

1.0. INTRODUCTION:

Piper nigrum (pepper fruit) is an indigenous fruit tree of the family Annonaceae (Etukudo, 2000). It's widely distributed and consumed by the inhabitants of Western Camerouns, Ivory Coast and Southern Nigeria (Hutchinson and Dalziel, 1954; Keay et al., 1960; Okiy, 1960). It is a medium- sized or small tree which spreads throughout the rain forest and sometimes found in forest within the Savanna areas (Keay et al., 1964). *Piper nigrum* fruits appear red when ripe and green when unripe. The matured fruits constitute the main edible portion. The leaves, fruit, bark and root of the plants possess strong pepperish and pungent spicy taste with a characteristic aroma and fragrance. The young leaves and fruits have instinctive spicy taste (Achinewhu et al., 1995). The fruits are chewed in different forms (fresh green, fresh ripened red, black dry fruit and dry seed).

Piper nigrum fruit serve as mild stimulant to the consumer (Aiyeloja and Bello, 2006; Ndukwu and Nwadiibia, 2006; Oyemitan et al., 2006). The fruits and leaves are used as seasonings which are added to prepared food such as meat, soup, sausage and in some special local dishes and vegetables (Ejechi and Akpomedeaye, 2005). *Dennettia* plant yields a good fuel wood (Abbiw, 1990 and Duguma et al., 1990). Its various parts are commonly used as spices and condiment (Oyemitan, 2008). The fruit is sold for money especially by rural women.

Piper nigrum fruits have been reported to contain important nutritive substances such as vitamins, minerals and fiber (Okwu et al., 2005). It was also indicated that the rich presence of essential oil (oleoresins) determines the aromatic flavoring, coloring and pungent properties of pepper fruits. Nwaogu et al. (2007) investigated phytochemical content of *Piper nigrum* and detected the presence of saponins, flavonoids, tannins and cyanogenic glycosides. Also Adebayo et al., (2006) reported the presence of flavonoids in *Dennettia tripetala*. The intake of flavonoids in any fruit and vegetable tends to decrease cancer risk (Neuhouser, 2004; Graf et al., 2005). Flavonoid according to Harpens et al., (1979) contributes to the colour of plants, their fruits and flowers. Timothy and Okeke (2005) reported that ingestion of 0.75g of *Piper nigrum* reduces the intraocular pressure (IOP) of normotensive emmetrops though not sustained at 30 minutes post consumption. The IOP was reduced by 17.30% (12.90 mmHg) from the mean baseline of 15.60mmHg.

On the other hand, *Dacryodes edulis* (also called African plum, African pear, black pear or Safou) is an indigenous fruit tree in the humid low lands and plateau regions of West, Central African and Gulf of Guinea countries. In south-east Nigeria, the trees are grown around homesteads and flowering takes place from January to April. The major fruiting season is between May and October (Emebiri and Nwifo, 1990; Kengue and Nyagatchou, 1990).

Fruits are ellipsoidal and their size varies approximately from 4 - 9 cm long and from 2 - 5 cm wide (Omoti and Okiy, 1987). They could be an important source of pulp oil, seed oil and even whole fruit oil (Awono et al., 2002). The Safou oil should take their place in the food industry, the pharmaceutical and the cosmetics industry (soap, perfume, creams) as well as in other branches of industry where fat raw materials are needed. The cake remaining after the production of pulp oil may be useful in human food industry (bakery, baby foods). Information on the consumption and composition of Safou is far from complete. As the fruit becomes more popular and is increasingly commercialized, such information is indispensable for proper valorisation of the fruit.

Monkey Kola which is known as the genus *Cola* of the family Sterculiaceae is to tropical Africa and has its centre of greatest diversity in West Africa. About 40 *Cola* species have been described in West Africa. In Nigeria about twenty three (23) species are known and some are used in traditional medicine as stimulant, to prevent dysentery, headache and to suppress sleep. *Cola rostrata* and *C. lepidota* (CL) K. Schum are perennial trees popularly known as monkey cola and cockroach kola. Monkey kola is a common name given to a number of minor relatives of the *Cola* spp. that produce edible tasty fruits. Native people of southern Nigeria and the Cameron relish the fruits, as well as some wild primate animals especially monkeys, baboons and other species. Seeds of the monkey kola species are obliquely ovoid with two flattered surfaces, rough and reddish brown or green; but not edible unlike the seeds of kola nut (*C. nitida*). The aril (waxy mesocarp) form the edible portion of the follicle, and varied in colour, with the *C. rostrata* having whitish aril, while *C. lepidota* is characterized by yellowish aril. *Cola lepidota* is reported to be employed in Nigerian folk medicine as febrifuges, for pulmonary problems and cancer related ailments

