

## Supplemental Material

Dietary, socioeconomic, and maize handling practices associated with aflatoxin and fumonisin exposure among women tortilla makers in 5 departments in Guatemala

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Cod Totilleria \_ \_ \_

### SURVEY TOOL -- Module 1: TORTILLERIA

"Estimating mycotoxin exposure and improving food safety in Guatemala"

(CIENSA, February 2022)

<b>Study title:</b> Estimation of mycotoxin exposure and increased food security in Guatemala <b>Researchers:</b> Barbara Kowalczyk, Olga Torres, Ariel Garsow <b>Sponsors:</b> Private Donor and The Ohio State University
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#### I. General Information about the Tortilleria

Paste ID sticker HERE

<b>0. Tortilleria ID</b> _____	
1. Department: _____ 2. Code _____	Guatemala = 1, Sololá = 2, Suchitepéquez = 3, Izabal = 4, Zacapa = 5.
3. Municipality _____ 4. Code _____	
5. Neighborhood/Colony _____ 6. Code _____	
7. Longitude _____ 8. Latitude _____	9. Temperature _____ C 10. Humidity _____ %
11. Time when the information for the previous variables _____. _____ hours	
12. Name of the tortilleria _____	13. Address _____
14. Tortilleria owner name _____	15. Cell phone number _____
16. Number of people working in tortilleria ____ 1. Owner ____ 2. family ____ 3. employee ____	
17. Person who gives information about the tortilleria: 1. Owner: ____ 2. family ____ 3. employee ____	
18. Name of the person interviewed _____ 19. Age _____ years	
<b>20. Survey components:</b> 1. Questionnaire ____ 2. corn sample ____	
3. Sample of tortillas ____ 4. Urine sample ____	
21. Language interview was conducted: 1. Spanish __ 2. Kaqchikel __ 3. Tz'utujil __ 4. K'iche' __ 5. Other __	
22. Date ____ / ____ / 2022 23. Interviewer name _____ Cod _____	

#### II. Conditions of the material of the tortilleria and storage of the corn

Site conditions or tortilleria (99 = Could not be observed)				
Aspects to qualify	Tortilleria	Cod	Storage	Cod
II. 1 Material that predominates on the floor?	_____	_____	_____	_____
II. 2 Material that predominates on the walls?	_____	_____	_____	_____
II. 3 Material that predominates in the ceiling?	_____	_____	_____	_____

III: Corn and tortilla making

Questions	Answer Options	Codes
<b>Origin, purchase of corn and storage</b>		
III. 1 What do you/ <i>do you all use</i> to prepare the dough of the tortillas you make in this tortilla shop?	1. Corn only? 2. Only maseca? 3. Corn and maseca? 4. Corn and 1. Sorghum, 2. Rice, 3. barley 4. Other _____	1 ____ 2 ____ 3 ____ 4 ____
III.2 What color is the corn you use/ <i>Do you use</i> to make tortillas?	1. White 2. Yellow 3: Black 4. Corinth 5. Other (E) _____	_____

III. 3 Almost always, what corn do you/ <i>use</i> to make tortillas is...	1. Harvested? , or -- ( <i>homegrown</i> )--- 2. Purchased? 3. Other ( <i>specify</i> ) _____	_____
<b>A. Harvested maize</b>		
III. 4 Is corn harvested within the municipality?	1. Yes, <i>Community</i> _____ <i>Cod</i> ____ 0.No 2. Don't know → Skip to question III.7	_____
III. 5 Approximate distance from harvest community to tortilleria ____ <i>kilometers</i>		
III.6 How do you transport harvested corn from the place where it is harvested to this place?	1. By land 2. By water (sea, lake, river) 3. Don't know/Don't respond	1 ____ 2 ____ 3 ____
<b>If the corn for tortillas is entirely homegrown, go to question III.12→</b>		
<b>B. Maize purchased:</b>		
III. 7 Here in _____ Where do you buy/ <i>buy</i> mainly the corn you use/use to make the tortillas?	1. Producer's truck 2. Intermediary truck 3. Producer's boat 4. Intermediary boat 5. Warehouse/warehouse/market seller/terminal 6. Private shop/Deposit (outside of the market) 7. Shop/grocery store 8. Other ( <i>specify</i> ) _____	1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____
III. 8 Do you know from which part of Guatemala comes the corn <b>that is bought</b> to make the masa with which tortillas are made?	1. Yes 0. Do not → go to question III. 11 3. Don't Know/Don't Answer Move → to Question Move to Question III.11	_____
III. 9 Where does the corn <b>that is bought</b> to make the tortillas come from?		
<b>Answer Options</b>	<b>Codes</b>	<b>Answer Options</b>
1. South Coast		5. Peten
2. North		6. Central Plateau
3. East		7. Mexico
4. The West		8. Other place <i>specify</i>
III. 10 How do you transport the corn that is bought to make the tortillas, from the place where it is harvested?	1. By land 2. By water (sea, lake, river) 3. Don't know/Don't respond	1 ____ 2 ____ 3 ____
III. 11 Most of the time, the corn <b>that is bought</b> to make the tortillas... ( <i>Read answer options 1 and 2</i> )	1. Do you buy it daily?, → Skip to question III.20 2. Do you buy it for a longer time and keep it? 3. Use harvested corn	_____

