

Food Safety Practices among Native Delicacy Producers and Vendors in the Public Market of Bayambang in Pangasinan, Philippines

Asia Pacific Journal of
Education, Arts and Sciences
Vol. 4 No. 2, 95-102
April 2017
P-ISSN 2362-8022
E-ISSN 2362-8030
www.apjeas.apjmr.com

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Date Received: March 2, 2017; Date Revised: April 29, 2017

Abstract -Unsafe food causes many acute and life-long diseases, ranging from diarrheal diseases to various forms of cancer. This study determined the food safety practices and measures among native cake vendors and producers, described the profile of the subjects in the public markets and enumerated the common native delicacies sold in the market and its economic viability. Described the safety food practices and measures of the producers and vendors in terms of: cleaning the materials and the workplace; formulation; cooking; food handling; packaging; labeling; storage; vending and finally identified the factors for non-compliance of the safety food practices and measures adopted from HACCP.

Utilized the descriptive method and made use of interview guide, checklist questionnaire and direct observation rating scale adopted from HACCP during and after the processing/selling of native delicacies. Using the HACCP standards and control of rating, kakanin vendors/producers have major deficiencies in food safety measures and practices in packaging, post product handling/ vending, health and hygiene and in the market place however, they have minor deficiency in the work place.

This study recommends that dissemination of these findings be given to proper authorities to remedy the poor condition of food and safety. The Institution will conduct trainings on food and safety and proper handling among the kakanin vendors. Municipal authorities on health and customers services should be vigilant in the observance on food and safety.

Keywords: Food safety practices, native delicacies, food contamination, food handling

INTRODUCTION

A large selection of rice cakes exist in many different cultures in which rice is eaten, and are

particularly known in Asia. It is a common snack in the country so they can stay away from unhealthy options like fries and chips. Filipinos have created many different kinds of rice cakes. In local language, it is called *kakanin*, derived from the word *kanin*, meaning prepared rice. *Puto* is derived from Indian cuisine *puttu* and it is the most preferred rice cakes in Pangasinan particularly in Bayambang. *Puto* can be eaten alone as a snack, typically flavored with cheese, butter or butter substitute, or freshly grated mature coconut meat. It is also an accompaniment to a number of savory dishes, and as dessert in gatherings and festivities [1].

World Health Organization (WHO) estimates that food borne and water-borne diarrheal diseases taken together kill about 2.2 million people annually, 1.9 million are children. Food borne diseases and threats to food safety contribute a growing public health problem [2].

A large proportion of food-borne illness is caused by poor food handling practices. It is extremely important that food handlers have the appropriate skills and knowledge in food safety and hygiene. It is also important that food preparation premises are maintained clean and sanitary to minimize potential contamination of from dirt, grease, bacteria and other harmful elements [3]. Observations showed that harmful elements cause gastrointestinal diseases which are often the cause of admission in the hospitals. Children below 10 years old are often victims of gastrointestinal disease (GIs).

Appropriate food safety sanitation management should be the concern to prevent and control GIs. Food safety practices are essential for community health. Hazard Analysis and Critical Control Point (HACCP) is a systematic, preventive approach to food safety that addresses physical, chemical, and biological hazards. It is designed to prevent problems

before they occur and to correct deviations as soon as they are detected [4].

The Department of Health (DOH) defines food safety as “the assurance/guarantee that food will not cause harm to the consumers when it is prepared and/or eaten according to its intended use” [5].

To minimize serious impact on health of the community as well as the financial viability of native rice cake (*kakanin*) business, food business operators must ensure food safety standards and requirements are satisfied at all times. Health officers enforce compliance of the standards and requirement. The Food and Drug Administration (FDA) ensures safe food handling practices which concerns safety, sanitation, prevention, identification and control of food related risks in the workplace. The agency and other health offices ensure safe food handling practices, safe packaging techniques, tampering resistance, special physical, chemical, or biological needs and sanitation management.

Sanitation management involves managing the food storage and handling, identifying and inhibiting food-borne illnesses and preventing cross contamination between food items in the kitchen [5]. Through proper food sanitation management prevention and control of GI diseases can be attained.

