

RESEARCH ARTICLE

Fruits quality and parasites status in Kogi markets, Nigeria

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Abstract

The study determined the fruit quality and parasites status in Kogi market, Nigeria. Six different types of fruits were sampled from three different markets (Anyigba, Dekina and Sheria) in two different Local Government Areas of Kogi State, Nigeria. A total of 1755 sample was examined for fruits quality and parasites status using sedimentation and centrifuging technique. A total of 284(16.18%) of the 1665 fruits were positive for intestinal parasites microscopically. Among these fruits, pepper had the highest number of intestinal parasites which was 98(31.41%). Parasites occasioned were cysts of *Giardia lamblia*, Larvae of *Strongiloides stercoralis* and ova of *Enterobium vermicularis*. Datas of the current study show high level of fruits contamination with intestinal parasites from three different markets in two different Local Governments in Kogi State, Nigeria, indicating existence of a great risk of acquiring intestinal parasites by eating raw and unwashed fruits.

Keywords: Fruit quality, parasites, Kogi market, sedimentation, pepper, unwashed fruits.

Introduction

Nigeria like other West African is fond of eating raw and unwashed fruits. However, fruits play major role in the nutritional livelihood of human population especially in undeveloped country like Nigeria where there is poor socio-economic conditions (Adeboye and Adedayo, 2008). Unfortunately, people do not wash them properly before eating. The cultivation of these fruits, using rain during wet season and irrigation during dry season engender parasites contamination. These two sources of water are highly polluted with human and animal faeces which represent high risk to farmers and consumers of fruit products. Market fruits are often contaminated by eggs of human intestinal nematodes where human and animal faeces are extensively used as fertilizer and revised waste water. This indirect reserve of river water contains a substantial percentage of municipal refuse and sewage. This practice is becoming popular in Nigeria as a result of growing cost of mineral fertilizer and high demand of basic fruits as a nutrient diet due to poor socio-economic conditions (Damen *et al.*, 2007).

The epidemiological research results have medicated that areas of South-west in Nigeria are characterized by endemic helminthic diseases in populations where raw untreated waste water is used for irrigated fruits generally eaten unwashed and uncooked, may lead to parasite infestations (Damen *et al.*, 2007). Therefore, clarion call is needed to increase awareness with this increasing population, urbanization and poor sanitation on fruits and parasite co-existences. Parasite is one of the "Nature Hangman" because parasite diseases continue to be a major public health problem all over the world with associated high degree of morbidity and mortality.

According to WHO, parasites are of the leading cause of death after HIV/AIDS and tuberculosis. One out of 10 living persons suffers from one or more 7 major tropical diseases of which 5 are parasite in nature (Adeboye and Adedayo, 2008). Common food especially, raw fruits, water and animals known to harbor parasites. These food-borne parasites include 3 types of worms (Nematodes, Cestodes and termatodes) and several protozoa (Doyle, 2003). Therefore, the focus of this study is to determine the intestinal parasite prevalence on common fresh fruits in major markets of Kogi, Nigeria.

Materials and methods

Study area and subjects: The study was carried out between April 2010 and August 2010. Fruits and vegetables were sampled from major markets in Bassa and Dekina Local Governments, Kogi State, where majority of the populace depend on the source to buy these products. The parasitological survey of these products was carried out at University Laboratory of Kogi State University, Anyigba. These markets were selected because majority of the farmer are from different locations within the state conveying their farm products which includes fruits and vegetables for sale in these markets.

Sample collection: The fruits were bought from the traders from these three markets from the hours of 6 to 11 am in the morning. Fruits include *Musa sapientum* (banana), *Lycopersium esculentum* (tomato) and *Citrus sinensis* (orange). The fruits were collected in sterile, labeled polythene bags and transported to the laboratory for examination for helminth ova and larvae within 6 h of collection.



Table 1. Percentage of intestinal parasites isolated from fruits in the study areas.

Fruits	Quantities	<i>Strongiloides stercoralis</i>	<i>Enterobium vermicularis</i>	<i>Opisthorchis</i>	<i>Entamoeba histolytica</i>
Orange	21	-	-	1(4.76%)	-
Egg plant	120	5(4.2%)	1(0.8%)	-	-
Banana	51	-	-	-	-
Okro	120	-	-	-	-
Tomatoes	101	6(5.9%)	-	-	-
Pepper	161	40(2.50%)	1(0.62%)	-	1(0.62%)
Total	574	51(12.60%)	2(2.42%)	1(4.76%)	1(0.62%)

Table 2. Prevalence of intestinal parasites on fruits from each market.

