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HERBS, SPICES, SEASONINGS AND CONDIMENTS USED BY FOOD VENDORS IN MADINA, ACCRA

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Abstract

The study investigated the knowledge and use of spices, seasonings and condiments by food vendors in Madina. A total of fifty (50) respondents were selected using the convenience sampling technique. A semi structured interview schedule was used to collect data for the study. The data obtained was analyzed using the Statistical Package for Social Sciences (SPSS) version 16. Most respondents were females (94%) and the average age was 37years. The study sample belonged to varied Ghanaian ethnic groups with the main group being Akans thus allowing for varied information about the issue under study to be collected. Most respondents had basic education (52%). Analysis of results of the study showed that (84%) respondents could define spices but all had difficulty defining seasonings and condiments. These terms were described mainly using their sensory characteristics. Food vendors used a variety of spices, seasonings and condiments from either plant, animal or chemical origin in the preparation of their food. Knowledge about sources and use of spices, seasonings and condiments was derived mainly from family members who extended the information by word of mouth. Most of this information was not documented. The study sample was aware of the nutritive, sensory qualities, health benefits as well as negative effects of using these spices, seasonings and condiments. They lacked knowledge about the laws governing the right quantity of spices, seasoning and condiments to use in the preparation of food. Some food vendors also substituted spices and seasonings with other items, which could be injurious to health. It was recommended there should be awareness creation and education by relevant stakeholders about the right quantities of spices, seasoning and condiments to use during food preparation to prevent consumers from suffering from negative health effects. Since Ghana is a country with diverse cultures, further research into specific local spices and seasonings used among specific cultural groups in Ghana could be conducted to help document and preserve such rich traditional cooking culture. Food scientists could conduct further experimental research to upgrade and standardize especially the local spices and seasonings

1. Introduction

Food is one of the essential fundamental elements needed for human survival [1]. Food comprises edible plant parts (such as fruit, nuts, corms, leaves) and animal tissues which may be cooked or eaten raw depending on the cultural orientation of the population. Whether eaten raw or prepared into delicious delicacies, food provides: energy and nutrients for proper nourishment of the body, maintains the body, repairs worn-out tissues and promotes growth of the body [1, 2]. The absence of food or inadequacy of certain nutrients, results in nutrient- related diseases [3]. Food is not only consumed for its nutritional benefits, but individuals' preference for a given food is mainly inspired by their cultural values, sensory qualities such as taste, texture, palatability, mouth feel and even physical appearance. Food service professionals therefore use seasonings, flavourings and flavour enhancers to help enhance the flavour of natural foods [4].

The term spices and condiments applies to a natural plant or vegetable products and mixtures, used in whole or ground form, mainly for enhancing the character of food. For example, imparting flavour, aroma and piquancy to foods [5]. According to Food and Drug Administration, spice is any aromatic vegetable substance (plant parts e.g. bark, buds, flowers, leaves, fruit, bulb roots or seeds) in the whole, broken or ground form that is used to season food rather than contributes nutrients [6]. Spices serve as one of the major ingredients in food preparation and processing throughout the world [7]. Seasoning is a comprehensive term applied to aromatic ingredients that improve the flavour of food products [8]. They are compounds, containing one or more spices, or spice extractives, which when added to a food during its manufacturing, preparation or before it is served, enhance the natural flavour of the food and increase its acceptance by consumers [8]. Seasonings include spices and other substances of vegetable origin that are added during the cooking process [9]. Condiments are prepared food compounds [10]. They are a mixture composed of one or more spices or spice extracts that are added to food when food is being consumed. The addition of condiments to food does not require a cooking process [9].

