

**UNIVERSITY OF EDUCATION, WINNEBA**

**COLLEGE OF TECHNOLOGY EDUCATION**

**EXAMINING THE “USE” OF “PREKESE” IN MEAL PREPARATION**

**PRACTICES OF CATERERS**



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degree**

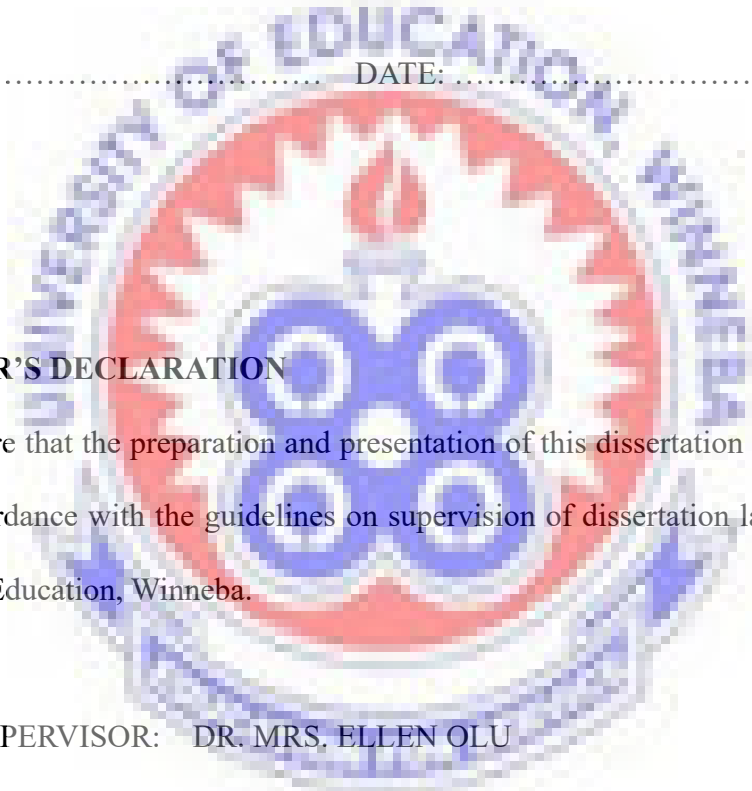
**2018**

## DECLARATION

### CANDIDATE'S DECLARATION

I, THEODORA AFFI ADDO-BEATSON, declare that this dissertation, with the exception of the quotations and references contained in published works which have all been identified and acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE: ..... DATE: .....



### SUPERVISOR'S DECLARATION

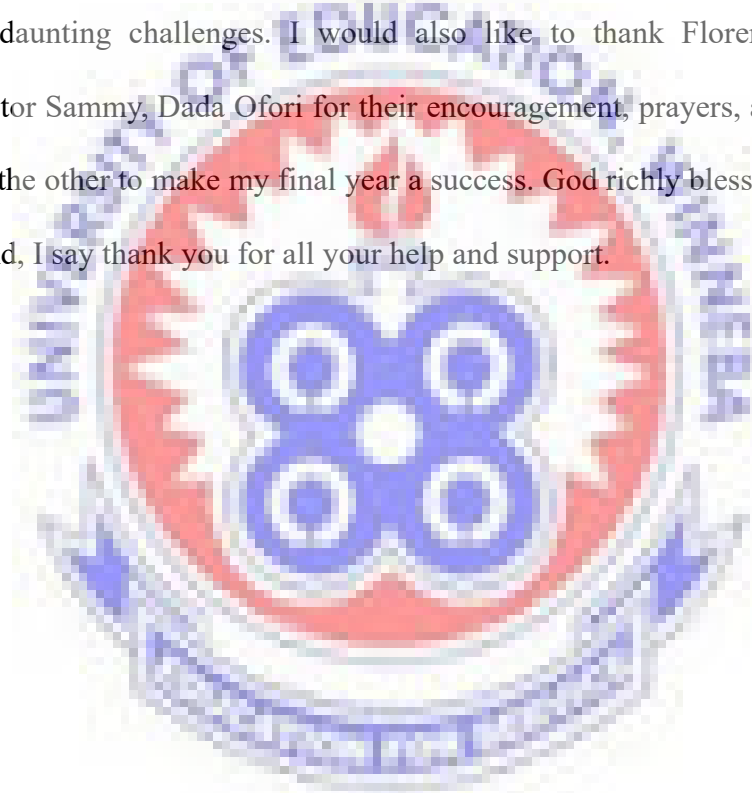
I hereby declare that the preparation and presentation of this dissertation were supervised by me in accordance with the guidelines on supervision of dissertation laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: DR. MRS. ELLEN OLU

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## **DEDICATION**

I dedicate this work to adorable sons Chief, Nana Asante, Papa Addo

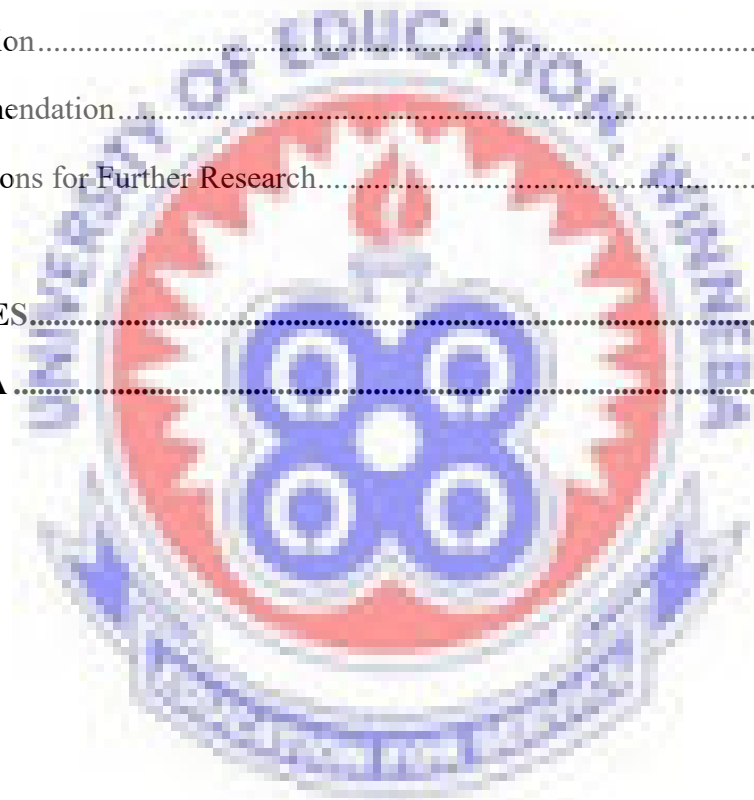


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## ABSTRACT

The main purpose of the study was to examine the use of “prekese” in meal preparation practices of caterers in the Kumasi Metropolis. This study adopted the case study strategy. Quantitative research approach was used. The population for the study was ninety (90). The population of the study was made up of selected caterers in the Kumasi Metropolis. Random sampling method would be used to select 73 respondents for the study. Questionnaires were the main instrument used to gather data for the study. The Statistical Package for Social Sciences (SPSS) version 18 was used to analyse data. The study results concluded that prekese can be used to manage a lot of sicknesses including convulsion and Leprosy, reducing inflammation of the body, arthritic pains and rheumatoid pains, supports the cardiovascular system, treatment of diabetes and supports the immune system, avoid post-partum contraction, treating asthma, and Fever. The local spices used by caterers were prekese, cumin seeds, black pepper, nutmeg, turmeric, cloves, coriander seeds, mustard seeds, fennel, fenugreek seeds, carom, red chillies, cardamom, cinnamon, and caraway seeds. Finally, meals which make use of prekese as a spice were meat pepper soup, palm kernel soup and Nsala (white soup), fish pepper soup and groundnut soup. The study recommended that the Ministry of Health should create public awareness regarding the health benefits of consuming prekese to enhance public awareness and consumption and the Government of Ghana should invest in medical and laboratory research to unravel the numerous hidden advantages of consuming prekese.

## CHAPTER ONE

### 1.0 Introduction

This chapter contains the background to the study, statement of the problem, purpose of the study, specific objectives of the study, research questions, significance of the study, scope of the study, and organisation of the rest of the study.

### 1.1 Background to the study

In West Africa, the plant *Tetrapleura tetraptera* (locally known as Prekese) is popular among the Akans of Ghana for its use as a spice, as a dietary supplement rich in vitamins and a medicine for many ailments. The 'Prekese' plant, scientifically called *Tetrapleura tetraptera* is from the family of *Mimosaceae* and commonly known as *Aridan* (fruit) in Nigeria. It is a single-stemmed, robust, perennial tree of about 30m. It has a grey/brown, smooth/rough bark with branches. The flower is yellow/pink and racemes white. The fruit has dark brown, four winged pods (12–25cm x 3.5–6.5cm). It is generally found in the lowland forest of tropical Africa. The fruit consists of a fleshy pulp with small, brownish-black seeds. The fruit possesses a fragrant, characteristically pungent aromatic odour, which acts as an insect repellent and a spice in foods (Aladesanmi, 2007).

