



RESEARCH ARTICLE

INTESTINAL PROTOZOAN PARASITES ON FRUITS SOLD IN JALINGO MARKETS OF  
TARABA STATE, NIGERIA

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ARTICLE INFO

Article History:

Received 04<sup>th</sup> October, 2017  
Received in revised form  
17<sup>th</sup> November, 2017  
Accepted 21<sup>st</sup> December, 2017  
Published online 19<sup>th</sup> January, 2018

Key words:

Protozoan,  
Fruits,  
Parasites,  
Markets and Infestation.

ABSTRACT

Intestinal parasitic diseases have remained endemic in rural communities of developing countries with significant economic and public health consequences. The study determined the prevalence of intestinal protozoan parasites infestation of fruits, in Jalingo markets of Taraba State, Nigeria. Five (5) different types of fruits from five markets were sampled. A total of four hundred and fifty samples (450) were examined using sedimentation method. The results showed 19.8% prevalence of intestinal protozoan parasites in fruits with *Ananas comosus* (44.0%) the most infested among fruits while *Psidium guajava* (2.0%) had the least infestation of protozoan parasites. *Entamoeba histolytica* (36.0%) was the most common protozoan parasite implicated on fruits from the various markets; Bera-Koffai market (24.7%) had highest infestation of intestinal protozoan parasites on fruits while Sabon-gari (16.9%) market had the lowest infestation, with no significant difference between the infestation of protozoan parasites on fruits among the markets ( $\chi^2=7.848$ ,  $p>0.05$ ). The results showed that fruits sold in Jalingo markets harbor intestinal protozoan parasites and there is the need for proper cleaning and handling of fruits by growers, sellers and buyers.

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Citation: Wama, B. E., Naphtali, R. S. Houmsou, R. S. and Joseph, J. 2018. "Intestinal protozoan parasites on fruits sold in jalingo markets of Taraba State, Nigeria", *International Journal of Current Research*, 10, (01), 63838-63840.

INTRODUCTION

Human intestinal protozoans are important causes of acute and severe persistent diarrhea episodes in young children, adolescents and immuno-suppressed individual globally (Parry, 2000). Humans harbour about 300 species of parasites among which 70 species are protozoans that may have been acquired from food, especially fruits and raw vegetables, water and animals (World Health Organizations, 1998). Diarrhea diseases account for over 50 million deaths (in all ages) worldwide and are ranked third among diseases responsible for human morbidity and mortality (Arora, 2012). *Giardiasis* alone affects 200 million people worldwide and produces symptom in 500,000 individuals every year (Endogrul, 2000). In developing countries it is one of the pathogens that infect children under 10 years of age with peak prevalence rate between 15-20% (Endogrul, 2000). Fruits play a very important role in human health and nutrition since they are major sources of vitamins, minerals and dietary fibers that are necessary for growth and good health (Su, 2006). The increased demand for these fruits in order to acquire nutritional

elements needed by the body becomes a problem when these foods are contaminated by pathogenic human parasites (Slifko, 2009). Fruits are widely exposed to parasitic contamination through contact with contaminated soil, dust, water and by handling at harvest or during post harvest processing (Doyle, 2003). Intestinal protozoan parasites are transmitted by the ingestion of contaminated food, fruits, vegetables and water with cysts, ova or oocyst of protozoan parasites (Robertson, 2000). Due to the great demand of fruits in urban areas of Nigeria, it becomes imperative to evaluate the public health implications of these fruits sold in markets. Thus, this study was conducted to determine the prevalence of intestinal protozoan parasites infestation on fruits sold in Jalingo markets, Taraba state, Nigeria.