It is on this premise that this study was undertaken. It aimed to determine the food safety practices and measures among native cake (*kakanin*) vendors and producers in Bayambang, Pangasinan public markets.

OBJECTIVES OF THE STUDY

This study determined the food safety practices and measures among native cake vendors and producers. It also described the profile of the subjects in the public markets and enumerated the common native delicacies sold in the market and its economic viability. Particularly, this study described the safety food practices and measures of the producers and vendors in terms of: cleaning the materials and the workplace; formulation; cooking; food handling; packaging; labeling; storage; vending and finally identified the factors for non-compliance of the safety food practices and measures adopted from Hazard Analysis Critical Control Points (HACCP)

MATERIALS AND METHODS

The researchers utilized the descriptive method of research and made use of interview guide, checklist questionnaire and direct observation rating scale adopted from HACCP during and after the

processing/selling of native delicacies. The results were comprehensive presentation and interpretation of statistical tabulation of data yielded from a survey. There were 20 respondents who were interviewed and observed doing the processing of the delicacies (*kakanin*).

Food safety, hygiene, and sanitation were determined by the use of structured interviews and observations. Practices in cooking skills, handling of food, place and manner in the preparation of food, personal hygiene, environmental conditions, methods of washing utensils and preservation methods of food were observed. Location of the vending area, utensils used, environment surrounding the street food vendors, general processing of the food and hygienic practices were also observed and recorded through an observation checklist. The researchers went to the preparation houses early in the morning and late at night. The processing of the delicacies (*kakanin*), packaging and selling/retailing were observed by the researchers.

The first part of the questionnaire focused on the demographic profile. The second part of the questionnaire was constructed checklist about the equipment and facilities used in food preparation and vending areas in terms of segregation/cleaning and washing area. The third part included the interview and observation of the researchers to the respondents from the preparation of the native delicacies (*kakanin*) until the actual vending. Average weighted mean, frequency and percentage were used to present the findings.

RESULT AND DISCUSSION

The profile of “kakanin” vendors were described in terms of their age, gender, educational attainment, income, average daily sales from “kakanin” and the availability of health certificate. Table 1 presents the demographic profile of the respondents.

It shows that 40% “kakanin” producers/vendors are 31-40 years old (40%) and are female (90%). Female “kakanin” vendors is exemplified by gender stereotype duty of the woman to cook according to (4) and further stated that the society’s perception of woman is to take care of the family by cooking and feeding the children and the rest of the family with nutritious foods. Majority of the respondents are either elementary graduates (40 %) or high school graduates (35%). Their monthly family income is within the range of 1001-10,000 (80%). The respondents said that their daily income from sales of “kakanin” is around PhP 501 and above (40%).

Table 1. Demographic Profile of the Respondents (N=20)

Demographic data	f	%
Age		
21-30	3	15
31-40	8	40
41-50	2	10
51-60	4	20
61-70	3	15
Gender		
Female	18	90
Male	2	10
Educational Attainment		
Below Elementary	1	5
Elementary Graduate	8	40
High School Graduate	7	35
College Graduate	4	20
Monthly Family Income		
1000-and below		
1001-5000	9	45
5001-10,000	7	35
10,001-and above	4	20
Average Daily Income from Sales		
200-and below	7	35
300-500	5	25
501- and above	8	40
Availability of Health Certificate		
Yes		25
No	515	75

However, according to them, even if their sales were low at around PhP 200 a day, it is compensated because the left-over “kakanin” can be taken home at the end of the day and can be eaten by the members of the family or can be sold for the following day if not yet spoiled. According to some of the respondents, there are some “kakanin” which has a shelf life of three days. Majority (75%) of the respondents do not have health certificates. They said that they are not aware of the health certificate of vendors, and the health practices of vendors. However, in the study “Economic and Hygiene features of street food vending in Gauteng” in South Africa, the survey showed a high hygiene standard maintained by most vendors during preparation and serving of the foods and it indicated that the health risks of consuming street foods are minimal, that street food vendors depend on vending for their livelihood and that their customers appreciate their trade. Food vending was acquired by self teaching, formal training in food handling and vending and by observation or taught by their parents are common ways in gaining knowledge (7).