The dry fruit has a characteristic aroma which makes it a popular seasoning spice in Ghana, Southern and Eastern Nigeria (Essien *et al.*, 2014; Adesina, 2012; Okwu, 2011). The fruit shell, fruit pulp and seed contain varying amounts of nutrients such as protein, lipids and minerals which are comparable to and some are even higher than popular spices and ginger (Essien *et al.*, 2014). It is also a source of minerals e.g. calcium, phosphorus,

potassium, zinc and iron. The plant has many traditional uses, mainly in the management of convulsion, leprosy, inflammation and rheumatic pains, schistosomiasis, asthma and hypertension (Ojewole and Adesina, 2012). The ethanol extract and saponins from the bark of the stem exerts an inhibitory effect on luteinizing hormone released by pituitary cells, suggesting its use as contraceptive agent (El-Izzi *et al.*, 2010). It is used extensively in soups for nursing mothers to prevent post-partum contractions (Nwawu and Akali, 2016) and gastro-intestinal disorders especially stomach ulceration (Noamesi *et al.*, 2012)

The fruit shell, fruit pulp and seed contained varying amounts of nutrients such as protein, lipids and minerals which are comparable and some are even higher than popular spices and ginger (Essien *et al.*, 2014). Okwu (2013) reported that the proximate composition of *T. tetraptera* as follows: crude protein (7.44% - 17.50%), crude lipid (4.98% - 20.36%), crude fibre (17% - 20.24%), carbohydrate (43.18% - 49.06%) and food energy (234.18% - 42,379.48 gl Cal). The species is also a source of minerals e.g. calcium, phosphorus, potassium, zinc and iron. In Ghana, it is used as a source of vitamins in diets (Okwu, 2013).

*T. tetraptera* is common on the fringe of the West African rainforest belt. Trees are widespread in the forests of tropical Africa, especially secondary forest. The species is found throughout the high forest zone, in the southern savannah-woodland and in the forest outliers of the African plains (Orwa *et al.*, 2009). The tree is deciduous, losing its leaves in December. Flowering begins towards the end of February and ends in early April. The indehiscent pods mature and ripen from September to December. When the pods fall, their scent attracts rodents, which probably disperse the seeds (Orwa *et al.*, 2009).

According to Abii and Amarachi (2007), it was observed that the dry fruit of *tetrapleura tetraptera* contains 9% ash, 4% oil and 3% moisture. The plant has many traditional uses, mainly in the management of convulsion, leprosy, inflammation and rheumatic pains, schistosomiasis, asthma and hypertension (Ojewole and Adesina, 2013). The ethanol extract and saponins from the bark of the stem exerts an inhibitory effect on luteinizing hormone released by pituitary cells, suggesting its use as contraceptive agent (El-Izzi *et al.*, 2010). It is used extensively in soups for nursing mothers to prevent post-partum contractions (Nwawu and Akali, 2016) and gastro-intestinal disorders especially stomach ulceration (Noamesi *et al.*, 2012). Phytochemical screening revealed the presence of tannins phenolic compounds, saponins, alkaloids, steroids and flavonoids which are assumed to be responsible for its varied biological and pharmacological properties (Okwu, 2013). This study therefore would examine the nutritional and health benefits of consuming *tetrapleura tetraptera* locally known as prekese in the Ghanaian community.

## 1.2 Statement of problem

In West Africa, the plant *Tetrapleura tetraptera* (locally known as Prekese) is popular among the Akans of Ghana for its use as a spice, as a dietary supplement rich in vitamins and a medicine for many ailments. Traditionally, the fruits, leaves, bark and roots are perceived to have important medicinal properties (Thomas *et al.*, 2001). Research has demonstrated how careful planting of *Tetrapleura tetraptera* in areas of high *Billharzia* transmission can reduce the rates of infection, offering countries with limited resource a more environmentally and financially friendly way of protecting their populations from this dreaded disease.

It was found that it had anti-ulcer and anti-convulsant properties, confirming its ethno medicinal use to treat these symptoms. The active ingredients were found to be rapidly passed through the mammalian body, with little retention in tissues. They were also found to exhibit very few toxic effects, and were mutagenic only in the presence of other more dangerous chemicals which are not frequently found. (Thomas *et al.*, 2001).

Prekese has many potential uses for instance it is a potential source of raw material for the growing pole industry of Ghana, which is currently based on teak. Farmers are critical of negative environmental impact of teak therefore it is a suitable indigenous substitute which is agro-forestry and environmentally friendly (Adewunmi, 2008).

Biological study has shown that Prekese extract has some useful therapeutic action easing hypertension, and Asthma. Active constituents include Scopletin which appears to have a relaxing action on smooth muscle, helping to ease constriction in the Bronchioles of the lung, and on constricted blood vessels (Adewunmi, 2008). Therefore, there is the need to examine the nutritional and health benefits of consuming tetrapleura tetraptera locally known as prekese in the Ghanaian community.

### **1.3 Purpose of the study**

The main purpose of the study is to examine the use of “prekese” in meal preparation practices of caterers in the Kumasi Metropolis.

### **1.4 Objectives of the study**

The following specific objectives would be used for the study including;

1. To examine the perceptions of caterers on the food and nutritional value of “prekese”.
2. To explore caterers selective practices/patterns of local spices.
3. To examine the specific meals which make use of prekese as a spice.

### **1.5 Research questions**

The research will be guided by the following research questions

1. What are the perceptions of caterers on the food and nutritional value of “prekese”?
2. What are the caterers selective practices/patterns of local spices?
3. What are the specific meals which make use of prekese as a spice?

### **1.6 Significance of the study**

The result of the study will address the need to encourage the consumption of *Tetrapleura tetraptera* in traditional dishes by marketing it in various regions and introducing it in restaurants and school children menus. It will also help to package and market the product internationally, and skills cooking competitions organized in the food industry.

### **1.7 Scope of the study**

The main purpose of the study is to examine the nutritional and health benefits of consuming *Tetrapleura tetraptera* locally known as prekese in the Ghanaian community. It will also seek to solve the wastage of *Tetrapleura tetraptera* when it is in abundance by promoting consumption of the fruit. Moreover, the study will be geographically focused on the Kumasi Metropolis. The study is theoretically, empirically and conceptually limited in scope to the following research objectives including to examine the nutritional and health benefits of consuming *tetrapleura tetraptera* locally known as Prekese in the Ghanaian community, determine the effect of *T. tetraptera* pod extract on the sensory characteristics of Ghanaian dishes, assess the shelf-life of food spiced with *T. tetraptera* pod extract on the local and international market and encourage and promote the consumption of *T. Tetraptera* in the local and international markets.

### **1.9 Organization of the rest of the Study**

This study consists of five Chapters, Chapter one deals with the background to the study, the statement of the problem, research questions and objectives of the study, significance and organization of the study. In Chapter two the researcher reviewed related literature while chapter three deals with the research methodology used in the study. Other aspects of chapter three describes the research design, the population sample and sample procedures, data gathering instruments and data collection procedures of the study, methods of data analysis. Chapter four describes the research findings and the discussion of the main findings and chapter five presents the summary of the findings, conclusions and recommendations and suggestions for further research.

## **CHAPTER TWO**



## LITERATURE REVIEW

### 2.0 Introduction

This chapter reviewed literature regarding Biology and ecology of *Tetrapleura tetrapetra*, Nutrient composition of *Tetrapleura tetrapetra*, Food and medicinal uses of *Tetrapleura tetrapetra*, Nutritional importance of *T. tetraptera*, Medicinal uses of *Tetrapleura tetraptera*, *T. tetraptera* Availability, Essential Oil Composition of *T. tetraptera*, Nutrition Facts of Prekese (*Tetrapleura tetraptera*), How to Use Prekese, The health benefits of consuming tetrapleura tetraptera in the Ghanaian community, Benefits of Tetrapleura Tetraptera (Prekese), The sensory characteristics of tetrapleura tetraptera in Ghanaian dishes and The shelf-life of food spiced with *T. tetraptera* pod extract on the local and international market.

### 2.1 Biology and ecology of *Tetrapleura tetrapetra*

*Tetrapleura tetrapetra* has two varieties, namely *Tetrapleura thoningii* and *Adenonthera tetraptera*, both of which belong to the Genera *Tetrapleura* and of the family *Minosaceae*. The plant is a perennial tree, about 30 m high and found in the lowland forest of tropical Africa particularly in the West Central and East Africa. The fruit consists of a fleshy pulp with some small brownish black seeds. The fruits are green when tender but dark, reddish brown when fully ripe. The fruit has four longitudinal wing-like fleshy ridges of about 10 cm broad with two of the ridges hard and woody while the remaining two are soft and fluffy. The fruits have fragrance, pungent aromatic odour.