Spices, seasonings and condiments are mostly used to enhance taste, improve nutritional content, improve colour, texture or shelf life of foods and beverages [7]. Some also perform antioxidant, antimicrobial, nutritional and medicinal functions and are traditionally credited with a wide range of pharmacological and preservative properties [11, 12]. Plants used as spices, seasonings and condiments are usually aromatic and pungent [13]. The knowledge and use of plants as spices and condiments is not a modern day phenomenon but is a practice that is as old as the history of mankind [14]. They were used during ages when technology had not advanced this much. For instance, as far back as 2000 BC, Indonesian cinnamon and pepper were used in the Middle East [15]. Currently, there is an increased use of spices in many countries because of their health benefits [15]. Numerous new dishes have been made possible because of these aromatic and pungent spices [8]. The increase or renewed fascination in the use of spices and condiments has occurred because of: exposure to different national dishes by the international air- travelling public, migration of multitudes over national boundaries, greater dissemination of nutritional and techniques through the mass media, and the sudden demand of the consuming public for more flavoured, exotic, nutritious and convenient foods [8]. Whatever the reason, one can readily observe an increase in ethnic-oriented restaurants in almost every large metropolitan area, where the use of a single spice or combination of unique spices, account for the many innovative, appetizing dishes we have available today [16].

Spices and seasonings are used in nutritionally insignificant quantities [17, 18]. Despite their limited use in food, their impact on food processed, stored or packaged is immense. If used in the right quantity, it is beneficial to health but then excess use may result in harmful effects. They could cause changes in food itself by altering or modifying the nutritional value of food. In Ghana, the use of herbs, spices seasonings and condiments by households and food vendors is a common phenomenon. They are used in our homes during food preparation as well as in exclusive restaurants , hotels, drive-ins (fast foods), pizzerias, by local food operators (chop bars), and street food vendors [19]. Food vendors and operators use their discretion to determine the type and amount of herbs, spices, seasoning or condiment to add to their food. Considering the possible toxic effect on consumer health if these spices, seasonings and condiments are improperly or excessively used, it is very necessary to find out how food vendors use them.

Information about these spices, seasonings and condiments are rarely documented but passed on by word of mouth over several generations [19]. Anecdotal evidence suggests most of these spices, seasonings and condiments (especially the local ones) may still be rather crude, not standardized, and not based on sound scientific principles, making their consumption in their present form unsuitable. Documenting such information would not only go a long way to help Food Scientists and Technologists especially those in West Africa process and refine such technologies [19], but would serve as a reference source and data of Ghanaian spices, seasonings and condiments. This information could be used by the Codex Alimentarius Commission, which is interested in identifying all food additives regardless of whether they are approved for use by consumers.

The main aim of the study was therefore to gain insight and document food spices, seasonings and condiments used by food vendors in Madina, Accra. The specific objectives were to: assess respondents understanding of the terms spices, seasonings and condiments, identify the kinds of spices, seasonings and condiments used by food vendors, assess respondents' knowledge about laws governing the use of spices, seasonings and condiments and find out respondents knowledge about the effect of spices, seasonings and condiments.

2. Methodology

A cross sectional survey was conducted on 50 food vendors in Madina and its environs. The study sample was selected using the convenience sampling method. A structured interview schedule was employed as a data collecting tool. Data collected was coded, entered and analyzed using the Statistical Package of the Social Sciences (SPSS) Version 16.

3. Results and Discussion

3.1 Demographic characteristics

Findings presented in Table 1 showed, most of the respondents were females (94%). This trend was not surprising because cooking of food in Ghana is traditionally perceived as a female-oriented occupation. Respondents ranged in age from 20 to 63 years, with their average age being 37 ½ years. Fifty – four percent (54%) of respondents were married, 74% were Christians, 96% had some form of formal education with most having basic education. The study sample belonged to varied ethnic groups with the main group being Akans. This allowed researchers collect varied information about herbs, spices, seasonings and condiments.

3.2 Knowledge and use of spices, seasonings and condiments

3.2.1. Definition of spices, seasonings and condiments

A qualitative analysis of themes in definitions given by the study sample revealed that almost all respondents (84%) had an idea and to some extent could define spices but had difficulty defining or describing seasonings and condiments. Most respondents used sensory qualities to describe seasonings and condiments. For instance majority described seasonings and condiments as things used to improve flavour, colour, nutritive value and taste of food or things used in preparation of food that were traditionally credited with medicinal and preservative properties.