Bayambang “kakanin” vendors have several native delicacies sold in the market. Each vendor has at least one or three expertise on the type of “kakanin” to be produced.

Table 2. Products Sold and/or Made by the Vendors

Items	f	%
Puto	13	15.85
Bitso-bitso	9	10.97
Latik	9	10.97
Cassava cake	8	9.76
Suman	6	7.32
Turonmalagkit	5	6.10
Tikoy	5	6.10
Maja	4	4.88
Pitchie-pitchie	4	4.88
Bibingka	4	4.88
Banana Cue	3	3.66
Bico	3	4.1
Botsi	3	4.1
Kutsinta	2	2.44
Palitao	1	1.4
Kundandit	1	1.4
Chocolate moron	1	1.4
Espasol	1	1.4

Thirteen of the respondents (about 16%) cooked “puto”, five of them cooked “turonmalagkit” and “tikoy” (6.10%). Several other “kakanins” prepared and sold in the market are “maja”, “pitchie-pitchie”, “bibingka”, banana cue, “bico”, “botsi”, “kutsinta”, “palitao”, “kundandit”, chocolate “moron”, and “espasol”. Table 2 shows that “puto” is the favorite “kakanin” produced and sold in the market. According to the vendors “puto” is commonly produced because the ingredients are few and cheap. In addition to this, “puto” is easily done, cooked and sold to the consumers. “Espasol” is the least prepared because the ingredients are expensive and the processing is quite difficult. However, “espasol” is a product which has three days shelf-life so it can be sold for at least three days in the market.

Table 3 presents the equipment and facilities used in food preparation and food retail. The equipment and facilities in the different preparation area of “kakanin, under the cleaning/segregation and washing area; compost pit facility is the open dump site at the backyard.

Table 3. Equipment and Facilities used in Food Preparation and Food Retail

Items	f	%
A. Segregation/ cleaning and Washing Area		
a.1.Compost pit facility	5	25
Open Dump facility	6	30
Burning facility	5	25
Collection facility	4	20
a.2.Sink with running water	15	75
No sink/ no running water	5	25
B. Preparation Area		
b.1.With tables	19	95
No tables	1	5
b.2.Adequate lights	7	35
Inadequate lights	20	100
C. Cooking Area/ Cooking Equipments		
c.1.Stove	7	35
Oven	4	20
Wood	1	5
Pugon	8	40
c.2.Stainless Knives	20	47.6
c.3.Stainless Wook	14	33.3
c.4.Stainless Molder	4	9.5
c.5.Stainless Basin	4	9.5
c.6.Pan	2	4.8
D. Packaging Area		
d.1.Storage		
Refrigerator	1	3.2
Plastic Container	7	22.6
Basket	17	54.8
Bilao	6	19.4
d.2.Packing	20	50
Plastic	1	2.5
Paper	12	30
Banana Leaves	7	17.5
Styro		
E. Product Control Area		
	0	0

Thirty percent of the respondents admitted that they have open dump facility near the house, 25% have compost pit, another 25% burn their trash and 20% depend on daily collection of garbage by the municipal dump truck. The preparation area is 75% of them have sink with running water and only 25% have no running water. The respondents with no running water are usually found in the rural where only deep well or artesian wells are available.

Majority(95%) of the preparation area of the respondents' possess' wooden table without cover, 65% have inadequate lighting facility however 100% of the respondents have adequate windows and natural ventilation. The preparation areas of the respondents

are usually an extension of the regular household kitchen and are wide enough for preparation and with sufficient ventilation. It was also observed due to their wide preparation area none of them have screened preparation area.

In the cooking area, 40% of the respondents use "pugon" (wooden oven), 35% use stove and 20% of them use gas oven. Majority of them use stainless knives (48%), stainless wok (33%), stainless holder and stainless basin (9.5%). It is a good observation that the respondents use stainless materials which are safe for corrosion[6].