It is a single-stemmed, robust, perennial tree of about 30m. It has a grey/brown, smooth/rough bark with branches. The flower is yellow/pink and racemes white. The fruit has dark brown, four winged pods (12–25cm x 3.5–6.5cm). It is generally found in the lowland forest of tropical Africa. The fruit consists of a fleshy pulp with small, brownish-black seeds. The fruit possesses a fragrant, characteristically pungent aromatic odour, which acts as an insect repellent and a spice in foods (Aladesanmi, 2007). The dry fruit has a characteristic aroma which makes it a popular seasoning spice in Southern and Eastern Nigeria (Essien *et al.*, 2014).

The fruit shell, fruit pulp and seed contain varying amounts of nutrients such as protein, lipids and minerals which are comparable to and some are even higher than popular spices and ginger (Essien *et al.*, 2014). It is also a source of minerals e.g. calcium, phosphorus, potassium, zinc and iron. The plant has many traditional uses, mainly in the management of convulsion, leprosy, inflammation and rheumatic pains, schistosomiasis, asthma and hypertension (Ojewole and Adesina, 2012). The ethanol extract and saponins from the bark of the stem exerts an inhibitory effect on luteinizing hormone released by pituitary cells, suggesting its use as contraceptive agent (El-Izzi *et al.*, 2010).

It is used extensively in soups for nursing mothers to prevent post-partum contractions (Nwawu and Akali, 2016) and gastro-intestinal disorders especially stomach ulceration (Noamesi *et al.*, 2012).

### **2.1.1 Nutrient composition of *Tetrapleura tetrapetra***

The shells, pulps and seeds of both fresh and dry fruits of *Tetrapleura tetrapetra* have varying amounts of protein, lipids and minerals, all of which are comparable and in some

cases even higher than those of popular spices such as red pepper, onion, curry and ginger ((Essien *et al.*, 2014). Crude protein is very low in the fleshy mesocarp (2.12 %) and seed (0.51%) but is not at all in the woody mesocarp (Essien *et al.*, 2014). Both fresh fruits and seeds are rich in potassium, iron, magnesium and phosphorus but low in sodium. The fruits have less than 5 mg / 100 g of zinc and nickel. Sucrose and fructose occur in traces in both the fruits and seeds.

The dried fruits have 7.44 % to 17.50 % crude protein, 17.0 % to 20.24 % crude fibre, 4.98 to 20.36 % lipid, 43.18 % to 49.06 % carbohydrate and 234.42 g / cal to 379.48 g / cal food energy (Okwu, 2013). The fruit oil is a good drying oil with a few unsaturated bonds. The seeds have the amino acids L-r- methylene glutamic acid and L-r- ethyldiene glutamic acid (Gmelin and Olesen, 2007).

The fruit contains cinnamon and caffeine acids (Adesina *et al* 2010). The fruit also contains the essential oils saponosides triterpenes, - aessculetin, caumarins, tannins, steroids and triterpene glycosides. Also present in the fruit are the phytochemicals, oxalates (8.14 to 16 Mg / 100 g), tannins (16.5 to 35.7 mg / 100 g) and hydrocyanic acid (hydrogen cyanide) (98 to 100 mg/100 g), saponins, alkaloids, steroids and flavonoids.

### **Food and medicinal uses of *Tetrapleura tetrapetra***

The fruits are used locally in Ghana and Nigeria for food flavouring, in soap and pomade preparations. The fruit is premixed with soap base made from palm kernel oil or shear butter to improve the foaming properties of the soap (Adebayo *et al.*, 2000). Convalescents bathe with the infusion of the fruit for healing. The bark, root and fruit of

the plant are used in the management of convulsion, leprosy, inflammation and rheumatic pains (Dalziel, 2008; Adesina *et al.*, 2010).

Infusion of the whole fruit is taken as a recuperative tonic (Ojewole and Adesina, 2013). Saponin extracted from the fruits has been proven to be a potent hypotensive and nonsposmolytic agent in traditional infusion (Obidoa and Obasi, 2011). In Eastern Nigeria, the fruits are used to prepare pepper soups for mothers after labour to prevent postpartum contraction (Nwawu and Akah, 2016), and also for normal cooking for its flavouring and cleansing effects. Extracts of the fruits exhibit anti-ulcer activity, confirming its use in ethnomedical medicine to treat ulceration in gastro-intestinal disorder (Noamesi *et al.*, 2012).

### **2.1.2 Nutritional importance of *T. tetraptera***

The fruit shell, fruit pulp and seed contained varying amounts of nutrients such as protein, lipids and minerals which are comparable and some are even higher than popular spices and ginger (Essien *et al.*, 2014). Okwu (2013) reported that the proximate composition of *T. tetraptera* as follows: crude protein (7.44% - 17.50%), crude lipid (4.98% - 20.36%), crude fibre (17% - 20.24%), carbohydrate (43.18% - 49.06%) and food energy (234.18% - 42,379.48 gl Cal). The species is also a source of minerals e.g. calcium, phosphorus, potassium, zinc and iron. In Ghana, it is used as a source of vitamins in diets (Okwu, 2013). According to Abii and Amarachi (2007), it was observed that the dry fruit of *tetrapleura tetraptera* contains 9% ash, 4% oil and 3% moisture.

### 2.1.3 Medicinal uses of *Tetrapleura tetraptera*

The plant has many traditional uses, mainly in the management of convulsion, leprosy, inflammation and rheumatic pains, schistosomiasis, asthma and hypertension (Ojewole and Adesina, 2013). The ethanol extract and saponins from the bark of the stem exerts an inhibitory effect on luteinizing hormone released by pituitary cells, suggesting its use as contraceptive agent (El-Izzi *et al.*, 2010). It is used extensively in soups for nursing mothers to prevent post-partum contractions (Nwawu and Akali, 2016) and gastro-intestinal disorders especially stomach ulceration (Noamesi *et al.*, 2012). Phytochemical screening revealed the presence of tannins phenolic compounds, saponins, alkaloids, steroids and flavonoids which are assumed to be responsible for its varied biological and pharmacological properties (Okwu, 2013).

### 2.1.4 *T. tetraptera* Availability

*T. tetraptera* is common on the fringe of the West African rainforest belt. Trees are widespread in the forests of tropical Africa, especially secondary forest. The species is found throughout the high forest zone, in the southern savannah-woodland and in the forest outliers of the African plains (Orwa *et al.*, 2009). The tree is deciduous, losing its leaves in December. Flowering begins towards the end of February and ends in early April. The indehiscent pods mature and ripen from September to December. When the pods fall, their scent attracts rodents, which probably disperse the seeds (Orwa *et al.*, 2009).

### 2.1.5 Essential Oil Composition of *T. tetraptera*

Udourioh and Etokudoh (2014) reported forty-four compounds representing 98.5% of the essential oil from the dry pods, using gas chromatography mass spectrophotometry

(GC-MS). The predominant chemical constituents of the oil were acetic acid (34.59%), 2-hydroxy-3-butanone (18.25%), butanoic acid (8.35%), 2-methyl butanoic acid (7.58%), 2-methyl butanol (7.45%), butanol (4.30%), 2-methyl butanoic acid (3.65%), nerol (3.25%), 2-methyl butenoic acid ethyl ester (2.70%), 2-methyl butanoic acid ethyl ester (2.09%) and linalool (1.84%). The oil is dominated by carboxylic acid which gives an entirely different report from that of essential oil results obtained from other spices by Onyenekwe *et al.* (2007), Karioti *et al.* (2014), Ekwenye and Okorie (2010) and Abugri and Pritchett (2013). Terpene constituents which often dominate most essential oils as observed in other spices were detected as minor or trace constituents in *T. tetraptera* (Udourioh and Etokudoh, 2014).

For example,  $\beta$ -caryophellene was 0.1%,  $\alpha$ -pinene (0.1%),  $\beta$ -pinene (0.2 %), myrcene (0.09 %),  $\gamma$ -terpinene (0.2 %), whereas reports on essential oils of *Piper guineense* showed  $\beta$ -caryophellene (20.8 %),  $\beta$ -pinene (12.15%),  $\alpha$ -pinene (10.6%), myrcene (1.8%) and  $\gamma$ -terpinene (4.9%) (Karioti *et al.*, 2014; Ekwenye and Okorie, 2010; Abugri and Pritchett, 2013). Linalool constitutes 1.8% of the essential oils and this account for the pepperish nature of the plant (Udourioh and Etokudoh, 2014).