III. 12 How long do you keep or store the corn before using it to make the tortillas?	1. Less than a week 2. One week 3. More than a week ___ D / ___ S / ___ M	___
III.13 How do you store or store the corn you use to make these tortillas? <i>(Read answer options 1 and 2)</i>	1. On the cob?, or 2. In grain?	___
III. 14 Where do you keep or store the corn you use to make tortillas?		
<b>Answer Options</b>	<b>Codes</b>	<b>Answer Options</b>
1. Troja		5. Silo
2. Sack		6. Other
3. Barrel / barrel		

III.15 Could I see where you keep the corn that you use/use to make the tortillas?	1. Yes 2. The place is very secluded/locked <b>99.</b> They declined observation → Move to question III.17	___							
<b>Observation:</b> III.16 What are the conditions of the place where this corn is stored?	<b>Aspects to observe:</b>	<b>YES</b>							
	1. Is it ventilated?	<b>1</b>							
	2. It is illuminated: <i>natural</i> ___ <i>artificial</i> ___	<b>1</b>							
	3. Is it wet?	<b>1</b>							
	4. Is it clean?	<b>1</b>							
	5. Is it used only to store corn?	<b>1</b>							
	6. Completely closed / Presence of holes? Yes ___ No ___	<b>1</b>							
	7. Are there pallets/ If they are metal, are they rusty? Yes ___ No ___	<b>1</b>							
		<b>NO</b>							
		<b>0</b>							
		<b>0</b>							
		<b>0</b>							
		<b>0</b>							
		<b>0</b>							
		<b>0</b>							
<b>Quality of maize observed during the interview</b>									
<b>Observation:</b> III.17 How is the presentation of the corn used to make the tortillas?	1. Whole 2. Broken 3. Chopped 4. With deteriorated natural color 5. Rotten 6. Other ( <i>specify</i> ) _____	1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___							
<b>Observation:</b> III.18 Does the corn used to make tortillas have contaminants or foreign materials?	<b>Aspects to observe:</b>	<b>Quantity</b>							
	1. It doesn't have, it's clean								
	2. Roots, leaves, garbage	___							
	3. Stones, sticks	___							
	4. Weevils	___							
	5. Earth, dust, garbage	<i>Present</i> ___ <i>absent</i> ___							
	6. Other (E) _____	___							
<b>Observation:</b> III.19 Does the corn used to make tortillas have any strong or noticeable odors?	1. It does not have 2. A fertilizer/herbicide/fungicide 3. A stale? 4. A rotten? 5. Other ( <i>specify</i> ) _____	1 ___ 2 ___ 3 ___ 4 ___ 5 ___							
III. 20 How long ago was the last time you bought /bought corn to make the tortillas you sell in this place? 1) ___ days 2) ___ weeks 3) ___ NS/NR →Skip to question 6) of this III.20									
4) Do you know where the corn you bought last time came from?	1	2	3	4	5	6	7	8	NS
5) Did you keep corn from what you bought last time? 1. Yes ___ 2. No ___ → P III. 21	Quantity / Unit: ___ / ___								