The facilities in the packaging consists common facility like the basket (55%) a plastic container (23%) and bilao (19%) and the least is the refrigerator (3%). According to respondent 1 and 2 "*Basket is the best storage because it has holes and the "kakanin" does not easily get spoiled. The moist from the kakanin is very inviting for molds particularly when the kakanin is stored hot inside a container. The refrigerator is least advised because it is not handy to be carried to the market. and besides, when the kakanin is stored in a cool place the coconut milk (gata) gets curd then making the kakanin hard to eat*". No one among the respondents have product control area.

Individual packaging of the kakanin is usually in a plastic wrapper (50%), banana leaves (30%) and styro (12%). Respondent #20, said that: "*Plastic is the best packaging (wrapper) material because it is cheap, and available in the market and also very convenient. Banana leaves use a lot of energy and preparation process before it can be used as a packaging material. One needs to heat the leaves and clean /wipe its part before using.*"

It has been observed that not all kakanin are individually wrapped. For example, *puto* is only wrapped in a plastic container or banana leaves upon buying, so with buying *latik*. *Puto* and *latik* are sold in retail basis. This *puto /latik* is individually sliced and wrapped in transparent plastic. The packaging system of kakanin was observed without product control area or system. After cooking the kakanin the respondents prepared the "bilao" covered with either plastic or banana leaves.

Table 4 to Table 9 adopted the HACCP measures in rating the descriptive equivalent of food safety measures being done by the kakanin vendors/producers and as observed by the researchers. It reveals that the respondents have "full compliance" in "packaging delicacies separately." This clearly shows that there is no cross contamination between prepared

kakanin varieties. Each variety of kakanin are placed in different containers which are reusable and properly cleaned, which is “fully complied” by the respondents.

Table 4. Food Safety Measures and Practices in Packaging

Criteria on Food Safety Measures	AWM	VI
1. Different kinds of delicacies packed separately	10.00	Full compliance
2. Containers (bilao or panning) are reusable and properly cleaned	8.75	Full compliance
3. Packaging materials are safe from any chemicals such as lead that can contaminate the food	7.35	Minor deficiency
4. Method of packaging can't affect the multiplication of microbial pathogens and/or the formation of toxins.	6.25	Minor deficiency
5. Packaging is not hard to clean or disassemble	5.95	Minor deficiency
6. Vendors dispose packing materials after usage	5.95	Minor deficiency
7. Bag used is necessary/compatible with the products	5.90	Minor deficiency
8. Packing materials are resistant to damage thereby preventing the entrance of microbial contamination	5.80	Minor deficiency
9. Vendors are performing and observing cleanliness during packaging.	4.05	Major deficiency
10. Materials used in packing are Biodegradable	3.45	Major deficiency
TOTAL	6.35	Minor deficiency

The respondents have “major deficiencies” in Biodegradable packaging material (3.45) and “cleanliness during packaging (4.05). It implies that majority of the respondents used plastic as a form of packaging material which is non-biodegradable.

The *kakanin* producers/vendors have minor deficiencies in their food safety measures and practices in packaging. According to HACCP principle number 3, producers and vendors should: “*establish critical limits for each critical control point*” a critical limit is the maximum or minimum value to which a physical, biological, or chemical hazard must be controlled at a critical control point to prevent, eliminate, or reduce to an acceptable level the harm to an individual. As a whole *kakanin* vendors have minor deficiency in all aspects of safety packaging.

Table 5. Food Safety Measures Observed in Product Formulation

Criteria on Food Safety Measures	AWM	VI
1. Reassures that all ingredients do not reach the expiration date before consumption	8.95	Full compliance
2. Not overstocking of item	7.50	Minor deficiency
3. Availability of potable water, ice, and steam used in formulating/handling foods	6.25	Minor deficiency
4. Presence of sensitive ingredients in foods	4.95	Major deficiency
5. Proper labelling of ingredients	4.65	Major deficiency
6. Inspection of incoming ingredients for damage so that it can be rejected	4.50	Major deficiency
7. Proper manner in storing ingredients	4.25	Major deficiency
8. Intended for consumption of the population without increasing susceptibility to illness	3.50	Major deficiency
9. Present finished product free from objectionable materials (hair, dust, Insect)	2.65	Major deficiency
10. Added nutrients to product	0.5	Non - compliance
Total	4.75	Major deficiency