### 2.1.6 Description

Prekese is a deciduous tree that sheds its leaves annually and grows approximately 20 to 25 meters in height. It is distinguished by round smallish crown that tends to flatten when old. Younger trees of *Tetrapleura tetraptera* have slender bole however, the older ones have low and sharp buttresses. The grey-brownish bark has a very smooth texture while the leaves are glabrous and hairy in appearance. It bears up to 5-10 pairs of pinnae that

measure approximately 5 to 10 cm long with 6 to 12 leaves on both sides of the pinna stalk. The top of the tree can be marginally notched sometimes while the base is basically hairless with slender stems (Abii, and Amarachi, 2007).

Tetrapleura tetraptera bears flowers that are sort of cream and pink in colour but they tend to change to orange colour on maturity. The flowers are located in the upper leaf axils and are always in pairs with short stamens and slender stalks. The aridan fruit hangs on stout stalks at the edges of the branches and they are characteristically brownish in colour. The fruit (pod) measures about 15 to 25 cm long and is distinguished by its 4 longitudinal ridges that are slightly curved. Two of the ridges are woody while the other two contains soft, aromatic and oily pulp. The pod contains tiny, hard seeds that measure approximately 8 mm long. The fruit is distinguished by its fleshy pulp when fresh but this fleshy pulp tends to be very strong when dried. The inner part of the aridan fruit is characterised by tiny black-brownish seeds (Aderibigbe, Iwalewa, Adesina and Agboola, 2010).

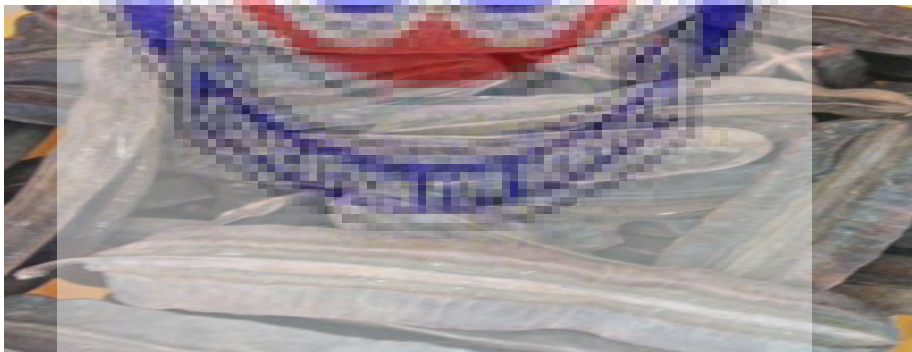


Figure 2.1: Prekese pods

Prekese is highly sought after due to its high medicinal and aromatic values and as such it is used for several purposes ranging from culinary, healing, therapeutic to

cosmetology. Researchers also reveal that this plant has anti-inflammatory, hypotensive, neuromuscular, cardiovascular, anti-ulcerative, molluscicidal and anti-microbial properties (Aderibigbe, *et al*, 2010).

### **2.1.7 Nutrition Facts of Prekese (*Tetrapleura tetraptera*)**

Prekese is highly valuable because it contains a high amount of essential phytochemicals and nutrients that are vital for the healthy functioning of the body. It is an excellent source of potassium, iron, calcium, zinc, flavonoids, phosphorous, tannins, alkaloids, saponins, steroids and phenolic compounds. It also contains 234.42 to 379.48g/cal of food energy, 7.44% to 17.50% of crude protein and 4.98% - 20.36% of crude lipid (Aderibigbe, *et al*, 2010).

### **2.1.8 How to Use Prekese**

Prekese pods can be crushed, ground, grated or broken into tiny pieces before adding to food or using for medicinal purposes. Alternatively, the pod can be broken into two or added whole to food during preparation but in this case, remember to scoop it out from the food before serving. It is important to add this spice a lot more earlier in the food while cooking so that it can infuse properly for more flavourful and aromatic smell. For herbal medicines, the stem, bark, root, leaves and pods of prekese can be infused, boiled, soaked, squeezed, extracted, crushed or transformed into concoctions.



## **2.2 The health benefits of consuming tetrapleura tetraptera in the Ghanaian community.**

Prekese or Tetrapleura tetraptera is a native of west tropical Africa and belongs to the pea family. The fruits of the plant have a pungent aromatic odor due to which it also possesses insect repellent properties. It is primarily used as spices. It is used as medicinal plant primarily in Ghana and Nigeria and other African countries. Some of the top diseases for which it is used medicinally are inflammation, convulsions, skin ailments like leprosy, and rheumatoid pains. Prekese is also called as Uyayak, Edeminang, Osakirisa, Osho, Dawo, Ojewole, and Adewunmi. Prekese is a rich source of antioxidants and has a high concentration of vitamins, minerals, and phytochemicals. It also does have anti-inflammatory properties. Its leaves bark and above all fruits contain medicinal properties (Abii, and Amarachi, 2007).

Over the past years, plants have become an indispensable source of food and medicine. To a larger extent, most people depend greatly on medicinal plants as an important source of remedy and treatment for most casual and life-threatening diseases. As a result, there is a growing demand all over the world for these medicinal plants. Aside from tackling diseases, people are resorting more to these medicinal plants as a means of reducing the use of chemical (orthodox) medicines that could potentially be detrimental to human health. Interestingly, most of these plants are used in our everyday cooking as herbs, spices, seasonings and preservatives. But the truth is that we often consume most of these essential medicinal plants in the form of spices without even acknowledging what our bodies gain from them (Abii, and Amarachi, 2007).

Furthermore, the use of these medicinal plants as food, preservatives, spices and as instrument for preventing and tackling the development of microorganisms in human bodies has become an area of extensive studies. One of such valuable medicinal plants is Prekese.

## **2.3 Benefits of Tetrapleura Tetraptera (Prekese)**

### **2.3.1 Contraceptive Properties**

Saponin and ethanol extract from the stem and bark of this plant has an inhibitory effect on luteinizing hormone released by the pituitary gland. This suggests why this plant equally serves as a contraceptive (Adetunji & Aladesanmi, 2016).

### **2.3.2 Management of convulsion**

In folk medicine, both the stem, leaves and fruit of the prekese are used for producing herbal concoction for managing convulsion. Studies reveal that the aqueous extract of this plant exhibits anticonvulsant activities and this confirms its inhibitory effects on the central nervous system. In traditional medicine, herbal mixture out of ingredients including stem, fruit, and leaves has a positive effect on treating convulsions. As per a study done at University of KwaZulu-Natal it was found that aqueous extract of the fruit contains anticonvulsant properties. It is also helpful for epilepsy patients in management and control of the condition. The fruit extract has the ability to slow down the nervous system (Adetunji & Aladesanmi, 2016).

### **2.3.3 Management of Leprosy**

Studies reveal that prekese can be used for treating leprosy, which is an infectious disease that affects mainly the skin, nerves and the mucous membranes thereby causing

blemishes and lumps on the skin. Severe cases of leprosy can lead to deformities and mutilation (Akah and Nwabie, 2013).

#### **2.3.4 Anti-inflammatory Properties**

The extract of this plant is known for its anti-inflammatory properties and this suggests its inhibitory impacts against certain human pathogens. As a result, it can be used for reducing inflammation of the body, arthritic pains and rheumatoid pains (Akah and Nwabie, 2013).

#### **2.3.5 Antimicrobial**

Due to the antibacterial and antimicrobial property of the prekese, the fruit extract is used in making of soap. The soap does not only have medicinal benefits for skin but it also improves the hardness and the foaming (Bella *et al.*, 2013).

#### **2.3.6 Culinary Purposes**

Dried taub fruit is known for its distinguished aromatic and flavorful fragrance and as such used as a spice for flavouring assorted dishes such as meat pepper soup, palm kernel soup (banga soup or ofe akwu), nsala (white soup), fish pepper soup etc. To use this spice, you can either crush it before adding to food or break into smaller portions before adding in the food while cooking (Bella *et al.*, 2013).

#### **2.3.7 Supports the Cardiovascular System**

Prekese supports the cardiovascular system due to its constituents of essential phytochemical and as such can be used for preventing and treating heart diseases (Bella *et al.*, 2013).

### **2.3.8 Molluscicidal Properties**

Studies reveal that the aqueous extracts from the stalk, leaves, stem, bark and roots of the prekese plant contain molluscicidal properties. This suggests why this plant acts as a pesticide for fighting against molluscs and pests. Prekese is normally used in gardening, planting and agriculture for offering protections and control against gastropod pests especially snails and slugs that feed on/damage crops and other valuable plants in the farmland (Effiong *et al*, 2014).

### **2.3.9 Dermatological Care**

The fruit can be dried and blended into powdered form for producing dermatological products such as soap. The great attention drawn towards the use of this plant for manufacturing soap is due to its high antimicrobial and antibacterial properties. It is worthy to note that the aridan plant helps to promote soap foaming as well as its hardness. To make soap with prekese, the dried powdered herbs can be combined with shea butter, palm kernel oil or any other bases of choice. Soaps produced with these three key ingredients have superior qualities unlike those with individual base (Effiong *et al*, 2014).