3.2.2 Types of spices, seasoning and condiments

An analysis of the data presented in Table 2 showed food vendors used a variety of spices, seasonings and condiments (derived from plant, animal and chemical origin) in the preparation of their food. The main spices used by majority of food vendors was ginger (100%) and pepper (80%); the main seasoning used was cubes (70%) and the main condiment was tomato ketchup (40%). Anecdotal evidence suggests currently, increasing numbers of people in Ghana prefer using natural spices, seasonings and condiments for preparation of their food mainly because of its health benefit. This finding supports literature [20], where it was realized that traditional cultures have used naturally occurring spices, seasonings and condiments mostly derived from plants in cooking mainly because of their health benefits.

3.2.3 The use of spices, seasoning and condiments

Data presented in Table 2 gives information about the use of various spices, seasonings and condiments. They were mainly used by the study sample to add flavour and taste to food and for their medicinal function. This confirms findings in literature about reasons for using spices, seasonings and condiments [5, 7, 8, 11, 12]. For instance, certain respondents indicated turkey berry (bedru) was used in the preparation of palmnut soup and garden egg stew for expectant mothers to increase their iron levels. Negro pepper (whintia) was also added to food to help solve abdominal problems. It must be stated that most of the health reasons stated by food vendors for using spices seasonings and condiments have not been scientifically proven. Most respondents indicated ethnicity or their ethnic culture influenced their choice of spices seasonings and condiments during food preparation.

Research has shown people substitute spices, seasoning and condiments with other substances when preparing food [21]. The phenomenon was realized in this study. Some of the study sample substituted certain spices, seasonings and condiments with other items to enhance mainly the texture and taste of their food. This information is presented in Table 3. They indicated that although this practice may not be scientifically proven, such information was passed on by word of mouth over the years and had become part of their cooking culture. The use of some substitutes (especially wood ash and charcoal in cooking) has been realized to have negative health effects. For instance, Food and Drugs Administration (FDA) stated that treated wood cannot be used under any circumstances

as a component of food unless a food additive regulation prescribes it as safe to use [22]. In effect; any food containing any residues from treated wood is considered adulterated under the 1938 Food, Drug and Cosmetic Act. There is therefore the need for mass sensitization to prevent food vendors from using these substitutes and endangering the lives of their customers.

3.2.4 Source of information about spices, seasonings and condiments

Figure 1 presents information about the study sample's source of knowledge about spices, seasonings and condiments. An analysis showed respondents had information from a variety of sources with the main source being family members. In the past through the socialization process, female family members extended information about the use of spices, seasonings and condiments by word of mouth to their children (especially the "girl child"). This practice was carried on from generation to generation thus preserving the cooking culture over the years. As was realized in literature, this information was rarely documented [19, 23]. Good practices or knowledge could be lost, adulterated or modified as the years go by and in the same vein, knowledge about bad cooking practices would be passed on from generation to generation as was the case with adding certain food substitutes like wood ash to food. Documenting such information would go a long way to curb some of these bad cooking practices.

3.2.5 Source of spices, seasonings and condiments

Respondents acquired spices and seasonings mainly from two sources; the market and their backyard garden. Most respondents purchased their spices, seasonings and condiments from the market while a minority (34%) grew some (especially spices) in their backyard garden. Those grown in the backyard garden include: basil (akokomesa), Turkey berry (bedru), amaranth leaves (fotete / alefu), jute leaves (ayoyo/ademe) pawpaw leaves (brofere ahaban / adiba magba) and pepper (kpakposhitor, meko, ogyema). Some food vendors indicated its growth in their backyard garden ensured they had constant supply of such spices and condiments.

3.4 Effect of consuming spices, seasoning and condiments

An analysis of the study samples responses (as presented in Table 4) suggested they had knowledge about the positive and negative effect of consuming spices, seasonings and condiments. Twenty – nine percent (29%) indicated if natural spices and seasonings were consumed, they were beneficial because they improved the nutritional status and health of their consumers. Some of the health effects could be inferred from Table 2 (e.g. turkey berry (bedru or kwahu nsusuaa), jute leaves (ayoyo) and basil (akokomesa or koklogbe) were realized as being good sources of iron; negro peeper (whintia), chili pepper (meko), and ginger (kakadro), were used to cure stomachaches; red sorrel (suule) was used to treat skin problems. Seventy – one percent (71%) had knowledge about the negative effects of consuming salt petre (kawn) and cubes (especially those containing mono-sodium glutamates). Salt petre (potassium nitrate - kawn) was perceived as a spice that caused a lot of negative health effects (e.g. stomach problems, heart burn, impotency in men) when consumed meanwhile it was used frequently by the study sample in food preparation.