MATERIALS AND METHODS

Study Area

The study was carried out in Jalingo Local Government Area, it is located between latitude 8° 47' to 9° 01' N and longitudes 11° 09' to 11° 30' E. Five markets were surveyed: these include Jalingo Main Market, Mayo Gwoi, Mile Six, Sabo

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Gari, and Bera Koffai Market. The climate of the area is characterized by wet and dry seasons. The wet seasons begins around late April and end in October, while the dry season starts in mid October and ends in April, it has a mean rainfall of about 1,200mm annual mean temperature range of 29-38°C and Relative humidity ranges between 35-45% in dry season.

Jalingo metropolis has two rivers, (river Mayo gwoi and Lamurde) which are tributaries of river Benue. The Major ponds in Jalingo are Vendu-nange, Vendu-ginnaji, Jekadafari, Worosambe, vendu-Jodi and Vendu Lamurde, these ponds are all sites for irrigation farming.

### Collection of Fruits Samples

Five species of fruits were collected: *Lycopersicum sativus* (tomato), *Mangifera indica* (mango), *Psidium guajava* (guava), *Solanum melongena* (Garden egg) and *Ananas comosus* (pineapple). Four hundred and fifty (450) sample of these fruits were bought using a randomized design from five markets namely: Jalingo Main market, Mayo- Gwoi market Mile-Six market, Bera- Koffai market and Sabon Gari market, these markets were selected because they are major markets were poor farmers and people of low socioeconomic class sold their goods.

After centrifugation, sediment was examined microscopically using x10 and x40 objective lens. Cysts, Ova and Oocysts of protozoan parasites were identified (Cheesbrough, 2005). Chi Square and percentage were used to analyzed the data.

### RESULTS

The result showed that out of 450 fruits processed 62(13.8%) of the fruits were infested with one or more intestinal protozoan parasites; *Ananas comosus* 22(44.0%) was most infested in the fruits processed while *Psidium guajava* 2(2.0%) recorded the least infestation of protozoan parasites. The result showed a prevalence of 19.8% of intestinal protozoan parasites on fruits (Table 1). Table 2 shows the occurrence of intestinal parasites on fruits, *Entamoeba histolytica* (36.0%) was the most prevalent parasite found followed by Oocysts of *Cryptosporidium* sp (24.7%) while *Balantidium coli* (5.6%) was the lowest parasite found. Table 3 shows the occurrence of intestinal parasites on fruits by markets in Jalingo; Bera-Koffai market (24.7%) had the highest infestation of intestinal protozoan parasites on fruits while Sabo-Gari market (16.9%) had the lowest. There was no significance difference observed in the infestation of intestinal protozoan parasites on fruits among the various markets ( $\chi^2=7.848$   $p>0.05$ ).

**Table 1. Infestation of intestinal protozoan parasites on fruits sold in Jalingo Market, Taraba State, Nigeria**

Fruits	Quantity Examined	Quantity infested	No. (%of Protozoan
<i>L. esculentum</i>	100	19 (19.0)	26 (10.1)
<i>M. indica</i>	100	16 (16.0)	20 (7.8)
<i>P.guajava</i>	100	2 (2.0)	06 (2.3)
<i>S. melongena</i>	100	03 (3.0)	08 (3.1)
<i>A.comosus*</i>	50	22 (44.0)	29 (11.3)
	450	62 (13.8)	89 (19.8)

\* Limited quantity available

**Table 2. Occurrence of intestinal protozoan parasites on fruits sold in Jalingo markets, Taraba state, Nigeria**

Fruits	Individual Parasites (%)						Total No protozoan
	Eh	Ec	Bc	Gl	OC	OI	
<i>L. esculentum</i>	9 (34.6)	4 (15.4)	2 (7.7)	3 (11.5)	6 (23.1)	2 (7.7)	26
<i>M. indica</i>	8 (40.0)	3 (15.0)	2 (10.0)	2(10.0)	4 (20.0)	1 (5.0)	20
<i>P. guajava</i>	1 (16.7)	1 (16.7)	0 (0)	0 (0)	3 (50)	1(16.7)	6
<i>S. melongena</i>	3 (37.5)	3 (37.5)	0 (0)	0 (0)	1 (12.5)	1 (12.5)	8
<i>A.comosus*</i>	11 (37.9)	4 (13.8)	1 (3.4)	3 (10.8)	8 (27.6)	2 (6.9)	29
	33 (36.0)	15 (16.9)	5 (5.6)	8 (9.0)	22(24.7)	7 (7.9)	89