### **2.3.10 Treatment of Hypertension**

In folk medicine, the stem and bark extracts of taub (*Tetrapleura tetraptera*) can be used for preventing and treating hypertension. Researchers agree that *Tetrapleura tetraptera* is effective for preventing high blood pressure and for improving the oxidative position in salt model of hypertension patients (Effiong *et al*, 2014).

### **2.3.11 Treatment of Diabetes**

The stem and bark extracts of *Tetrapleura tetraptera* (Taub) can be used for preparing herbal medicines for treating diabetes (Effiong *et al*, 2014).

### **2.3.12 Supports the Immune System**

Being an excellent source of key vitamins such as potassium, iron, calcium, magnesium and zinc, aridan helps to strengthen our immune system. Iron helps to regenerate lost blood, zinc offers protection against viruses especially those that can cause respiratory tract infections while calcium and potassium helps to manage, prevent and control bones and muscles disorders (Effiong *et al*, 2014).

### **2.3.13 Post-partum Care**

Prekese pod is traditionally used for preparing special soups for newborn mothers immediately they put to bed in order to avoid post-partum contraction. Although Prekese can be used alone for this sort of postnatal soup preparation however, it can be used together with piper guineese, gongronema latifolium and scotch bonnet pepper for superior action. Using this spice for post-partum care is attributed to its high constituents of calcium, iron and potassium, which are very important for new mothers. Furthermore, it helps to restore and replenish lost blood for new mothers and promotes lactation. Prekese pod is used as an additive in the soup which is served to postpartum mother to avoid contraction. The pods are rich in potassium, iron, and calcium which are the three most important ingredients required for postpartum woman. The soup also helps in the production of milk in new mothers and helps to restore the lost blood (Ekwenye, *et al*, 2010).

### **2.3.14 Wound Healing Properties**

Wet fruit extract of the dry prekese has very good wound healing properties. Traditionally the aqueous extract from the fruit is used for healing which is proved scientifically too. However, the low concentration (200mg/ml) of the extract proved to be more efficient than when high concentration (2000mg/ml) extract was taken. The study was done at the University of Uyo. To have best effects always use the fruit extract in low concentration for healing wounds. Prekese pods contain essential chemical compounds such as flavonoids, triterpenoid glycoside (aridanin) and phenols, which have been reported effective for healing wounds (Ekwenye, *et al*, 2010).

### **2.3.15 Anti-oxidizing Properties**

Prekese is an excellent source of antioxidants such as polyphenols, alkaloids, tannins and flavonoids. Antioxidants help to protect our body from oxidative damage by scavenging for free radicals thereby preventing peroxidation. It is important to note that free radicals and reactive oxygen species formed during oxidation process contribute immensely to diseases such as cardiovascular diseases, cancer, diabetes as well as ageing. Prekese fruit has a remarkable chemodiversity due to its constituents of polyphenols. It also has a strong radical reducing and scavenging abilities (Ekwenye, *et al*, 2010).

### **2.3.16 Treatment of Asthma**

Traditionally, this plant can be used for treating asthma.

### **2.3.17 Treatment of Schistosomiasis**

Studies reveal that Prekese can be used for treating schistosomiasis. This is an infection that is also known as snail fever or bilharziasis caused by parasitic flukes of the genus *Schistosoma*. This infection occurs mainly in the tropical regions and eastern Asia and is mostly transmitted to humans through snails or fecal-contaminated fresh water. Common symptoms of schistosomiasis include anemia, pain, fever and breakdown of the infected organs (Ekwenye, *et al*, 2010).

### **2.3.18 Treatment of Gastrointestinal Disorders**

The fruit can be used for treating gastrointestinal disorders such as stomach pain, diarrhea, vomiting etc due to its constituents of phytochemicals.

### **2.3.19 Antibacterial Ability**

Researchers reveal that water extracts and alcoholic mixture of the Prekese fruit can inhibit the growth of *Staphylococcus aureus*. The presence of glycosides and tannins in ethanolic and water extracts of Prekese have been proven effective for inhibiting the growth of bacteria (Ekwenye, *et al*, 2010).

### **2.3.20 Analgesic Properties**

In the same study mentioned above, it was also found that Prekese contains strong analgesic properties. Due to this, the extract is often used to manage arthritic pain. It reduces inflammation in arthritis and rheumatism patients (Ekwenye, *et al*, 2010).

### **2.3.21 Fever & Enema**

A person who is recovering from a medical condition is often asked to bathe with water soaked with whole fruit. This also gives fast relief from feverish conditions. Similar infusion also helps people suffering from constipation, enema, and emetic (Ekwenye, *et al*, 2010).

### **2.3.22 Flavonoids & Phenolic Acids**

Prekese is rich in flavonoids which possess antioxidant and anti-inflammatory benefits. These properties of the fruit help in the prevention of heart diseases. Phenolics extract of the fruit was found to be beneficial in prevention and control of hyperuricaemia. This is attributed to its phenolic acids and flavonoids content (Ekwenye, *et al*, 2010).

### **2.3.23 Diabetes**

As per a study done on rats, it was found that *Tetrapleura tetraptera* or Uyayak is very beneficial in controlling type 2 diabetes mellitus. It was also found that prekese fruit extract was beneficial in lowering blood glucose levels in both fasting and nonfasting conditions.

### **2.3.24 Mosquito Repellant**

The fruit has a strong smell due to which it is often used as the mosquito repellant and is effective too. This property is attributed to the presence of essential oils in it.

### **2.3.25 Gastrointestinal Disorders**



Its uses in gastrointestinal-related ailments could be attributed to the presence of phytochemicals. The fruit extract is often used traditionally in curing problems like diarrhea, vomiting or stomach pain. Prekese is often called as wonder fruit due to its immense medicinal properties and effective health benefits in curing lot of diseases (Ekwenye, *et al*, 2010).

#### **2.4 The sensory characteristics of tetrapleura tetraptera in Ghanaian dishes.**

Boateng, Dari, Adzitey, & Teye, (2015) carried out their research to determine the effect of “prekese” (Tetrapleura Tetraptera) seed powder on the sensory characteristics and nutritional qualities of pork sausage. A total of 4kg of minced pork was used. The pork was divided into four equal parts (1kg per treatment). Each treatment contain the following: (T1) control (without PSP), (T2) with 3g of PSP, (T3) with 4g of PSP and (T4) with 5g of PSP. The sausages were stuffed into casing and vacuum sealed in transparent polythene bags and refrigerated at 2°C for laboratory and sensory analysis. The sensory analysis was conducted to determine the effect of ‘prekese’ seed powder on the sensory characteristics of the product. Crude fat, crude protein, moisture content and pH were determined to find out the effect of the seed powder on the nutritional qualities of the products. The results showed that, the inclusion of up to 5g of PSP has no significant effects on taste, colour, prekese flavour, aroma and overall-liking. There were no significant differences ( $P > 0.05$ ) in the crude fat of the products but there were significant differences ( $P < 0.05$ ) in terms of moisture, crude protein and pH. Crude protein of T1, T3 and T4 were significantly higher ( $P < 0.05$ ) than T2. The moisture content of T2 product was the highest followed by T4, T1

and T3. pH of the products T1, T2 and T3 were significantly higher ( $P < 0.05$ ) than T4 (Boateng, *et al*, 2015)

## 2.5 The shelf-life of food spiced with *T. tetraptera* pod extract on the local and international market

According to Achi, (2016), the biological active components from pods of *Tetraptera tetrapleura* Taub were analysed by phytochemical methods and spectral analyses. The main components were tannins and glycosides. Antibacterial activity, determined with the impregnated paper disc methods, was observed against four typed bacterial strains, *Staphylococcus aureus* ATCC 12600, *Bacillus subtilis* (ATCC6051), *Pseudomonas aeruginosa*, (ATCC10145) and *Escherichia coli* (ATCC11775). The activity was particularly high against *Staph aureus*, *P. aeruginosa* and *E. coli*, which are common foodborne bacteria. Minimum inhibitory concentrations of the extract were determined to be 250 g mL<sup>-1</sup> against *E. coli*, *Staph aureus* and *P. aeruginosa* or 500 g mL<sup>-1</sup> against *B. subtilis*. The addition of 4% (v/v) of the extract to culture broth reduced the viable counts of the test organisms from 2 to 6 log factors after incubation at 37°C for 24 h. In general, a lower activity was observed in the presence of *B. subtilis*. With the increase of concentration, the antibacterial activity of the extracts also increased. These results suggest the potential use of the above extract for reducing the number or preventing the growth of pathogens in food systems and therefore, increasing the shelf life of the food spiced with Prekese.

