

Assessing Ethnobiological Use of Spices and Condiment in Prepared Dishes in Bahir Dar City Market, Bahir Dar ,Ethiopia: Ethnobiological 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 questionnaire 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 pairedwise comparison. **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.

Keywords: Spice, Indigenous knowledge, condiment, ranking

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1. 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 preparation of condiment or directly add in to foods as a flavoring agent for the purpose of increasing its taste [1-3] and identifying the nature of the chemical released as sensory transduction through the nasal cavity or taste buds [3]. Spices to have health benefits as antioxidant, antibiotic, antiviral, anticoagulant, anticarcinogenic, 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 [7] extracts to enhance the flavor of the food. 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 ethnobiological 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 ethnobiological and skill of traditional use of spice and condiments in routinely prepared dish in the 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 to the society.

2. Methods

2.1. 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 kebeds 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.

2.2. 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 respondents 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 questionnaire, in order to identify the type of spice and condiment prepared and consumed in the local community.

2.3. 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 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

2.4. Data Analysis

Data were edited, coded, entered and analyzed by SPSS version 20. Descriptive statistical methods were used to analyze and summarize the inhabitants sociodemographic characteristics. 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.

3. Results

3.1. 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).

Table1: Socio-demographic characteristics among inhabitants give response related to ethnobiological study in Bahir dar city market, Northwest Ethiopia, 2018. (n=169)

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

3.2. 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 respondents gave response corresponding to the condiment with the most important spice added to the prepared condiment (table 2)

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

No.	Condiments	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, fennel, rosemary, thyme
4	Datta	Green chili pepper
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.

3.3. Comparison Indigenous Knowledge Vs. age in spices and condiments preparation

The use of spice and condiment were indicated (table 3) 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. Further more 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.

Table 3: spices and condiments use compared by age groups with KAP (< 4 spice and condiments = less knowledgeable, > 7 spice and condiments = do have excellent knowledge)

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

3.4. Ranking of spices and condiments based on perceived importance

3.4.1 Preference ranking

As shown in table 4 below Red peppers, stood first among the six 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 other spices that can be used the same action. Score in the table indicates ranks given to condiments based on this personal preference. Highest number (6) indicates the most preferred and the lowest number (1) the least preferred condiments used in society (Table 4).

Table 4: Preference rankings of condiments used in the society

Condiments	Personal preference values of the respondents						Mean	Ranking
	1	2	3	4	5	6		
Mekelesha	25	17	25	30	35	15	86.50	5 th
Silijo	25	17	8	40	23	14	74.67	3 rd
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	4 th
Bekolt	6	12	23	41	25	30	94.67	2 nd

3.4.2 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).

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

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

3.4.3 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).

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

Use	<i>Curcuma domestica</i>	<i>Allium sativum</i>	<i>Ocimum bacilicum</i>	<i>Thymus vulgaris</i>	<i>Trigonella foenum graecum</i>
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

3.5. Spice found in the study area

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

Table 7: List of spices used for prepared dishes in the study area

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

4. Dessionion

Major seed spices are coriander, cumin, fennel and fenugreek. The use of analysis indicates that it is directly proportional to the community used upto date. Spices are important from the point of view of both consumption with food and comertial value [2]. In orde 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 reveald 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].

Spice and condiments are unique biologically and culturally. Spices are used for flavour, colour, 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 grand parents and great-grandparents and the loss of the indgenous knowledge [11,12].

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

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 preeservation and safty. For example clove [23] 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]

5. 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.

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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, to first draft of the paper, to the field work, data analysis and manuscript preparation. The author 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.

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