6) How much corn is stored from the one you bought last time?		Quantity / Unit: ___ / ___
III.21 How was the corn that you bought this last time to make the tortillas? (Read answer options, on each item)		
a. 1. Whole?, 2 broken?, 3. picado?, or 4. rotten?		___ / ___ / ___ / ___
b. 1. Clean?, 2. con roots, 3. con stones, or earth, or with 4. weevils?		___ / ___ / ___ / ___
c. 1. With the smell of fertilizers/herbicides?, 2. Rancid, or smelling 3. rotten?		___ / ___ / ___
d. 99. Didn't review it / Doesn't remember		___
Preparation of tortillas		
III. 22 What do you do when <b>you</b> realize that the corn to prepare the tortillas has: fungal weevils, or is eaten by birds or mice?	1. Discarded/Thrown Away 2. It is given to animals ( <i>pigs, poultry</i> ) 3. Nothing, always used 4. Mix it with corn that has no harm 5. She / <i>they</i> always buy good quality corn 6. Other ( <i>specify</i> ) _____	_____

III.23 Who is in charge of making the nixtamal para the dough with which they make the tortillas? (Ask the following question to the person in charge of preparing the nixtamal)	1. The owner of the tortilleria 2. Another person 3. They always buy the ready-made dough → Ask for THE KNOWLEDGE of the nixtamalization process)	_____														
III. 24 What are the steps you do/ <i>what do you</i> do to make the dough with which the tortillas are prepared, since the corn is obtained? (Read answer options 1 to 6) Do you know what the steps are... ?	___ Do you soak in lime water, overnight? ___ Is it boiled with lime (Nixtamalized)? ___ Boils without lime? ___ Drains? ___ Is it washed several times with different water? ___ times ___ Is ground? (at home or in the motor mill) 7. Doesn't know	1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___ 7 ___														
III. 25 How much corn, water and lime do <i>you use</i> to make tortilla dough? Do you know how much...?	<table border="1"> <thead> <tr> <th>Ingredients (per grind)</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>1. Corn</td> <td>___ lb/a</td> </tr> <tr> <td>2. Water for nixtamal</td> <td>___ lt / bot / gal</td> </tr> <tr> <td>3. Lime</td> <td>___ oz / lb</td> </tr> <tr> <td>4. Water for washing</td> <td>___ lt / bot / gal</td> </tr> <tr> <td>5. Boiling time</td> <td>___ h/m</td> </tr> <tr> <td>6. Don't know</td> <td></td> </tr> </tbody> </table>	Ingredients (per grind)	Quantity	1. Corn	___ lb/a	2. Water for nixtamal	___ lt / bot / gal	3. Lime	___ oz / lb	4. Water for washing	___ lt / bot / gal	5. Boiling time	___ h/m	6. Don't know		
Ingredients (per grind)	Quantity															
1. Corn	___ lb/a															
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4. Water for washing	___ lt / bot / gal															
5. Boiling time	___ h/m															
6. Don't know																
III. 25a How long is corn boiled? Do you know how long...?	How many torteadas do you do a day? ___ torteadas How many tortillas are made in C/torteadas? ___ tortillas How many tortillas are made per day? ___ tortillas															
III.26 What kind of fuel do you/ <i>Do you use</i> to prepare the mase and make the tortillas?																
Answer Options	Codes	Answer Options														
1. Firewood		4. Electricity														
2. Coal		5. Other (E)														
3. Propane gas																
III. 27 Where do they get the water they use to make tortilla dough?																
Answer Options	Codes	Answer Options														
1. Own jet		4. Public/relative or neighbor well														
2. Public jet / relative or neighbor		5. River, lake, spring														
3. Own well		Other (E)														

Risk factors for aflatoxin and fumonisin exposure in Guatemala, Garsow et al.

<p><b>III. 28</b> What do you/<i>do</i> with the water you use for nixtamal and washing? ----- <i>What would you do with....?</i></p>	<p>1. Use it again to soak, nixtamalize or drain 2. They use it to prepare other foods 3. They give it to animals (<i>pigs, poultry</i>) 4. They throw it away or discard it 5. Other (<i>specify</i>) _____ <b>6. Don't know</b></p>	<p>1 ____ 2 ____ 3 ____ 4 ____ 5 ____</p>
<p><b>III.29</b> After preparing the tortillas, what do you <i>do</i> with the dough that is left over? ----- <i>What would usted/ do you do...?</i></p>	<p>1 They keep it to make tortillas of the next time/day 2. They use it for other preparations 3. Discard it thrown away or give to animals 4. Makes dough atol / fresh dough 5. Other (<i>specify</i>) _____ <b>6. Doesn't know</b></p>	<p>1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____</p>