3.5 Laws governing the consumption of spices, seasoning and condiments

A review of literature revealed there are laws governing the general use of food additives. The researcher thus sought to find out what knowledge respondents had about these laws. An analysis of the data suggests most respondents (54%) were aware they had to check the manufacture and expiry date but just a few (20%) had knowledge about laws governing the use of the right quantity of food additives. With regards to the quantity of spices, seasonings and condiments used during meal preparation, most food vendors indicated, they did not have any specific measures but with experience, they used their discretion to determine the amount to put in food during meal preparation. Since most negative health effects occur as a result of over-use or prolonged use of food additives, this finding is an issue of concern. These food vendors prepare food for the public and if they do not have knowledge about the right quantities of food additives to use, they could be putting consumers' life at risk.

4. Conclusion

In conclusion, food vendors used a variety of spices, seasonings and condiments from either plant, animal or chemical origin in the preparation of their food. Knowledge about sources and use of spices, seasonings and condiments was derived mainly from family members who extended the information by word of mouth. Most of this information was not documented. The study sample was aware of the nutritive, sensory qualities, health benefits as well as negative effects of using these spices, seasonings and condiments. They lacked knowledge about the laws governing the right quantity of spices, seasoning and condiments to use in the preparation of food. Some food vendors also substituted spices and seasonings with other items, which could be injurious to health.

5. Recommendations

In the light of the findings, it is recommended that:

1. There should be awareness creation and education of food vendors and the general populace by relevant stakeholders (public health workers, students of Family and Consumer Sciences, Ghana Standards Authority, and Food and Drugs Authority) about the right quantities of spices, seasonings and condiments to use during food preparation to prevent consumers from suffering from negative health effects.
2. A study on the quantities of spices, seasonings and condiments used in food preparation could be carried out.
3. Since Ghana is a country with diverse cultures, further research into specific local spices and seasonings used among specific cultural groups in Ghana could be conducted to help document and preserve such rich traditional cooking culture.
4. Some identified spices and seasonings may not be standardized thus documenting such information would go a long way to provide Food scientists with information to conduct further experimental research to upgrade and standardize such traditional technologies.

Appendices

Table 1: Demographic characteristics of food vendors

Characteristics		No (n = 50)	%
Gender	Male	3	6
	Female	47	94
Age	< 38	23	46
	38	10	20
	> 38	18	36
Marital Status	Single	21	42
	Married	27	54
	Widow	2	4
Ethnic group	Akan	22	44
	Ewe	10	20
	Ga / Adangbe	6	12
	Northerners	12	24
Educational status	Basic	26	52
	Senior High School	11	22
	Vocational School	9	18
	Tertiary Education	2	4
	No formal Education	2	4
Religious Background	Christian	37	74
	Moslem	13	26

Fig. 1 Respondents source of knowledge about spices, seasonings and condiments

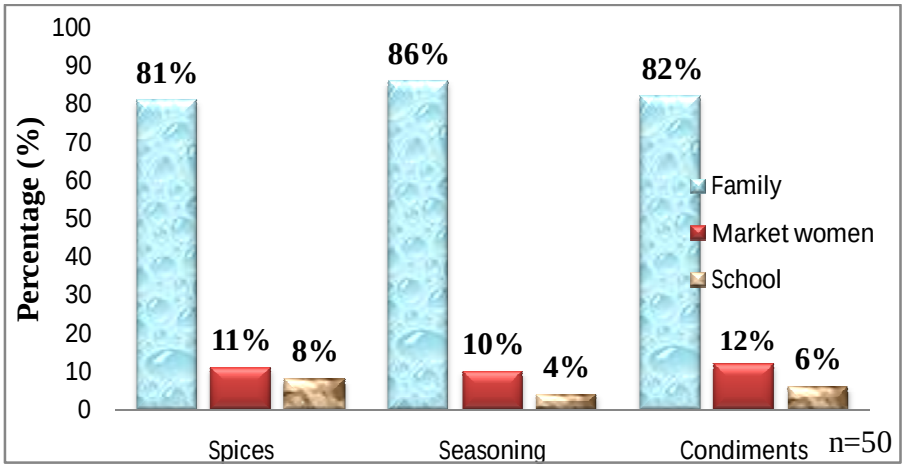
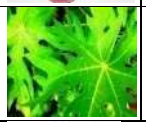


