

# FOOD AND SOCIETY **PROCEEDINGS**

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## **Cultural differences in insect acceptance – a comparison between students in Sweden and Thailand**

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### **Introduction**

The global demand for nutritious and acceptable food, driven by a growing population as well as increased consumption per capita, is increasing <sup>1</sup>. Extrapolating the current trend of rising incomes driving the demand for meat protein and total calories will, according to Tilman and Clark (2014) result in an increased global consumption. In 2050 humanity will need a total of 15% more calories and 11% more protein, compared to today. These trends pose a threat to a sustainable development, from an environmental as well as a health perspective, and alternative dietary scenarios are needed. As one of many possible alternatives, edible insects have been put forward as a resource efficient source of protein and other essential nutrients<sup>2</sup>.

Insects is already part of the diet in many regions of the world, and in parts of Asia, Africa, Mexico and Southern America the eating of insects is part of a long tradition and cultural heritage<sup>3</sup>. An example of a country where the consumption of insects is steadily increasing is Thailand<sup>4</sup>. Today, some 200 insect species are eaten in Thailand. Bamboo caterpillars, house crickets, giant water bugs and grasshoppers dominate the commercial sales in markets. In particular, Thai people like to eat giant water bugs (*Lethocerus indicus* Lep.-Serv.) with a unique catty and ripe guava-like odour<sup>5</sup> and flavor of male specimen and a texture described as watery scrambled eggs. Many species are collected from the wild and sold seasonally in local markets. House crickets and palm weevils have been farmed successfully in many Thai provinces since the mid-1990s. Nowadays the practice has increased in popularity and has expanded nationwide. Consumption patterns of insects continue to evolve and recently emphasis has shifted to convenience and consuming insects as snacks<sup>4</sup>. The price of insects in Thai markets is often three or four times the price of meat and fish on a per kilogramme basis<sup>6</sup>. Interestingly, parallel to the trend of a rapid consumption increase, a very large share of Thai people are, based on disgust and perceived side effects or dangers from eating insects, still sceptical to insects as food.

In Europe on the other hand, eating insects is still unfamiliar to most people. Several studies have shown that most people in the western part of the world have difficulties accepting insects as food<sup>7,8</sup>. This is also related to the fact that it has been forbidden to sell insects as food in the EU for the last 20 years. As part of the legislation related to Novel foods, insects as food must be approved according to a particular EU process <sup>9</sup>. The purpose of the legislation is to protect consumers from unknown hazards such as allergies, poisons and infections. However, some countries in EU, such as the Netherlands, Belgium, France, the UK and Denmark have interpreted the law in a less strict manner, enabling selling as well as rearing insects to a certain extent<sup>10</sup>, where the most common is insects that has been pulverised or sold as dried or freeze-dried products. In Sweden selling and rearing insects as human food is still prohibited.

In the quest for more sustainable protein sources, the fact that a variety of climatic, cultural, religious and historic reasons affects the diets of different nations and regions has to be acknowledged. A sustainable transition to a diet that includes components that are novel to consumers, like edible insects are to Swedish consumers, will require careful consideration with regard to the local food culture and heritage. In fact, the general acceptance of edible insects in most Western societies is low and eating insects is often perceived as disgusting and primitive. An acquired familiarity with the notion of eating insects has been shown to be a powerful driver for acceptance<sup>8</sup>. An awareness of what the eating of insects is all about may result in more positive intentions towards buying and including insects in the diet, both in relation to one's own diet and in relation to trying to affect friends and relatives to include insects in their diet<sup>11, 12</sup>.

In order to promote entomophagy – the practice of eating insects – the disgust factor must be addressed<sup>7,13</sup>. Disgust elicitors may be similar across cultures or culturally specific<sup>14</sup>. This variability makes a theoretical model to classify disgust elicitors, not only associated to mere pathogen avoidance but also in relation to different types of moral violations, relevant. Concerning food, the moral domain of disgust is of relevance when it comes to for example acceptance of new food technologies or to the differentiation of various animal based proteins into either appropriate or inappropriate to ingest<sup>15</sup>. Disgust can be monitored through the Food Disgust Scale (FDS), a self-report measure that enables the assessment of an individual's emotional disposition to react with disgust to certain food-related (offensive) stimuli<sup>15</sup>.

In a recent master thesis, an attempt to understand how Swedish consumers think about eating insects through semi-structured interviews reveal that that curiosity, fear, disgust are the main perceptions among the 18 participants. The author argues that the negative perceptions arise mainly out of cultural/social construction and low exposure to insects<sup>16</sup>. In another, cross-cultural qualitative study the basis of acceptance and rejection of various insects and insect containing foods amongst Thai and Dutch consumers was examined<sup>17</sup>. The interest here laid in the tension between a culture where insects are part of the cuisine and one where insects are generally not considered food<sup>17</sup>. Inspired by this approach we wanted so use the FDS and the concepts of familiarity and intention to buy, to make a quantitative description of young consumers reactions and attitudes to various food related stimuli and insects in Sweden and Thailand. The aim of the present study was thus to explore cultural differences between Swedish and Thai students with regard to their disposition to react with disgust to certain food-related stimuli. Further the study aimed at elucidating differences in familiarity and intention to include insects in the diet between these groups.

