Service-Learning to Promote Edible Insects

Effects of education and exposure on student perceptions of insects and entomophagy.

Marianne Shockley and Audrey Wright
Dept. of Entomology
College of Agricultural & Environmental Sciences
University of Georgia
Introduction

- Premalatha
- Godber (2014)
- Mlcek (2014)
- Nadaeu (2014)
- Core77 (2012)

Diagram:
- 2012: 7 billion people, 20 gigacalories
- 2050: 9 billion people, 40 gigacalories

(Premalatha), (Godber 2014), (Mlcek, 2014), (Nadaeu, 2014), (Core77, 2012)
**Problem:**
Globalization = Western Opinion

Edible insects are wildly nutritious and sustainable. So why is globalization KILLING traditional entomophagy and its humanitarian potential?

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**"Ick Factor"**

- Traditional Entomophagy
- Poor nutrition causes 45% of deaths in children under five
- Increased meat demand
  - Not Sustainable!!!

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**Solution:**

Change Western Opinion!

Insects are a sustainable, nutritious AND gourmet FOOD.

- Combat Food Instability
- Humanitarian need for edible insect farming in developing world
- Micro Economic Development

- Food attitudes DO change
- Bugs must trend!
- #EdibleInsects

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Get bugs on the menu

- bugpissont.com
- gastronomy on six legs
  - edible insect recipes
  - product reviews
  - cooking tips
10 Kg Feed

9 Kg

1 Kg

grasshoppers
96 kcal per portion

12% Carbs
72% Protein
16% Fat

beef mince
285 kcal per portion

52% Protein
48% Fat
# NUTRITION PROFILE COMPARING

**Cricket Flour vs Steak & Broccoli**

<table>
<thead>
<tr>
<th>Nutritional Component</th>
<th>Daily Requirement for 70kg adult</th>
<th>100g Cricket Flour</th>
<th>113g Steak (275 kcal)</th>
<th>9 cups chopped, raw broccoli (277 kcal)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESSENTIAL AMINO ACIDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>histidine</td>
<td>0.70g</td>
<td>1.44g</td>
<td>0.975g</td>
<td>0.48g</td>
</tr>
<tr>
<td>isoleucine</td>
<td>1.400g</td>
<td>2.59g</td>
<td>1.391g</td>
<td>0.643g</td>
</tr>
<tr>
<td>leucine</td>
<td>2.730g</td>
<td>4.61g</td>
<td>2.431g</td>
<td>1.05g</td>
</tr>
<tr>
<td>lysine</td>
<td>2.100g</td>
<td>3.61g</td>
<td>2.583g</td>
<td>1.099g</td>
</tr>
<tr>
<td>methionine</td>
<td>0.70g</td>
<td>1.09g</td>
<td>0.796g</td>
<td>0.309g</td>
</tr>
<tr>
<td>cysteine</td>
<td>0.28g</td>
<td>0.507g</td>
<td>0.394g</td>
<td>0.228g</td>
</tr>
<tr>
<td>threonine</td>
<td>1.050g</td>
<td>2.37g</td>
<td>1.221g</td>
<td>0.716g</td>
</tr>
<tr>
<td>tryptophan</td>
<td>0.280g</td>
<td>0.560g</td>
<td>0.201g</td>
<td>0.269g</td>
</tr>
<tr>
<td>valine</td>
<td>1.82g</td>
<td>3.70g</td>
<td>1.516g</td>
<td>1.018g</td>
</tr>
<tr>
<td><strong>OVERALL PROTEIN</strong></td>
<td>50g</td>
<td>65g</td>
<td>32g</td>
<td>2.8g</td>
</tr>
<tr>
<td><strong>B12</strong></td>
<td>2.4mcg</td>
<td>30mcg</td>
<td>6mcg</td>
<td>0mcg</td>
</tr>
<tr>
<td><strong>OMEGA 6:3 RATIO</strong></td>
<td>ideal ratio 3:1</td>
<td>3:1</td>
<td>18:1</td>
<td>1:2</td>
</tr>
</tbody>
</table>

Source: Nutrition profile provided by Maxxam Analytics
Human Grade Crickets and Cricket Powders/Flours

BIG CRICKET FARMS
AMERICA'S FIRST URBAN CRICKET FARM

HOME ABOUT US PRODUCTS FAQ CONTACT US BLOG

Aketta by ASPIRE
Research Questions

• Does entomological education and weekly exposure to live specimens change student perceptions of *insects*?