The respondents have “full compliance” in reassuring that all ingredients do not reach the expiration date before consumption,” This clearly shows that vendors/producers limit their products due to insufficient capital so it does not reach the expiration date before it is sold. Six out of ten items got major deficiency where item on “free objectionable materials (hair, dust and insects) got a very low score. It implies that the vendors/producers do not use hair net and proper attire in cooking /vending. The vendors do not cover immediately the product so it has the tendency there are some objectionable materials like dust that may possibly mix and that may contaminate the product. The vendors/producers show noncompliance on the item on “addition of nutrients to the product”. It is likely that preservatives, nutrients and artificial sweeteners were not added since they are not aware on the advantages and disadvantages in the product.

Table 6 presents the food safety measures in post-product handling/vending practices.

Table 6. Food Safety Measures in Post-product Handling/Vending Practices

Criteria on Food Safety Measures	AWM	VI
1. Left-over products are handled separately from the newly made delicacies	7.15	Minor deficiency
2. Finished products are properly covered during transportation	6.75	Minor deficiency
3. Vendors have separate basin/container for spoiled food products	6.70	Minor deficiency
4. Vendors use proper food cover in their products during vending	6.70	Minor deficiency
5. Vendors use plastic gloves or food tongs in handling foods	5.00	Major deficiency
6. The vendors understand the process and the factors they must control to assure the preparation of safe foods	4.85	Major deficiency
7. The vendors perform hand washing before and after handling finished product	3.20	Major deficiency
8. The vendors dry their hands thoroughly on a single use towel or in another way that is not likely to transfer disease-causing organisms onto the hands during food handling	3.15	Major deficiency
9. Vendors make sure that there's no fly or an insect that comes in contact with their products	2.75	Major deficiency
10. The vendors remove their food gloves (if they have any) before accepting the payment	0.50	Non-compliance
Total	4.68	Major deficiency

Food Safety measures in post-product handling/vending practices item on "left-over products are handled separately from the newly made delicacies" seen with minor deficiency. It implies that vendors are aware that leftover foods can contaminate the newly products when it is not segregated thus increasing the risk of early spoilage. There are five items that bear "major deficiencies": like vendors do not use plastic gloves or food tongs in handling the product, they do not perform handwashing before and after handling finished product, vendors do not dry their hands thoroughly on a single use towel, and vendors do not make sure that there's no fly or an insect in contact with their products. It implies that the vendors have major deficiencies on food safety measures in post-product handling and vending practices.

Table 7 presents the Food Safety Measures/Practices in the workplace.

Table 7. Food Safety Measures/Practices in the Workplace

Criteria on Food Safety Measure	AWM	VI
1. Proper size of equipment for the volume of food that will be processed	8.10	Minor deficiency
2. Reliability of equipment or it is prone to frequent breakdown	7.70	Minor deficiency
3. Positive air pressure that maintain in packaging area	6.50	Minor deficiency
4. Providing time temperature control of equipment that is necessary for safe food	6.40	Minor deficiency
5. Designation of equipment so that it can be easily cleaned and sanitized	6.25	Minor deficiency
6. Well ventilated and clean workplace before and after use	5.85	Minor deficiency
7. Availability of garbage disposal at workplace	5.70	Minor deficiency
8. Cleaning and sanitizing of equipment that come in contact with food as often as necessary to prevent contamination	5.05	Major deficiency
9. Including controllable process to destroy pathogen	5.0	Major deficiency
10. Permitting safe handling of food through easily cleaned and sanitized facility and equipment	4.40	Major deficiency
Composite Mean	6.10	Minor deficiency

It shows that the vendors got "minor deficiency" in proper size of equipment for the volume of food that will be processed (8.1), reliability of equipment used, pressurized packaging, temperature controlled equipment, designation of equipment, cleanliness, and availability of garbage disposal in the workplace. The workplace got "major deficiency" in sanitized equipment and control for pathogens for the equipment and the workplace. The data suggest that the producers and vendors are not aware of the sources of pathogens thus, have major deficiency in practices in maintaining cleanliness in the workplace.

