Comparative Proximate Analysis of Some Food Condiments

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Abstract: The proximate composition of three common food condiments – ginger (*Zingiber officinale*), garlic (*Allium sativum*) and locust bean (*Parkia biglobosa*) were investigated. The composition of the locust bean was determined before and after fermentation. The results obtained show that fermentation increases the moisture and oil contents of locust bean, but reduces the protein content. The results also show that ginger is highest in moisture content (76.86%), followed by garlic (66.67%) and then locust bean (41.8% and 8.67% in the fermented and raw beans respectively).

Key words: Ginger, garlic, locust bean, spices

INTRODUCTION

Food condiments or spices are strong smelling, sharp tasting substances usually used to improve or adjust the flavour of food. They are usually of vegetable origin. Common examples include mustard, nutmeg, ginger, garlic, coriander, locust bean etc [1,2]. Ginger (*Zingiber officinale*) is a rhizome with a warm, sweet, strongly aromatic odour and sharp pungent flavour[3]. It is used as an essential spice in curry powder, gingerbread and in some beers and other drinks. The taste and pungency of ginger increases with the maturity of the plant, thus young rhizomes are juicy and fleshy with a very mild taste while juice from old rhizomes are extremely potent and sharp and is often used as a spice in Chinese cuisines[3]. Ginger is used as ingredient in making soups, as a spice in ginger bread and other recipes and can be stewed in boiling water to make ginger tea. It can also be made into candy or used as flavouring for cookies, crackers and cake[4]. It helps to allay motion sickness and is used, especially in the Far East, as a digestive aid and a food preservative[5]. In Nigeria, ginger is used to flavour a local drink called *Kunnu*.

Garlic (*Allium sativum*) is a specie of the onion family and is used as a flavouring in cooking and pickling, sometimes in the form of whole or grated cloves and sometimes in the form of a cooked extract, as in sauces and dressings[5-7]. Garlic has a characteristic pungent, spicy flavour that mellows and sweetens considerably with cooking[5-7]. Locally, garlic is often paired with ginger to make stews and soups. Generally, garlic is used as condiment and in the preparation of baked goods, puddings, gravies, soups, stew, meat products, non-alcoholic beverages and soft candy[5-8]. In medicine garlic is used as a digestive stimulant, diuretic and anti-spasmodic.

African locust beans (*Parkia biglobosa*) and other oilseeds such as melon seed, castor seed, soybean etc are fermented to produce condiments[9]. Fermented locust bean is a well known condiment with characteristic ammoniacal odour and flavour which enhances the taste of traditional soups and sauces especially those used as accompaniments to starchy foods. It is known to contribute to the calorie and protein intake[10-12]. It is generally added to soups as low cost meat substitute by low income families in parts of Nigeria.

This study aims to determine the nutritional composition of these plants commonly used as food condiments - ginger (*Zingiber officinale*), garlic (*Allium sativum*) and raw and fermented locust bean (*Parkia biglobosa*)

Experimental:

Samples and Sample Preparation: Ginger and garlic were purchased from a popular market within the Ilorin metropolis in Kwara State, Nigeria. Fermented locust beans were purchased from local producers while the raw beans were handpicked from trees. The purchased ginger was thoroughly washed under running water and the light outer skin of the rhizomes was removed and the rhizomes cut into tiny pieces. The light scaly leaves of the garlic cloves were also removed and the naked bulb and cloves washed in water before being chopped into tiny pieces. The coat of the raw locust beans were removed by ‘beating’ the beans and handpicking the yellow inner beans. All the samples so prepared including the fermented locust bean seeds were dried in an air-circulating oven and ground into fine powder.
The nutritional components of fermented locust beans (except ash) are significantly higher than those of the raw beans. About 79% increase was observed in the moisture content (from 8.67% in raw to 41.85% in fermented), while the fat and protein content increased by about 45% and 40% respectively. The high protein content of fermented locust beans is similar to those reported by Alabi et al (34.02%)[10], Okpala (31.6%)[17], Obizioha (34.3%)[18] and Omafuvbe et al (37.2%)[9] for the fermented locust bean seeds and the cotyledons. Omafuvbe actually showed that the protein content increased as the length of the fermentation period increased[9]. It had earlier been confirmed that fermentation resulted in protein enrichment of the fermented locust beans[19]. This work therefore confirms that it is not just the protein that is enriched but other nutrients as well.

The higher fat content observed in the fermented beans is also in agreement with that reported by Ikenebomeh et al[20]. Lower ash content was observed in the fermented beans (36% reduction). This may imply a loss of some minerals during the process of

**RESULTS AND DISCUSSION**

The proximate analysis of the nutrients in ginger, garlic and raw and fermented locust beans are shown in Table 1. All the samples have significantly different nutritional composition except the protein contents of ginger and garlic which are not significantly different at the 5% level. Ginger has the highest amount of moisture while the raw locust bean seeds have the lowest moisture content. The results obtained for the proximate composition of ginger and garlic are somewhat different from what we previously reported[14]. The fibre contents obtained for these two spices are the same as in the previous study, whereas the protein content obtained for garlic in the previous study is significantly higher than what was obtained in this present study, while that obtained for ginger is lower in the previous study. This may imply that soil and geographical location of the source have an effect on the nutrient composition and since these materials were obtained from different sources over a period of time, the values obtained were different. The protein content obtained for garlic in this study is only a little higher than that reported by the USDA nutrient database (6.39%) [15], while the fat content is very similar (0.5%) to that reported by the same body. The values obtained for ginger however, are significantly higher than that reported by the USDA.
fermentation, or it may mean that the mineral components actually reside in the hull of the beans and are thus removed during processing\(^9\).

**Conclusion:** This work has shown that these food condiments, while providing aroma and flavour and enhancing the taste of foods, also serve as sources of some essential nutrients which are naturally present in them.

**REFERENCES**