• Does entomophagical education and weekly exposure to live specimens change student perceptions of *entomophagy*?
Methods

N = 50 students

5 weeks

6 entomophagy modules

14 survey statements

ENTO 3300S

Survey & Before & After
survey:

1. Insects are ecologically important.
2. I like insects.
3. Insects are edible.
4. I would eat a whole, cooked insect.
5. I would eat an insect if I liked the food it was combined with. (Ex: chocolate-covered crickets)
6. I would eat an insect if it was not visible in the food sample. (Ex. insect protein powder as an ingredient in brownie mix)
7. I would buy insects to prepare at home if they were sold in the grocery store. (Ex. ground insect protein powder)
8. Excessive meat consumption can negatively affect human health.
9. I would eat insects as an alternative animal protein.
10. I value the environment.
11. Humans may be responsible for accelerated climate change.
12. Livestock production can negatively impact the environment.
13. Eating insects as an alternative protein could create a more sustainable food system.
14. Eating insects may be a solution to ending world malnutrition.
<table>
<thead>
<tr>
<th>Question</th>
<th>First Survey Average</th>
<th>Second Survey Average</th>
<th>Increase in Average</th>
<th>Significant at 95% Confidence Interval?*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insects are ecologically important.</td>
<td>6.61</td>
<td>6.71</td>
<td>0.11</td>
<td>No</td>
</tr>
<tr>
<td>I like insects.</td>
<td>4.46</td>
<td>5.18</td>
<td>0.71</td>
<td>Yes</td>
</tr>
<tr>
<td>Insects are edible.</td>
<td>4.54</td>
<td>6.32</td>
<td>1.79</td>
<td>Yes</td>
</tr>
<tr>
<td>I would eat a whole, cooked insect.</td>
<td>3.00</td>
<td>4.29</td>
<td>1.29</td>
<td>Yes</td>
</tr>
<tr>
<td>I would eat an insect if I liked the food it was combined with.</td>
<td>3.93</td>
<td>5.50</td>
<td>1.57</td>
<td>Yes</td>
</tr>
<tr>
<td>I would eat an insect if it was not visible in the food sample.</td>
<td>4.75</td>
<td>6.21</td>
<td>1.46</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>I would buy insects to prepare at home if they were sold in the grocery store.</strong></td>
<td><strong>2.07</strong></td>
<td><strong>4.43</strong></td>
<td><strong>2.36</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>Excessive meat consumption can negatively affect human health.</td>
<td>5.04</td>
<td>5.75</td>
<td>0.71</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>I would eat insects as an alternative animal protein.</strong></td>
<td><strong>2.86</strong></td>
<td><strong>5.14</strong></td>
<td><strong>2.29</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>I value the environment.</td>
<td>6.18</td>
<td>6.25</td>
<td>0.07</td>
<td>No</td>
</tr>
<tr>
<td>Humans may be responsible for accelerated climate change.</td>
<td>5.86</td>
<td>6.14</td>
<td>0.29</td>
<td>No</td>
</tr>
<tr>
<td>Livestock production can negatively impact the environment.</td>
<td>4.89</td>
<td>5.86</td>
<td>0.96</td>
<td>Yes</td>
</tr>
<tr>
<td>Eating insects as an alternative protein could create a more sustainable food system.</td>
<td>4.57</td>
<td>6.14</td>
<td>1.57</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Eating insects may be a solution to ending world malnutrition.</strong></td>
<td><strong>3.68</strong></td>
<td><strong>6.14</strong></td>
<td><strong>2.46</strong></td>
<td><strong>Yes</strong></td>
</tr>
</tbody>
</table>

*calculated via one-tailed related mean t-test
<table>
<thead>
<tr>
<th>data:</th>
<th>Percentage of students with a positive perception of insects</th>
<th>Percentage of students with a positive perception of entomophagy</th>
<th>Percentage of students aware of environmental issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before:</td>
<td>64%</td>
<td>14%</td>
<td>54%</td>
</tr>
<tr>
<td>After:</td>
<td>68%</td>
<td>75%</td>
<td>78%</td>
</tr>
</tbody>
</table>
Perception of Insects

Changes in Perception

First Survey Averages
Second Survey Averages

Willingness to Consume Insects
Discussion

Does entomological education and weekly exposure to live specimens change student perceptions of *insects*? YES

Does entomophagical education and weekly exposure to live specimens change student perceptions of *entomophagy*? YES
Future Research

• Student preparation of edible insect food items
• Compare students who have been exposed to the entomological education ONLY versus entomological education AND entomophagical education.
• Administer survey in subsequent semesters to various ENTO courses.
Thank you for your time.

Questions?