\* Limited quantity

Key

Eh- *Entamoeba histolytica*

Bc- *Balantidium coli*

OI- *Oocyst of Isospora*

Gl-*Giardia lamblia*

Ec-*Entamoeba coli*

OC- *Oocyst Cryptosporidium*

**Table 3. Occurrence of intestinal protozoan parasites by Markets**

Markets	Intestinal protozoan parasites						Total No(%) of protozoan
	Eh	Ec	Bc	Gl	OC	OI	
Jalingo main market	6(35.3)	2(11.8)	0(0)	2(11.8)	6(35.3)	1(5.9)	17(19.1)
Sabon Gari	4(26.7)	2(13.3)	1(6.7)	1(6.7)	5(33.3)	2(13.3)	15(16.9)
Mayo Gwoi	7(36.8)	4(21.1)	2(10.5)	2(10.5)	3(15.8)	1(5.3)	19(21.3)
Mile six	6(37.5)	4(25.0)	0(0)	1(6.3)	4(25.0)	1(6.3)	16(18.0)
Bera-Koffai	9(40.9)	3(13.6)	2(9.1)	2(9.1)	4(18.2)	2(9.1)	22(24.7)
	32(36.0)	15(16.9)	5(5.6)	8(9.0)	22(24.7)	7(7.9)	89

( $\chi^2=7.848$   $p>0.05$ ).

### Preparation of fruits samples and microscop examination

After buying from the markets, these fruits were taken to the laboratory for processing. Each fruit was washed in physiological saline and sieved; the filtrate was transferred into centrifuged tube and centrifuged at 1500rpm for 2minutes.

### DISCUSSION

The findings of this study have a significant public health implication because some of the fruits are processed and eaten uncooked which could lead to infection. The infestation of

fruits (13.8%) in Jalingo is similar to findings of Dauda *et al* (Dauda, 2011) who reported 14% infestation of human pathogenic parasites of fruits from three different markets in Kaduna. However, Umeche (United State Food and Drug Administration, 2006), reported similar results for fruits (13.49) parasites infestation at Calabar.

**The protozoan:** *Entamoeba histolytica*, *Entamoeba coli*, *Giardia*, *Cryptosporidium* and *Isopora* reported in this study confirm with results of Robertson and Gyerde (Robertson, 2000) in Norway. They reported that fruits are common vehicles for transmission of protozoans. The presence of *Entamoeba histolytica*, *Entamoeba coli*, *Giardia* and *Cryptosporidium* on fruits could be considered as an indicator of local or regional health standard, because these protozoan parasites clearly indicate the contamination of these fruits by human faeces either through their growth and harvest or their poor handling by vendors. In this study, fruits with rough and uneven surface like *Ananas comosus* (44.0) had more parasites than those with smooth surfaces like *Psidium guajava* (2.0) this could be due to the uneven nature of the surfaces of these fruits which easily provides avenues for trapping parasites. This agrees with the report of study conducted in USA which found that that the rate of contamination of fruits varies according to their surfaces whether smooth or uneven (rough) (United State Food and Drug Administration, 2006).

### Conclusion

The results of this study show that the fruits sold in the markets of Jalingo Local Government Area harbors intestinal protozoan parasites. This reveals the possibility of acquiring intestinal parasites infection by eating improperly washed fruits. It is therefore recommended that proper cleaning and careful handling of fruits is adopted as means of reducing risk infections to consumers of fruits. Also Public Enlightenment campaign on the necessity of sanitation and personal hygiene to fruits growers, vendors and consumers should be emphasized.

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