Spices and herbs have been reported to be potent sources of natural antioxidants. Spices are known to impact flavour and improve overall organoleptic quality of foods. The

use of naturally occurring materials like spices as preservatives has been proved to be a promising alternative to the use of chemicals. The effects of *Aframomum danielli* and *Zingiber officinale* crude extract on the storability of fried bean cake snacks were investigated. Proximate and sensory analyses of the snack were also assessed. The fried bean cakes were spiced with 0.2, 0.4, 0.6, 0.8 and 1% of both spices, the untreated sample was also prepared making a total of 11 samples. Proximate analyses revealed that moisture ranged from 0.85-1.05%, protein 80.00-78.70%, fat 2.09-1.08%, ash 1.50-1.30%, fibre 2.00-1.80%, carbohydrate 10.25-12.75% and dry matter 3.52-2.30%. Sensory evaluation shows that there was no significant difference ( $p < 0.5$ ) among the treated and untreated samples in terms of all the sensory attributes evaluated. Storage stability test also indicated the preservative effects of the incorporated extracts on spoilage microorganisms at ambient temperature when compared to the control sample. There was, with respect to concentration of extract added, little significant difference in preservative effect between samples preserved with alligator pepper and ginger extracts. Conclusively, the fried bean cake snacks treated with 0.2% and 0.4% of both spices were more acceptable generally and stable than the ones treated with 0.6 and 0.8% of both spices. The fried bean cake snacks treated with 1% of both spices were unacceptable in terms of all the sensory attributes evaluated.

It has long been recognized that some plant materials exhibit antimicrobial properties. The use of these plant materials as preservatives and as means of preventing microorganism development in foods has become the subject of extensive studies (Gould, 2006). In particular, the inhibitory effects of extracts of many kinds of herbs and spices against food borne spoilage bacteria and pathogens have been reported. Among these are cassia, clove,

garlic, sage, oregano, pimento, thyme and allspice (Shelef, 2013; Zaika and Kissinger, 2011).

Currently, there is growing demand worldwide of consumers for minimizing chemical preservation that can be detrimental to human health (Cho *et al.*, 2015; Smid and Gorris, 2009). Consequently, spices, herbs and naturally occurring phenolics from various plants sources are being studied in detail in response to consumer requirements for fresher and more natural additive-free products (Nychas, 2015; Tassou *et al.*, 2007).

*Tetrapleura tetraptera* Taub, family Mimosaceae, locally known as *oshosho* in South eastern Nigeria has widely varied applications in Nigerian folk medicine. The pods notably have an appealing culinary use. Apparently, they are used to prepare soups for mothers from the first day of delivery to relieve post parturition contraction and as a lactation aid (Enwere, 1998). The antimicrobial activity of this plant has been exploited in the formulation of the dried powdered fruits of the plant. Thus dried powdered herbs have been formulated into soap bases using palm kernel oil (Adebayo *et al.*, 2010). At the same time most of the folkloric claims agree in the traditional use of the fruit for management of convulsion, leprosy, inflammation and rheumatoid pains (Dalziel, 2008).

The molluscicidal activity of the extracts from the leaf, leaf stalk, stem-bark, root-bark have been exploited for long, but studies on the antibacterial effects of the essential oil from its fruits are scarce. Given the limited research information in this area the purpose of this study was to examine the antibacterial effects of the essential oil of the pods of *T. tetraptera* extracted using different solvents, to identify the chemical components of the extract and to determine at which concentration they were bacteriostatic and bactericidal

to some food borne pathogenic bacteria. Such studies are essential if the full potential of *T. tetraptera* as a pharmacologic preparation in increasing the shelf-life of foods is to be exploited.



## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.0 Introduction

In this chapter an attempt is made to look at the research design, target population, data sources, sampling procedures (size and technique), data collection instruments, fieldwork/ data collection and data analysis.

#### 3.1 Research Design

The research design includes an outline of what the researcher is writing on including their operational implications to the final analysis of the data. This study adopted the case study strategy. Among the various research designs, case studies are frequently regarded as using both quantitative and qualitative research and a combination of both approaches (Bryman, 2004). The researcher used both primary and secondary data sources, which were considered to be more appropriate for this study. These types of research were used because it eventually enables the researcher to make judgement about the effectiveness, relevance or desirability of the programme. Research methods can be placed into two basic categories: quantitative or qualitative. Qualitative research gathers information that is not in numerical form.

For example, diary accounts, open-ended questionnaires, unstructured interviews and unstructured observations. Qualitative data is typically descriptive data and as such is harder to analyze than quantitative data. Qualitative research is useful for studies at the individual level, and to find out, in depth, the ways in which people think or feel (e.g. case

studies). The researcher used both qualitative and quantitative research approach for the study.

### **3.2 Population**

The population for the study was ninety (90). The population of the study was made up of selected caterers in the Kumasi Metropolis.

### **3.3 Sampling Procedure and Sample Size**

The ever increasing need for a representative statistical sample in empirical research has created the demand for an effective method of determining sample size. To address the existing gap, Krejcie & Morgan (1970) came up with a table for determining sample size for a given population for easy reference. According to the Krejcie & Morgan (1970), table of determining sample size, a population of 90 requires a sample size of 73. A sample size of seventy three (73) would be chosen for the study. Random sampling method would be adopted for the study. The primary intention of the study is to gain an insight into the use of “prekese” in meal preparation practices of caterers in the Kumasi Metropolis. As a result of this, local restaurant operators’ would be approached and questioned with well-designed questionnaires.

Random sampling technique would be used to select caterers who frequently use “prekese” to spice up their local dishes. This method of sampling therefore would ensure that all participants have an equal opportunity of being selected for the study. From a review of literature, a survey questionnaire would be developed to collect data for the study. Data would be collected through the use of a written questionnaire hand-delivered to

participants in their chop bars at Kumasi Metropolis. Questionnaires would be filled out by participants and returned to the researcher. Customers would be approached to answer the questionnaires at the premises of the selected local restaurant operators. Numbers 1-80 would be written on white papers including blank papers, participants who would pick the first 73 papers would form part of the research.

### **3.4 Data Collection Instrument**

The instruments used to collect primary data for the study would be questionnaire. Likert scale would be used as categories mainly ranging from strongly disagree, disagree, neutral, agree to strongly agree. The study also obtained information from the respondents using face to face interview. These interviewed participants would be chosen purposively.

### **3.5 Pre-testing of Questionnaire**

The pilot questionnaire would be given to 10 people to answer to correct errors which could take the form of repetition of questions and typographical mistakes and the avoidance of double questions.

### **3.6 Data Collection Procedure**

Primary data would be collected through a field survey of traditional restaurant operators and customers in the Kumasi Metropolis. Data would be collected through the use of a questionnaire and interview guide administered to participants in their restaurants. Questionnaires would be filled out by participants and the researcher had to go for the



questionnaires on the same day. However, the researcher interviewed traditional restaurant operators at their leisure time.

### **3.7 Data Analysis**

The data would be coded to enable the respondents to be grouped into limited number of categories. The SPSS version 18 would be used to analyse data. Data would be presented in tabular form, graphical and narrative forms. In analyzing the data, descriptive statistical tools such as bar graph and pie charts would be used.



## CHAPTER FOUR

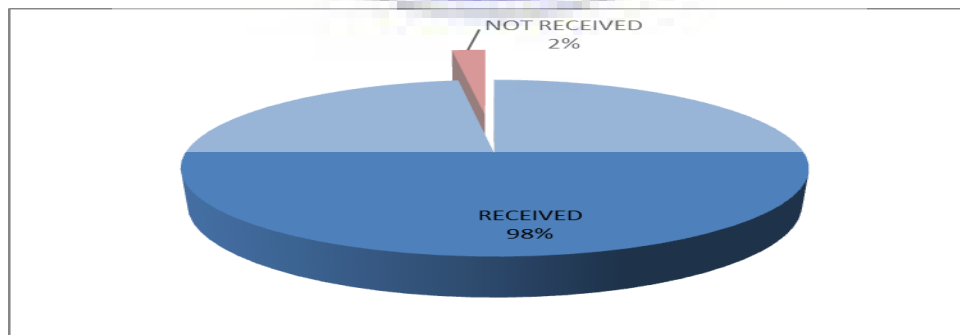
### RESULTS OF THE STUDY

#### 4.1 Introduction

The main purpose of the study is to examine the use of “prekese” in meal preparation practices of caterers in the Kumasi Metropolis. The following specific objectives would be used for the study including examining the perceptions of caterers on the food and nutritional value of “prekese”. Secondly, to explore caterer’s selective practices/patterns of local spices and to examine the specific meals which make use of prekese as a spice. The analysis of the study was based on these research objectives of the study.