1.1. BACKGROUND OF THE STUDY:

In Nigeria, many indigenous plants are used as spices, food or medicine. A great number of these plants are traditionally noted for their medicinal and pesticide properties. *Piper nigrum* (pepper fruit) is a medium sized tree found commonly in the tropical rainforest region of Nigeria and sometimes in savannah areas. The young leaves and fruits have a distinctive spicy taste. Pepper fruit tree is a tropical tree common in the mangrove forests of the west coast of Africa. It flowers at the beginning of the rainy season, especially during the months of April and May. The mature fruits constitute the major edible portions. However, some communities in parts of Southern Nigeria also utilise the leaves and the roots in addition to the fruits for medicinal purposes. *Piper nigrum* is used for masticating which, when chewed, produces a special peppery effect. The peppery, spicy taste of mature fruits usually serves as a mild stimulant to the consumer. The fruits are sometimes taken with kola nut, garden egg and palm-wine in parts of Nigeria. The fruit of *Piper nigrum* is quite popular in Southern Nigeria where it serves for cultural entertainment of guests, particularly during coronation, the new yam festival and marriage ceremonies. It is used as a spice, seasoning or natural flavour which is added to prepared food such as meat, sausage, stew, soup and vegetables. The bark of *Piper nigrum* fruits is mixed with food to create variation in the taste and flavour of different foods. It has been reported that the peppery fruits of *Piper nigrum* usually find application in food meant for pregnant women. Moreover, *Piper nigrum* seeds are very important in the diets of women after childbirth, during which time it is claimed that spices and herbs aid the contraction of the uterus. The various constituents of this important fruit have not been fully documented. Little is known of the composition of *Piper nigrum* fruit despite its widespread multipurpose uses as food and drugs.

African pear is well known plant in West African; the fruit is referred to as the "Ube" in the South-East of Nigeria, "Native pear" in Ghana, or "Safoutier" in Cameroon and "Bush butter" in many other areas of tropical regions of

Africa. The tree of Africa pear is an evergreen oleiferous tropical fruit tree which grows in the humid and subhumid climates of West and Central African Countries (Kengue, 2001). The fruit at maturity becomes bluish black and more susceptible to injury and heavy losses at the advanced stage of maturity (Kapsue and Kayem, 1998). The fruit pulp and seed of African pear are well known for richness in protein, fat, fiber, mineral and essential amino acids (Kengue, 2001). Domestically, the fruits are gathered for household used such as eaten raw, boiled in hot water or roasted alongside with boiled or roasted corn.

1.2. STATEMENT OF PROBLEM:

The following forms the statement of problem of the study;

A major setback in the commercial utilization of African fruits is the lack of adequate and consistent data. Most of the published data collected on the chemical and antioxidant properties of the fruits, are at variant from each other.

Also, lack of information on the properties of the fruit has led to no processed products from the fruit. Efforts made so far to optimize the economic and to a lesser extent the nutritional value of the fruits have emphasized its oil content (quality and extraction methods) and have largely ignored how other components, especially the proteins could also be utilized to supplement the nutritional needs of the consumer.

Most studies aimed at enriching bakery products have made use of legumes as their major protein source. Yet other plant food sources such as the pepper fruit, black pear and monkey kola rich in proteins could be used for this purpose.

1.3. OBJECTIVES OF THE STUDY:

At the end of the research work, the researcher expects to achieve the following objectives;

Improve the general awareness of the uses of the fruits under study

Throw more light towards the medicinal application of the fruits.

Elaborate the chemical and antioxidant content of the fruits

Show practically how the chemical and antioxidant content of the fruits can be used medicinally.

1.4. AIM OF THE STUDY:

This research work is aimed at investigating successfully the chemical and antioxidant content of pepper fruit, black pear and monkey kola in the laboratory. To effectively achieve this, a step by step rudiments was ensured in where the chemical and antioxidant content was first ascertained as well as the properties of these chemicals and antioxidants.

1.5. SIGNIFICANCE OF THE STUDY:

The significance of this research work is to determine the chemical and antioxidant content and properties of pepper fruit, black pear and monkey kola. This is aimed at so that knowledge of its utilization especially medicinally will be ascertained so that its knowledge will assist people who can easily get the fruit to treat come common sicknesses like cough, sore throat etc.

1.6. LIMITATION OF THE RESEARCH:

Although the aim of the work was achieved, the research work was faced with lot setbacks especially during the practical aspect. It was discovered the necessary materials and reagents needed to effectively carry out the practical work was limited coupled with the limited time frame given for the research work.

1.7. SCOPE OF THE STUDY:

The research details presented here only shows the chemical and antioxidant properties of pepper fruit, black pear and monkey kola with a little introduction of its medicinal uses and implications.

CHEMICAL AND ANTI OXIDANT PROPERTIES OF PEPPER FRUIT BLACK PEAR MONKEY KOLA

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