Table 2: Summary of data on herbs, spices, seasonings and condiments used by food vendors

TYPE	SCIENTIFIC/ FAMILY NAME	LOCAL NAME(S)	USE(S)		ORIGIN	NO. (n = 50)	(%)
Adobo (SEASONING)	Blend of various spices e.g salt, paprika, black pepper, onion powder, oregano, cumin, garlic powder, and chili powder	Not known	seasoning for meat, poultry and fish to impart flavor		Chemical	5	10
African Locust bean (SEASONING)	Parkia biglobesa/ Fabaceae	Hausa: Dawadawa	- Enhances food flavour - Adds taste to food - Medicinal		Plant	12	24
Amaranth leaves (SEASONING)	Amaranthus/ Amaranthaceae	Hausa - alefu, Ewe - fotete	- Used in vegetable dishes - Medicinal value		Plant	2	4
Aniseed (SPICE)	Pimpinella anisum / Apiaceae	Twi – Nkitinkiti	- Add flavour (Similar to Cumin)		Plant	20	40
Aridan (SPICE)	Tetrapleura tetraptera / Leguminosae (Fabaceae	Twi - Prekese	- Enhances flavour - Has health benefits		Plant	4	8
Basil (HERB)	Ocimum basilicum L / Lamiaceae	Twi - akokomesa, Ewe – koklogbe Ga – Wuɔrbaa / Koowɜr Hausa - kamshie	- To improve taste and enhance food flavor. - Good source of iron and Vitamin C		Plant	2	4
TYPE	**SCIENTIFIC/ FAMILY NAME**	**LOCAL NAME(S)**	**USE(S)**		**ORIGIN**	**NO. (n= 50)**	**(%)**
Bay leaves (HERB)	Laurusnobilis / Lauraceae	Not known	- Imparts a distinctive aroma to soups, stews and vegetable sauces		Plant	3	6

Black pepper / Peppercorn (SPICE / SEASONING)	Piper nigrum / Piperaceae	Not known	- Flavour - Medicinal		Plant	6	12
Calabash nutmeg (SPICE)	Monodora Myristica	Twi - wedie aba	- Flavour in food - Medicinal (stomach ache and headache)		Plant	4	8
Cinnamon powder (SPICE)	Cinnamomum zeylanicum/ Lauraceae	Not known	- Enhance flavor and taste - Medicinal (indigestion, diarrhea, loss of appetite)		Plant	2	4
Cloves (SPICE)	Syzygiumaromaticum/ Myrtaceae	Twi – perpre	- Enhance flavor and taste - Medicinal (treat toothache, nausea, flatulence and indigestion)		Plant	13	26
Cubes (SEASONING)	Cubes (Maggi, Royco and Onga)	Not known	- Flavoring food and enhancing its taste.		Chemical	35	70
Cumin (SPICE)	Cuminum cyminum/ Apiaceae	Twi – nkitinkiti Ewe – Ahaliwoe Ga – sicorni Ewe – sicoli Hausa – neri	- Add flavour - Medicinal (improves blood level and strengthens bones and teeth) (Similar to aniseed)		Plant	11	22
TYPE	**SCIENTIFIC/ FAMILY NAME**	**LOCAL NAME(S)**	**USE(S)**		**ORIGIN**	**NO. (n = 50)**	**(%)**
Curry powder (SPICE)	Not known	Not known	- Enhance flavor - Add yellowish colour to food		Chemical	13	26