#### 4.2 Response Rate

The researcher sent a total of 70 questionnaires to gather information from the respondents. Out of 70 questionnaires sent out for primary data, 69 questionnaires were received while 1 questionnaire was not received. Therefore, the analysis of the study was based on 98% response rate (see Figure 4.1).



**Figure 4.1: Response rate of the questionnaires**

### 4.3 Demographic Information of the Respondents

Table 4.1 shows the demographic information of the respondents including the respondent's gender, age ranges, and highest educational qualification.

**Table 4.1 Demographic Information of the Respondents**

<i>Gender</i>	<i>Frequency</i>	<i>Percent</i>
Male	32	46.4
Female	37	53.6
Total	69	100.0
<b>Age ranges</b>		
19-29 years	2	2.9
30-39 years	15	21.7
40-49 years	16	23.2
50-59 years	19	27.5
60-69 years	12	17.4
above 70 years	5	7.2
Total	69	100.0
<b>Highest educational background</b>		
Never	7	10.1
BECE	16	23.2
SSSCE/WASSCE	17	24.6
Diploma	19	27.5
Bachelors' degree	7	10.1
Masters' degree	3	4.3
Total	69	100.0

n=69

Source: Field survey, 2018

Table 4.1 shows that 37 respondents representing 53.6% were females while 32 respondents representing 46.4% were males. Moreover, 19 respondents representing 27.5% were between the age ranges 50-59 years, 16 respondents representing 23.2% were between the age ranges 40-49 years, 15 respondents representing 21.7% were between the age category 30-39 years, 12 respondents representing 17.4% were between the age ranges 60-69 years, 5 respondents representing 7.2% were above 70 years, while 2 respondents representing 2.9% were between the age ranges 19-29 years.

Furthermore, 19 respondents representing 27.5% were Diploma holders, 17 respondents representing 24.6% were holding SSSCE/WASSCE certificates, 16 respondents representing 23.2% were possessing BECE as their highest academic qualification, 7 respondents representing 10.1% said that they do not have formal education and Bachelor's degrees respectively, while 3 respondents representing 4.3% had Masters degrees.

#### **4.4 The Perceptions of Caterers on the Food and Nutritional value of “Prekese”.**

Table 4.2 reveals the perceptions of Caterers on the Food and Nutritional value of “Prekese”.

**Table 4.2 The Perceptions of Caterers on the Food and Nutritional value of “Prekese”.**

<i>STATEMENT</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Total</i>
	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>	<i>n(%)</i>
Prekese fruit can serve as a contraceptive	6 (8.7)	4 (5.8)	59 (85.5)	69 (100)
Management of convulsion and Leprosy	4 (5.8)	3 (4.3)	62 (89.9)	69 (100)
Prekese can be used for reducing inflammation of the body, arthritic pains and rheumatoid pains.	5 (7.2)	4 (5.8)	60 (87)	69 (100)
Due to the antibacterial and antimicrobial property of the prekese, the fruit extract is used in making of soap.	7 (10.1)	5 (7.2)	57 (82.6)	69 (100)
Prekese supports the cardiovascular system due to its constituents of essential phytochemical and as such can be used for preventing and treating heart diseases.	8 (11.6)	5 (7.2)	56 (81.2)	69 (100)
Researchers agree that <i>Tetrapleura tetraptera</i> is effective for preventing high blood pressure and for improving the oxidative position in salt model of hypertension patients.	5 (7.2)	5 (7.2)	59 (85.5)	69 (100)
Prekese is used in the treatment of diabetes and supports the immune system	6 (8.7)	4 (5.8)	59 (85.5)	69 (100)
Prekese pod is traditionally used for preparing special soups for newborn mothers immediately they put to bed in order to avoid post-partum contraction.	6 (8.7)	2 (2.9)	61 (88.4)	69 (100)
Traditionally, this plant can be used for treating asthma.	4 (5.8)	8 (11.6)	57 (82.6)	69 (100)
Prekese can be used to treat Fever & Enema	6 (8.7)	3 (4.3)	60 (87)	69 (100)

n=69

Source: Field survey, 2018

Table 4.2 reveals that 59 respondents representing 85.5% agreed that prekese fruit can serve as a contraceptive, 6 respondents representing 8.7% disagreed, while 4 respondents representing 5.8% were neutral. This result is in agreement with Adetunji & Aladesanmi

(2016), they revealed that Saponin and ethanol extract from the stem and bark of this plant has an inhibitory effect on luteinizing hormone released by the pituitary gland. This suggests why this plant equally serves as a contraceptive.

Also, 62 respondents representing 89.9% agreed that prekese can be used to manage convulsion and Leprosy, 4 respondents representing 5.8% disagreed, while 3 respondents representing 4.3% were neutral. This result is in agreement with Akah and Nwabié, (2013), studies reveal that prekese can be used for treating leprosy, which is an infectious disease that affects mainly the skin, nerves and the mucous membranes thereby causing blemishes and lumps on the skin. Severe cases of leprosy can lead to deformities and mutilation

Furthermore, 60 respondents representing 87% agreed that prekese can be used for reducing inflammation of the body, arthritic pains and rheumatoid pains, 5 respondents representing 7.2% disagreed, while 4 respondents representing 5.8% were neutral. The study result indicates that due to the antibacterial and antimicrobial property of the prekese, the fruit extract is used in making of soap, 7 respondents representing 10.1% disagreed, while 5 respondents representing were neutral.

To add more, 56 respondents representing 81.2% agreed that prekese supports the cardiovascular system due to its constituents of essential phytochemical and as such can be used for preventing and treating heart diseases, 8 respondents representing 11.6% disagreed, while 5 respondents representing 7.2% were neutral. This result concord with Bella *et al.*, (2013), they revealed that prekese supports the cardiovascular system due to its constituents of essential phytochemical and as such can be used for preventing and treating heart diseases.

The study results revealed that 59 respondents representing 85.5% agreed that *Tetrapleura tetraptera* is effective for preventing high blood pressure and for improving the oxidative position in salt model of hypertension patients, while 5 respondents representing 7.2% disagreed and were neutral respectively. This result is in agreement with Effiong *et al*, (2014), they indicated that in folk medicine, the stem and bark extracts of taub (*Tetrapleura tetraptera*) can be used for preventing and treating hypertension. Researchers agree that *Tetrapleura tetraptera* is effective for preventing high blood pressure and for improving the oxidative position in salt model of hypertension patients.

The study result held that 59 respondents representing 85.5% agreed that prekese is used in the treatment of diabetes and supports the immune system, 6 respondents representing 8.7% disagree, while 4 respondents representing 5.8% were neutral. As per a study done on rats, it was found that *Tetrapleura tetraptera* or Uyayak is very beneficial in controlling type 2 diabetes mellitus. It was also found that prekese fruit extract was beneficial in lowering blood glucose levels in both fasting and nonfasting conditions.

Moreover, 61 respondents representing 88.4% agreed that prekese pod is traditionally used for preparing special soups for newborn mothers immediately they put to bed in order to avoid post-partum contraction, 6 respondents representing 8.7% disagreed, while 2 respondents representing 2.9% were neutral. Moreover, 57 respondents representing 82.6% agreed that traditionally, this plant can be used for treating asthma, 4 respondents representing 5.8% disagreed while 8 respondents representing 11.6% were neutral. The stem and bark extracts of *Tetrapleura tetraptera* (Taub) can be used for preparing herbal medicines for treating diabetes (Effiong *et al*, 2014).

Furthermore, 60 respondents representing 87% agreed that prekese can be used to treat

Fever & Enema, 6 respondents representing 8.7% disagreed while 3 respondents representing 4.3% were neutral. A person who is recovering from a medical condition is often asked to bathe with water soaked with whole fruit. This also gives fast relief from feverish conditions. Similar infusion also helps people suffering from constipation, enema, and emetic (Ekwenye, *et al*, 2010).

#### 4.5 Exploring caterers selective practices/patterns of local spices

Table 4.3 explored caterer’s selective practices/patterns of local spices

**Table 4.3: Caterers selective practices/patterns of local spices**

<i>Name of spice (s)</i>	<i>Frequency</i>	<i>Percent</i>
Prekese	19	27.5
Turmeric	6	8.7
Cumin seeds	7	10.1
Coriander seeds	3	4.3
Mustard seeds	3	4.3
Fenugreek seeds	2	2.9
Black pepper	7	10.1
Cloves	5	7.2
Cardamom	1	1.4
Cinnamon	1	1.4
Caraway seeds	1	1.4
Carom seeds	2	2.9
Nutmeg	7	10.1
Red chillies	2	2.9
Fennel	3	4.3
Total	69	100.0

n=69

Source: Field survey, 2018

Table 4.3 indicate that 19 respondents representing 27.5% used prekese to spice food, 7 respondents representing 10.1% used cumin seeds, black pepper, and nutmeg, 6



respondents representing 8.7% used turmeric, 5 respondents representing 7.2% used cloves, 3 respondents representing 4.3% used coriander seeds, mustard seeds, and fennel to spice foods, 2 respondents representing 2.9 used fenugreek seeds, carom, and red chillies, while 1 respondent representing 1.4% used cardamom, cinnamon, and caraway seeds. Spices play an important role as flavouring agents in the diet and are used throughout the world. Spices refer to the dried part of a plant that contain volatile oils or aromatic flavours such as, buds (cloves), bark (cinnamon), root (ginger), berries (black pepper), seeds (cumin, coriander). While consumption of spices is generally higher in Asian countries such as India, China, and Thailand, there has been an increasing trend in their intake in developing countries such as in Ghana, because of changing food habits and preference for ethnic and spicy food.