## SURVEY TOOL -- Module 2: WOMEN

"Estimating mycotoxin exposure and improving food safety in Guatemala"  
(CIENSA, February 2022)**Study title:** Estimation of mycotoxin exposure and increased food security in Guatemala**Researchers:** Barbara Kowalczyk, Olga Torres, Ariel Garsow**Sponsors:** Private Donor and The Ohio State University

## I. General information of the woman interviewed

Paste ID sticker HERE

0. Tortilleria ID _____	
1. Department: _____ Code _____	Guatemala = 1, Sololá = 2, Suchitepéquez = 3, Izabal = 4, Zacapa = 5.
3. Municipality: _____ Code _____	
5. Neighborhood/Colony _____ Code _____	
7. Name of the tortilleria _____ 8. Code _____	9. Cell phone number _____
10. Roles of the people who work in the tortilleria : 1. Owner ___ 2. family ___ 3. employee ___	
11. Selected person who gives information of <b>this survey</b> : 1. Owner: ___ 2. family member ___ employee ___	
12. Name of interviewee _____ Age _____ years	
<i>[Select this woman from those who want to participate in this study and give a urine sample]</i>	
14. Language in which the interview was conducted: 1. Español ___ 2. Kaqchikel ___ 3. Tz' utujil ___ 4. K'iché' ___ 5. Other ___	
15. Date ____ / ____ / 2022 16. Interviewer _____ Cod _____	

## II. Characteristics of the woman interviewed and her home

Questions	Answer Options	Codes
II.1 Marital status of the interviewee	1. Married 2. United 3. Single 4. Widow 5. Divorced 6. Separate	
II. 2 Formal education of the woman interviewed	Can you read? ___ Do you know how to write? ___	_____ Degree _____ Code _____ Level _____ Code _____
II. 3 Where are you?, Where were you born?	Community _____ Municipality _____ Department _____	Code _____ Code _____ Code _____
II.4 How long ago did you leave your community?	_____ months _____ years	

Part III. Consumption of prepared corn-based foods, during the last week

Did you eat ____ / Did you drink ____ last week?					<i>Note: Consider all foods consumed by the target person, both at home and outside of the home, regardless of where they were prepared.</i>	
No	Food:	If you ate it or drank it...			Units	Grams
		1 = Yes 0 = No	How many days a week did you eat/drink?	How much ____ Did you eat/drink in these ____ days?		
1	Tortillas	1 0	_____	_____. ____	or	40
2	Little Tamales	1 0	_____	_____. ____	or	200
3	Tamales	1 0	_____	_____. ____	or	55
4	Chuchitos	1 0	_____	_____. ____	or	75
5	Sleeps	1 0	_____	_____. ____	or	65
6	Toast	1 0	_____	_____. ____	or	25
7	Nachos	1 0	_____	_____. ____	u/b	5 / 60
8	Tortrix	1 0	_____	_____. ____	b	40
9	Pinol	1 0	_____	_____. ____	cd/oz/lb /tz	8 /28.7 / 454 / 95
10	Tayuyos / Tones	1 0	_____	_____. ____	or	55
11	Mass water	1 0	_____	_____. ____	v / tz / C	20 / 20/ 20
12	Mass atol	1 0	_____	_____. ____	v / tz / C	40 / 40 / 40
13	Corn coffee	1 0	_____	_____. ____	cd/ v /tz	12 /12 /12
14	Corn atol	1 0	_____	_____. ____	v / tz / C	40 / 40 / 40
15	Corn (roasted/cooked)	1 0	_____	_____. ____	or	115
16	Cornstarch	1 0	_____	_____. ____	cd / oz/lb/ tz	12 /28.7 /454 / 12
17	Polenta (CSB)	1 0	_____	_____. ____	cd / oz/lb/ tz	14 /28.7 /454 / 14
18	Corn flakes	1 0	_____	_____. ____	cd / tz	7 / 45
19	Incaparina	1 0	_____	_____. ____	cd / oz / lb-b / bp tz	14 /28.7 /454 / 75 14
20	Tacos	1 0	_____	_____. ____	or	35
21	Other food	1 0	_____	_____. ____	u/cd / oz /lb/ ____	_____

Unit abbreviations	
CD	= tablespoon
C	= ladle
or	= unit
Oz	= ounce
Lb	= pound
b	= bag
BP	= sachet (small bag)
tz	= cup
v	= glass