Dried sorghum leaves (SEASONING)	Panicum miliaceum./ Gram ineae; Poaceae	Twi –waakyeahaban Ga – waakyebaa Ewe – adah Hausa – karandefe	- Adds reddish colour to food - Adds taste - Medicinal (blood stimulation and to build body defense)		Plant	6	12
Fish meal (SEASONING)		Twi - nsesawa ayayam, Ewe – adziadortutu Ga – loo moimoe Hausa - kifekana	- To add taste - For nutritive value (provides protein and calcium.	 	Animal	17	34
Fluted pumpkin leaves (SEASONING)	Telfairia occidentalis / Asteraceae	Twi – krobonko Hausa - kuka	- Used in sauces to add taste - Nutritive (rich in iron) - Medicinal		Plant	1	2
Garlic (SPICE/ SEASONING)	Allium sativum L. / Liliaceae	Not known	- Seasoning, - Add flavour - Medicinal values (fever, asthma, hypertension, constipation, skin diseases)		Plant	32	64
Ginger (SPICE)	Zingiber officinale/ Zingiberaceae	Twi–kakadro, Ga - kakatsofa, Ewe- gometakui/ nkraosa Hausa - Kakaduro	- For unique flavour and hot pungent taste - preparation of dishes, local beverages - medicinal (treat colds, catarrh, stomach ache) -		Plant	50	100
TYPE	**SCIENTIFIC/ FAMILY NAME**	**LOCAL NAME(S)**	**USE(S)**		**ORIGIN**	**NO. (n = 50)**	**(%)**
Grains of paradise (SPICE)	Aframomum melegueta /Zingiberaceae	Nzema – essa, Twi – efom wesa Ewe – Ewo Hausa - Masa ton kwa	- Hot spicy taste - Enhance flavour - Medicinal (colds and catarrh, hypertension, worms)		Plant	10	20
Jute leaves (SEASONING)	Corchurus olitorious L. / Tiliaceae	Hausa – rama / ayoyo, Ewe – Ademe	- Used in preparation of soup - Medicinal (increases iron level, cures constipation & worm infestation)		Plant	12	24

Lime juice (SEASONING)	Citrus aurantifolia / Rutaceae	Twi – Ankaa dwea Ewe – tɔnti Ga – abonua	- Adds flavour and taste to food		Plant	2	4
Mixed spices (SPICE)	Blend of various spices E.g salt, paprika, black pepper, onion powder, oregano, cumin, garlic powder, and chili powder	Not known	- Enhance the flavor and taste of stews - To spice meat		Chemical	14	28
Negro pepper (SPICE)	Xylopia aethiopica / Annonaceae	Twi – whintea, Ewe – etso	- Flavour to soups, stews and beverages - Medicinal (stomach ache, fever, after birth or post -partum treatment)		Plant	5	10
Nutmeg (SPICE)	Myristica fragrans / Myristicaseae	Not known	- impart a nice flavour to food - medicinal – rheumatic pains		Plant	2	4
TYPE	**SCIENTIFIC/ FAMILY NAME**	**LOCAL NAME(S)**	**USE(S)**		**ORIGIN**	**NO. (n = 50)**	**(%)**
Onion (SPICE)	Allium cepa L. / Liliaceae	Twi – Gyene Ga –Sabolai, Ewe –Saballa Hausa – Alibasa	- Enhances food flavor and taste - Medicinal (coughs, colds, skin diseases, treatment of convulsion, ulcers.		Plant	45	90
Pawpaw leaves (SEASONING)	Carica papaya / Caricaceae	Twi –brofere ahaban Ewe – adiba magba	- To tenderize meat - Medicinal (heartburn, indigestion)		Plant	1	2
Pepper (SPICE)	Capsicum annuum L, Capsicum frutescens L, Capsicum minimum/ Solanaceae	Twi - meko, Ewe - atadi, Ga – shitor, kpakposhito	- Enhances flavour and taste in soups and sauce - Medicinal (helps with blood circulation) (There are different types of pepper)		Plant	40	80

