The origin of cultivated plants in Southeast Asia. *Economic Botany* 24: 3-19.
7. Darriet A (2007) *Herbs, spices and essential oils. Handbook of food products manufacturing Wiley, New York.* 2007: 205-220.
8. Albuquerque UP, Alves RRN (2016) *Introduction to ethnobiology: Springer* 2016.
9. Albuquerque UP, De Medeiros PM, Casas A (2015) Evolutionary ethnobiology. *Evolutionary ethnobiology: Springer* 1-5.
10. Gadgil M, Berkes F, Folke C (1993) Indigenous knowledge for biodiversity conservation. *Ambio* 1993: 151-156.
11. McGregor D (2004) Coming full circle: Indigenous knowledge, environment, and our future. *American Indian Quarterly* 28: 385-410.
12. DeWalt BR (1994) Using indigenous knowledge to improve agriculture and natural resource management. *Human organization* 1994:123-31.
13. Tesfa T, Bayu W, Gashaw A, Beshir H (2017) Spice Production, Marketing, and Utilization in South Wollo, Ethiopia. *East African Journal of Sciences* 11: 27-36.
14. Sumner C, Yimam W. *Indigenous Knowledge Systems in Ethiopia Report of Ethiopia National Workshop.*
15. Idris, Tetemke Mehari, Mogessie Ashenafi A (2001) Some microbiological and biochemical studies on the fermentation of 'awaze' and 'datta', traditional Ethiopian condiments. *International journal of food sciences and nutrition* 52: 5-14.
16. Hadgu KM, Gebremichael D Indigenous knowledge practices for climate change adaptation and impact mitigation: The case of smallholder farmers in Tigray, Northern Ethiopia.
17. Jansen PC (1981) *Spices, condiments and medicinal plants in Ethiopia, their taxonomy and agricultural significance. Pudoc* 1981.
18. Yirga G (2010) Assessment of indigenous knowledge of medicinal plants in Central Zone of Tigray, Northern Ethiopia. *African Journal of Plant Science* 4: 6-11.
19. Erkossa T, Ayele G (2003) Indigenous knowledge and practices for soil and water management in East Wollega, Ethiopia. In *Conference on International Agricultural Research for Development, Deutscher Tropentag Göttingen* 8-10.
20. Meaton J, Abebe B, Wood AP (2015) Forest spice development: The use of value chain analysis to identify opportunities for the sustainable development of Ethiopian Cardamom (Korerima). *Sustainable development* 23:1-5.
21. Gottardi D, Bukvicki D, Prasad S, Tyagi AK (2016) Beneficial effects of spices in food preservation and safety. *Frontiers in microbiology* 7: 1394.
22. Araújo TA, Almeida AL, Melo JG, Medeiros MF, Ramos MA, et al. (2012) A new technique for testing distribution of knowledge and to estimate sampling sufficiency in ethnobiology studies. *Journal of Ethnobiology and Ethnomedicine* 8:11.
23. Vandebroek I (2016) Cultural comparisons in ethnobiological research. In *Introduction to Ethnobiology, Springer, Cham* 265-271.
24. Da Silva TC, Cruz MP, de Sousa Araújo TA, Schwarz ML, Albuquerque UP (2014) Methods in research of environmental perception. In *Methods and techniques in ethnobiology and ethnoecology. Humana Press* 99-109.
25. Riffel AD, Luckay M Views on Indigenous Knowledge Questionnaire (VIKQ) on the beliefs on weather prediction in the Western Cape, South Africa.
26. Hardison P, Bannister K (2011) Ethics in ethnobiology: history, international law and policy, and contemporary issues. *Ethnobiology*, edited by EN Anderson, DM Pearsall, ES Hunn, and NJ Turner 18: 27-49.

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