Fruits	Anyigba market		Dekina market		Sheria market	
	No. examined	No. positive	No. examined	No. positive	No. examined	No. positive
Orange	61	9	21	6	15	6
Egg Plant	87	26	120	14	141	18
Banana	149	13	51	6	133	14
Okro	120	4	120	20	174	13
Tomatoes	50	11	101	13	100	16
Pepper	83	29	161	48	68	19
Total	540	92	574	107	551	85
Percentage	-	17.59	-	18.64	-	15.43

Sample processing: Hundred grams of each type of fruits were washed in 360 mL of distilled water. Each suspension was strained through a piece of double layered sieve, which filtered off coarse sandy particles but allowed the passage of helminth ova, cyst and larvae. The filtrate was centrifuged at 2500 rpm for 1 min. The supernatants were poured off from the different tubes to leave only the sediment. The sediment from each tube was checked for parasites ova, cyst and larvae by the concentration technique as described by Cheesbrough (1998). In order to determine, the factor responsible for parasites occurrence and distribution, a questionnaire was given out.

Statistical analysis: Chi-square (χ^2) test was used to determine whether any relationship exists between geo-helminthic ova/larvae and contamination of different fruits types and location of markets.

Laboratory examination: The laboratory examination of the collected samples was done in the Biological Sciences Department of Kogi State University, Anyigba. However, in this study, the concentration method and centrifuging as described by cheesbroug (1998) were used for parasites cyst and ova on fruits and vegetables. This is also the same with Umeche (1991) and Okwor (2002) work.

Results

Helminth larvae and egg of *Entrobium vermicularis* are detected in 4.2% (6/20) of egg plant. 5.9% (6/10) of tomatoes and orange were contaminated with 4.76% (1/21) of egg opisthorchi, 2.5% (43/161) of pepper were infected with larvae of *Strongiloides stercoralis* and 0.62% of egg of *Enterobrium vermiculars* and cysts of *Entamoeba histolytica* were considered parasites free while low level infection were recorded in the orange examined.

Of the 120 egg plants, 101 tomatoes, 161 pepper samples recorded 4.2%, 5.9%, and 2.5% respectively (Table 1). Eggs of *Entrobium vermicularis* recorded 0.8% and 0.62% and were defected not significantly in total egg plant and pepper. In addition, eggs of *Entamoeba histolytica* and *opisthorchis* were defected not significantly in total pepper and orange (Table 1). Table 2 shows prevalence of intestinal parasites on fruits from each market and Table 3 indicate the number of fruit sample contaminated with intestinal parasites in each market.

Discussion

The consumption of raw fruits is a major way in transmission of parasites of food-borne illness because consumers would want to retain natural taste and preserve heat labile nutrients to be derived from these fresh fruits (Jifsan, 2002; Slifko *et al.*, 2009). Intestinal parasites or food-borne parasite infections have received little or no attention most especially in developing countries. By habit, these organisms contaminate fruits while still on the field and are usually transmitted by contaminated water sand spread by ineffective hygienic practice (James and Ogochukwu, 2006). A total number of 1755 fruits were examined, out of which 184(17.59%) were noted positive of parasites contamination. Dekina market recorded the highest number (18.64%) while, Sheria market recorded the least parasitic contamination (15.43%) (Table 2). This high percentage data infection agreed with the colossal population suffering from helmithic infection in the study areas. This result is similar to the study carried out by James and Ogochukwu (2006) in Onisha, where 18.5% parasitic contamination was recorded. The result from this study shows that pepper 98(31.41%) recorded the highest contamination followed by egg plant 55(15.81%) while, the least contamination was orange 21(21.65%) (Table 3).

Table 3. Number of fruit samples contaminated with intestinal parasites in each market.

Fruits	Anyigba market	Dekina market	Sheria market	No. examined	No.(%) for intestinal Parasites
Orange	61	21	15	97	0(0.0)
Egg plant	87	120	141	348	0(0.0)
Banana	149	51	133	333	0(0.0)
Okro	120	120	174	414	0(0.0)
Tomatoes	50	101	100	251	1(0.99)
Pepper	83	161	68	312	1(0.62%)
Total	540	574	551	1755	2(1.61%)

This high parasite prevalence in fruits are not far from the fact that open markets were characterized by the presence of refuse dumping sites nearby, poor drainage, improper disposal of faces of traders and poor hygienic practice. Among others three different types of parasites found are *Giardia lamblia*, *Strongloides stercoralis* and *Enterobium vermicularis*. Contamination with *Giardia lamblia* were common in the three study areas and this could be due to the fact that this parasite tend to be more adaptable and can withstand a wide variety of adverse environmental conditions which could serve as an indication of water pollution as a result of indiscriminate defecation resulting in pollution of water and farmlands as observed by Damen *et al.* (2007). Faecal contamination of water sources used in crop irrigation is the important sources of human infection, so the contaminations of fresh fruits are of greatest concern (Okwor, 2002).

Conclusion

The data from this research shows high contamination levels of fruits with intestinal parasites from three different markets in kogi, indicating presence of a great risk of acquiring both helminthic and intestinal parasite infections by eating improperly washed fruits. The findings also sound warning both to the seller and the consumer or indiscriminate handler of such product with contamination.

Recommendations

A well organized orientation symposium for the public on necessity of fruit sanitation and personal hygiene should be intensified. Public market should be well-equipped with modern amenities such as toilets, running tap water and good drainage to ensure good sanitary system in our markets.

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