Powdered shrimps (SEASONING)	Dendrobranchiata / Caridea	Twi -mmɔnkoayayam, Ewe – borlututu Ga – sɔn momoe Hausa – zaatolele	- Gives exclusive flavor and taste to stews, soups - Nutritive value - Adds protein		Animal	15	30
Red Sorrel (HERB)	Rumex acetosa / Polygonaceae	Hausa – suule	- Adds flavour - Nutritive value - Medicinal (diuretic, reduces fever, helps cure skin problems & sore throat)		Plant	3	6
Rosemary (HERB/SPICE)	Rosmarinus officinalis/ Lamiaceae	Not known	- For taste and flavour - Medicinal (cure toothache, eczema, indigestion, cough, joint pains)		Plant	6	12
TYPE	**SCIENTIFIC/ FAMILY NAME**	**LOCAL NAME(S)**	**USE(S)**		**ORIGIN**	**NO. (n = 50)**	**(%)**
Salt (SEASONING)	Sodium chloride	Twi - nkyene , Ewe - edze, Ga – ŋoo' Hausa – dzishile	- To add taste - As a preservative		Chemical	10	20
Salted fish (SEASONING)		Twi – momoni Ewe – lafifi Ga – looŋshala	- Add flavour and taste to most local dishes.		Animal	13	26
Saltpetre (SPICE)	Sodium / Potassium nitrate	Twi - Kawn Ewe – kawn Hausa – kawn Ga - kãwe	- To alter the taste of food - To cure meat - To enhance texture of food (e.g. soften beans)		Chemical	17	34
Soy sauce (CONDIMENT)	Mixture of soybeans, roasted grains, salt, Aspergillus oryzae or Aspergillus sojae moulds	Not known	- To add flavour and taste to food		Chemical	2	4

Suya khebab powder (SPICE)	Mixture of spices - e.g. pepper, ginger, garlic and cloves.	Not known	- Adds flavour and add taste especially to grilled meat		Chemical	5	10
Sweet melon (SEASONING)	Citrullus lanatus L. / Cucurbitaceae	Twi – Wrewre Ewe – Agushie Hausa – Kanana	- Adds taste and flavor especially to soups - Highly nutritious		Plant	2	4
TYPE	**SCIENTIFIC/ FAMILY NAME**	**LOCAL NAME(S)**	**USE(S)**		**ORIGIN**	**NO. (n = 50)**	**(%)**
Tomato Ketchup (CONDIMENT)	Not known	Not known	- To add taste to food		Chemical	20	40
Turkey berry (SEASONING)	Solanum torvum / Solanaceae	Twi - bedru or kwahu nsusuaa Ga – Sebebibii Ewe – Ete – vi Hausa – kantosè	- Added to soups and sauces to add taste - Medicinal (rich in iron)		Plant	7	14
White pepper (SPICE)	Piper nigrum Piperaceae	Not known	- Add flavour and taste to food		Chemical	7	14

**Total percentages exceed 100% because there were multiple responses

Table 3: Items respondents used to substitute spices/ seasonings during food preparation

Spice/Seasoning	Substitute	Meal	Reasons for use
Salt peter	Wood ash	Stew	Taste
Salt peter	Cassava dough	Steamed maize meal (Kenkey)	Texture
Onion	Charcoal	Groundnut and Palm fruit soup	Treatment of spoilage
Salt peter	Charcoal	All kinds of soups	Taste and treatment of spoilage/ preservation
Salt peter	Gari	Tenderizes tough meat	Texture
Salt peter	Green bean leaves	Jute leaves (Ayoyo) soup	Colour
Cube	Powdered shrimps	Tomato stew	Taste and flavor
Salt peter	Monosodium glutamate	Tenderizes tough meat	Texture

Table 4: Knowledge about the effect of use of herbs, spices, seasonings and condiments

Effect		Types of spices, seasonings and condiments		
			Freq.	%
Positive (29%)	Medicinal	Turkey berry, African locust beans, Cloves, cumin seeds, Garlic, Ginger, Aridan	11	22
	Nutritious	African locust beans (Dawadawa), Basil, fish meal, shrimp powder	5	10
Negative (71%)	Stomach upset	Salt peter	25	50
	Heartburns	Salt peter	21	42
	Hyperactive	Cube, Monosodium Glutamate, Mix spices	12	24
	Impotency in men	Salt petre	3	6