#### 4.6 The specific meals which make use of prekese as a spice

Table 4.4 indicates the specific meals which make use of prekese as a spice

**Table 4.4: The specific meals which make use of prekese as a spice**

<i>The specific meals which make use of prekese as a spice</i>	<i>Frequency</i>	<i>Percent</i>
Meat pepper soup	21	30.4
Palm kernel soup (banga soup or ofe akwu)	20	29.0
Nsala (white soup)	20	29.0
Fish pepper soup	4	5.8
Groundnut soup	4	5.8
Total	69	100.0

n=69

Source: Field survey, 2018

Table 4.4 reveals that 21 respondents representing 30.4% affirmed that caterers used prekese to spice meat pepper soup, 20 respondents representing 29% said that caterers used prekese to spice palm kernel soup and Nsala (white soup), while 4 respondents representing

5.8% indicated that caterers used to prepare fish pepper soup and groundnut soup respectively.

These agrees with Enwere, (1998), she revealed that *Tetrapleura tetraptera* Taub, family Mimosaceae, locally known as *oshosho* in South eastern Nigeria has widely varied applications in Nigerian folk medicine. The pods notably have an appealing culinary use. Apparently, they are used to prepare soups for mothers from the first day of delivery to relieve post parturition contraction and as a lactation aid.



## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

## 5.0 Introduction

This chapter contains the summary of findings, conclusion, recommendations and suggestions for further research.

### 5.1 Summary of findings

The main purpose of the study is to examine the use of “prekese” in meal preparation practices of caterers in the Kumasi Metropolis. This study adopted the case study strategy. Quantitative research approach was used. The population for the study was ninety (90). The population of the study was made up of selected caterers in the Kumasi Metropolis. Random sampling method would be used to select 73 respondents for the study. Questionnaires were the main instrument used to gather data for the study. The Statistical Package for Social Sciences (SPSS) version 18 was used to analyse data.

### 5.2 Major Findings of the Study

The first objective of the study was to examine the perceptions of caterers on the food and nutritional value of “prekese”. The study reveals that 59 respondents representing 85.5% agreed that prekese fruit can serve as a contraceptive. Also, 62 respondents representing 89.9% agreed that prekese can be used to manage convulsion and Leprosy. Furthermore, 60 respondents representing 87% agreed that prekese can be used for reducing inflammation of the body, arthritic pains and rheumatoid pains. The study result indicates that due to the antibacterial and antimicrobial property of the prekese, the fruit extract is used in making of soap.

To add more, 56 respondents representing 81.2% agreed that prekese supports the cardiovascular system due to its constituents of essential phytochemical and as such can be used for preventing and treating heart diseases. The study results revealed that 59 respondents representing 85.5% agreed that *Tetrapleura tetraptera* is effective for preventing high blood pressure and for improving the oxidative position in salt model of hypertension patients. The study result held that 59 respondents representing 85.5% agreed that prekese is used in the treatment of diabetes and supports the immune system.

Moreover, 61 respondents representing 88.4% agreed that prekese pod is traditionally used for preparing special soups for newborn mothers immediately they put to bed in order to avoid post-partum contraction. Moreover, 57 respondents representing 82.6% agreed that traditionally, this plant can be used for treating asthma.

Furthermore, 60 respondents representing 87% agreed that prekese can be used to treat Fever & Enema.

The second objective of the study was to explore caterer's selective practices/patterns of local spices. The study results indicate that 19 respondents representing 27.5% used prekese to spice food, 7 respondents representing 10.1% used cumin seeds, black pepper, and nutmeg, 6 respondents representing 8.7% used turmeric, 5 respondents representing 7.2% used cloves, 3 respondents representing 4.3% used coriander seeds, mustard seeds, and fennel to spice foods, 2 respondents representing 2.9 used fenugreek seeds, carom, and red chillies, while 1 respondent representing 1.4% used cardamom, cinnamon, and caraway seeds.

The third objective of the study was to examine the specific meals which make use of prekese as a spice. The study results reveals that 21 respondents representing 30.4% affirmed that caterers used prekese to spice meat pepper soup, 20 respondents representing 29% said that caterers used prekese to spice palm kernel soup and Nsala (white soup), while 4 respondents representing 5.8% indicated that caterers used to prepare fish pepper soup and groundnut soup respectively.

### 5.3 Conclusion

The study concluded that prekese can be used to manage a lot of sicknesses including convulsion and Leprosy, reducing inflammation of the body, arthritic pains and rheumatoid pains, supports the cardiovascular system, treatment of diabetes and supports the immune system, avoid post-partum contraction, treating asthma, and Fever.

The local spices used by caterers were prekese, cumin seeds, black pepper, nutmeg, turmeric, cloves, coriander seeds, mustard seeds, fennel, fenugreek seeds, carom, red chillies, cardamom, cinnamon, and caraway seeds. Finally, meals which make use of prekese as a spice were meat pepper soup, palm kernel soup and Nsala (white soup), fish pepper soup and groundnut soup.

### 5.4 Recommendation

Based on the conclusion of the study, the following recommendations were made:

1. The Ministry of Health should create public awareness regarding the health benefits of consuming prekese to enhance public awareness and consumption.

2. The Government of Ghana should invest in medical and laboratory research to unravel the numerous hidden advantages of consuming prekese.

### **5.5 Suggestions for Further Research**

Based on the limitations of the study, the researcher suggested that further studies should also be done to establish the effect of *T. tetraptera* on the nutritional quality of fresh foods in the international market.



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## APPENDIX A

### QUESTIONNAIRE FOR THE RESPONDENTS

UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

The researcher is a post-graduate student of University of Education Winneba, Kumasi Campus conducting a piece of research on **THE “USE” OF “PREKESE” IN MEAL PREPARATION PRACTICES OF CATERERS**. I respectfully request that you form part of this research by completing the attached questionnaire. Anonymity and non-traceability are assured. It is my fervent hope that you participate in the study. May I thank you for your valuable cooperation.

#### **Section A: Demographic Information of the Respondents**

1. What is your gender?

Female [ ] Male [ ]

2. What age range do you belong?

Below 18 years [ ] 19-29 years [ ] 30-39 years [ ] 40-49 years [ ] 50-59 years [ ]  
60-69 years [ ] above 70 years [ ]

3. What is your highest educational background?

Never [ ] BECE [ ] SSSCE/WASSCE [ ] Diploma [ ] Bachelors' degree [ ]  
Masters' degree [ ] PhD [ ]

**SECTION B: The Perceptions of Caterers on the Food and Nutritional value of “Prekese”.**

Please use the following likert scale to evaluate the perceptions of caterers on the food and nutritional value of “prekese”.

DISAGREE, NEUTRAL, AGREE

STATEMENT	DISAGREE	NEUTRAL	AGREE
4. Prekese fruit can serve as a contraceptive			
5. Management of convulsion and Leprosy			
6. Prekese can be used for reducing inflammation of the body, arthritic pains and rheumatoid pains.			
7. Due to the antibacterial and antimicrobial property of the prekese, the fruit extract is used in making of soap.			
8. Prekese supports the cardiovascular system due to its constituents of essential phytochemical and as such can be used for preventing and treating heart diseases.			
9. Researchers agree that Tetrapleura tetraptera is effective for preventing high blood pressure and			

for improving the oxidative position in salt model of hypertension patients.			
10. Prekese is used in the treatment of diabetes and supports the immune system			
11. Prekese pod is traditionally used for preparing special soups for newborn mothers immediately they put to bed in order to avoid post-partum contraction.			
12. Traditionally, this plant can be used for treating asthma.			
13. Prekese can be used to treat Fever & Enema			

**SECTION C: Exploring caterers selective practices/patterns of local spices.**

14. What are caterers selective practices/patterns of local spices?

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**SECTION D: The specific meals which make use of prekese as a spice.**

15. What are the specific meals which make use of prekese as a spice?

Meat pepper soup [ ] Palm kernel soup (banga soup or ofe akwu) [ ]

Nsala (white soup) [ ] Fish pepper soup [ ] Groundnut soup [ ]

Other please specify.....