In the health practices of the vendors as shown in Table 8, have major deficiencies in health and personal hygiene practices, particularly food handlers with cuts, bruises and skin problems. The vendors do not comply with proper dress attire for food safety and formal training on food handling. It reveals that the *kakanin* vendors/producers have major deficiency with health practices and hygiene.

Table 8. Health Practices

Criteria on Food Safety Measure	AWM	VI
1. The vendor do not exercise unnecessary mannerisms like nose picking, ear picking and spitting on site during vending of products	8.0	Minor deficiency
2. The vendor washes her/his hand before retailing and uses mask when affected with any food borne or airborne illness.	8.0	Minor deficiency
3. The vendors eat, drink and use tobacco products in designated area and not in the working area	7.9	Minor deficiency
4. The vendor uses gloves when affected with skin injures	5.2	Minor deficiency
5. The vendors have health or personal hygiene practices upon the safety of the food being processed	3.5	Major deficiency
6. The vendors are trained to follow good hygienic practice	3.2	Major deficiency
7. Protection is offered to workers with cuts and lesions on part of the body that may contact with fresh products	2.1	Major deficiency
8. The vendors go for consultation when seen symptoms of infectious disease	1.7	Major deficiency
9. Use of proper cooking and vending attire like apron, hairnet, and food gloves	1.4	Non -compliance
10. The vendor attend a formal training on food handling	1.3	Non- compliance
Composite Mean	4.23	Major deficiency

Table 9. Food Safety Measures/Practices in the Marketplace

Criteria on Food Safety Measure	AWM	VI
1. The layout of the facility provide an adequate separation of raw materials (wet) from ready-to-eat (RTE) foods (dry)	5.80	Minor deficiency
2. The food spilled or uneaten by vendors are cleaned up quickly so as not to attract pests or breed of bacteria	5.65	Minor deficiency
3. The roof of the stall is adequate enough to cover the finished products from over-exposure to sun or rain	5.65	Minor deficiency
4. The stall is placed in a high area to avoid floods and muds	5.65	Minor deficiency
5. The place is far from contaminated areas specially sewage canal	5.60	Minor deficiency
6. Water supply is accessible and adequate with enough pressure	4.45	Major deficiency
7. The vendors have business and sanitary permit	4.45	Major deficiency
8. The area outside the facility is free of evidence of pest activity	1.85	Major deficiency
9. The area is free from objectionable odor, smoke flying ash, dust, etc.	1.50	Non-Compliance
10. The stall is permanent	0	Non-Compliance
Composite Mean	3.97	Major deficiency

It shows that the vendors have no permanent stall in the market. They are mobile thus no business permit. At present the *kakanin* vendors are situated in the wet market area where meat and fish stalls are also located. Some *kakanin* vendors are situated near the road where customers can readily buy their products however not safe due to dust from passing vehicles. The *kakanin* vending area is situated in a low place and with evidences of pests, objectionable odor and dust. To sum it up the market place of *kakanin* was rated with major deficiency.

CONCLUSION AND RECOMMENDATION

This study determined the food safety practices and measures among native cake (*kakanin*) vendors and producers. The *kakanin* vendors are usually

female middle adult, elementary graduate with monthly income of P1001 to P5000. They have an average daily income of P500 and above from sales of *kakanin*. However, majority of them do not have health certificate because they are not oblige to have one. *Puto*, *latik* and *bitso-bitso* are the common *kakanin* being produced and sold in the market. Their preparation area have an open dump site facility for throwing garbage, has sink with running water, with wooden tables, inadequate light, stove or “pugon” (oven), basket food storage facility, with plastic as packaging material and no product control area or facility. Using the HACCP standards and control of rating, *kakanin* vendors/producers have major deficiencies in food safety measures and practices in packaging, post-product handling/vending, health and

hygiene, and in the market place however, they have minor deficiency in the work place.

This study further recommends that dissemination of these findings be given to proper authorities to remedy the poor condition on food safety. The Institution should also conduct trainings on food safety and proper handling among the *kakaninvendors* as extension activities. Municipal authorities on health and customers services should be vigilant in the observance of food safety.

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