**Total percentages exceed 100% because there were multiple responses

REFERENCES

1. Tull, A., (1995). Food and Nutrition. Oxford University Press. Walton St. Oxford.
2. Fife, B., (2005). Eat fat look thin: A safe and natural way to loose weight permanently. Piccadilly Books Ltd. USA.
3. Ahmed N., Dawson M., Smith S., &, Wood E. (2007) Biology of Disease. Taylor & Francis, 2006. 270 Madison Avenue USA.
4. NIIR (2006). The Complete Book on Spices & Condiments (with Cultivation, Processing & Uses. NIIR Board of Consultants & Engineers. Asia Pacific Business Press Inc.
5. Peter K. V. (2004) Handbook of herbs and spices. Volume 2. Woodhead Publishing Limited, Abington Hall, Abington, Cambridge CBI 6AH, England.
6. Toldra F. (2008). Handbook of fermented meat and Poultry. John Wiley & Sons, 2008. ISBN 0470376341, 9780470376348
7. Parry, J.W. (1969). Spices II Their morphology, History and Chemistry, Chem.pub.co.inc., New York. N.Y., USA.
8. Farrell, K. T. (1998). Spices, Condiments and Seasonings. Springer. New York, Springer. ISBN 0-8342-1337-0.
9. Hirasa K. & Takemasa M. (1998) Spice Science and Technology. CRC Press. USA
10. Farrell, K. (1985). Spices, Condiments and Seasonings. AVI Publications. WestPoint CT.
11. Dovlo, F.E., (1970). Special report on local foods. Food Research Institute, Accra, Ghana.
12. Nair, K.P.P., (2013). The Agronomy and Economy of Turmeric and Ginger: The Invaluable Medicinal Spice Crops. Newness. 32 Jamestown Road London NWI 73Y

13. Achinewu, S. C, Aniena, M.I. and Obomanu, F.G., (1995). Studies on spices of food values in the South Eastern States of Nigeria I: Antioxidants Properties. J, African Med. Plants I8:135-139.
14. Garland S. (1972). The Herbs and Spices Book. Frames Lincoln Publishers, London pp. 20-27.
15. htpp://www.cryofoods.com (2013). Cryogenically processed food. Spice for Life. New Delhi. Retrieved September, 6th, 2013
16. Page K. and Dornenburg A. (2008). The Flavor Bible: the Essential Guide to Culinary Creativity, Based on the Wisdom of America's Most Imaginative Chefs. New York: Little, Brown and Company. 978-0-316-11840-8
17. Jones, T., (2007). Culinary Calculations: Simplified Math for Culinary Professionals John Wiley & Sons, Inc. Canada.
18. Shankar S., Rakesh K. Srivastava (2012) Nutrition, Diet and Cancer Springer, 2012 ISBN 9400729227, 9789400729223
19. Aworh, O. C. (2008). The role of traditional food processing technologies in national development: the West African Experience. Using Food Science and Technology to Improve Nutrition and Promote National Development. Robertson, G. L. & Lupien, J. R. (Eds). International Union of Food Science & Technology. ISBN: 978-0-91810247-0-7.
20. Kumar, V. (2006). The Secret Benefits of Spices and Condiments. New Dawn Press ISBN 9781845575854
21. htpp://gernot-katzers-spice-pages.com/engl/Xylo_aet.html (2003). Gernot Katzer's spice pages. Retrieved May, 6th, 2013
22. USEPA, (2014). Chromated Copper Arsenate (CCA). Consumer Safety Information Sheet: Inorganic Arsenical Pressure – Treated Wood. United States Environmental Protection Agency (USEPA), http://www.epa.gov/oppad001/reregistratiion/cca/cca_consumer_safety.htm Retrieved Feb. 07/2014.
23. Kuhnlein H.V., Erasmus, B. & Spigelski, D. (2009). Indigenous People's Food Systems: the Many Dimensions of Culture, Diversity and Environment for Nutrition and Health. Rome. United Nations Food and Agriuclture Organization.