## **Methods**

A questionnaire adapted from the studies by Verneau et al. (2016) and Hartmann & Siegrist (2018) was administered electronically, using the software EyeQuestion, to a sample of Swedish students at Kristianstad University (Sweden) and Thai students at Rangsit University (Thailand) in September-October 2018. The questions included demographics in that the students were asked to indicate gender. Further, an adaption of the FSD on a continuous scale (1-7) using the following wording and translated to Swedish and English, was used:

How disgusting do you perceive:

- To put animal cartilage into my mouth? (Not disgusting at all - totally disgusting)
- To eat with dirty silverware in a restaurant? (Not disgusting at all -totally disgusting)
- Food donated from a neighbor whom I barely know? (Not disgusting at all-totally disgusting)
- To eat hard cheese from which mold was cut off? (Not disgusting at all -totally disgusting)
- To eat apple slices that turned brown when exposed to air? (Not disgusting at all - totally disgusting)
- The texture of some kinds of fish in the mouth (Not disgusting at all - totally disgusting)
- To eat brown-colored avocado pulp? (Not disgusting at all -totally disgusting)
- To eat a salad if there is a little snail in it (Not disgusting at all -totally disgusting)

Familiarity was monitored via the question “Have you ever heard of the eating of insects?” with the reply alternatives:

- Yes, I have heard of the eating of insects and I know what it means
- I have heard of the eating of insects but actually don't know what it means
- No, I have never heard of the eating of insects
- I don't know

Intention to include insects in the diet was monitored by the following questions:

- If you have heard about eating insects, is your intention then to introduce insects in your diet?
- If you have heard about eating insects, is your intention then to suggest to introduce insect proteins in friends and relatives diets?
- If you have heard about eating insects, is your intention then to buy products with insect proteins rather than traditional protein sources, if available on the market?

In total, 42 Swedish students and 39 Thai students responded to the questionnaire. Data was analysed using the students t-test for FSD questions and chi-squared tests for the non-parametric data using Microsoft Excel.

## Results

Indications of poor hygiene, like having to eat with dirty silverware in a restaurant, was found to be the most disgusting food-related stimuli among Swedish and Thai students alike. Swedish students were significantly more concerned than those from Thailand about putting animal cartilage into the mouth and by eating with dirty silverware in a restaurant ( $p=0.004$  and  $=0.005$ , respectively). Thai students were more disgusted than Swedes by eating hard cheese from which mold was cut off or to eat apple slices that has turned brown when exposed to air ( $p=0.002$  and  $0.000$  respectively).

In Sweden 98% of the respondents had heard of eating insects but of these, only 25 % stated that they did not know what eating insects actually meant. Among Thai students, 89% had heard of eating insects but among these, 26% did not know what this actually meant. However, there was no significant difference between Swedish and Thai students in their intention to incorporate insects in the diet of their own or in recommending it to friends and relatives. Further, no difference in the intention to buy products with insect protein rather than traditional protein sources was detected (table 1).

**Table 1.** The intention to buy products with insect protein rather than traditional protein sources among Swedish and Thai students, respectively.

Intention to buy products with insect protein rather than traditional protein sources, if available on the market	Country		Total
	Sweden	Thailand	
No	28	26	54
Yes	14	13	27
Total	42	39	81

## Discussion

By studying the impact on disgust induced by different factors the understanding of how to promote new foods, *e.g.* insects, in different cultures may increase. From the results it was clear that Swedish students were significantly more concerned than those from Thailand about putting animal cartilage into the mouth. This might be explained by the different cultural background, where the Thai students were more familiar with this type of food matrix. Previous research strongly emphasize the role of culture, including familiarity, in acceptance of food in general, and in regard to insects in specific<sup>8,18</sup>. The food that has been part of growing up is also important in the acceptance, as well as the preferences of certain food and food ingredients later in life. In the present study, this was further illustrated by the fact that the Thai students where more disgusted than Swedes by eating hard cheese from which mold was cut off because Thai students were not familiar with the idea of eating cheese. With reference to anthropologist and cultural theorist Mary Douglas (2002) there are also cultural differences regarding what is perceived as “disgusting” and what is seen as dirty or pure. In her discussions about purity and danger, certain food can be considered as dangerous/dirty, and be harmful to the prevailing norms in society in one cultural context and historical time and not in another<sup>19</sup>. This also highlights the importance of acknowledging the symbolic, as well as changing nature of how certain food is defined as well as categorized. However, something can also be considered as dirt when crossing a certain symbolic border – for instance – food on the floor might be perceived differently (as non-food) from food on the plate. In relation to insects – the disgust factor might increase when imagining eating the insect, not by watching it in its natural environment.

From the results, there was no significant difference between Swedish and Thai students in their intention to incorporate insects in their own diet or in recommending it to friends and relatives. The majority of students of both nationalities, did not intend to incorporate insects in their diet. This was somewhat unexpected but seems to illustrate that many consumers, independently of their cultural background may associate entomophagy with disgust and perceived side effects or dangers from insect consumption<sup>20</sup>. In the study of Tan et al. (2014), liking or aversion of insect-containing foods was found to be an interplay of cultural and individual preferences and motivations. The authors showed that extrinsic motivators such as healthiness and sustainability may appeal to consumers but that the psychological barriers to consumption are often stronger. Sensory expectations and perceived appropriateness of a food play very large roles in the intention of eating. If insects are considered inappropriate or are not even regarded as food, insect containing foods will be very hard to accept, be it in Thailand or Sweden. In Thailand, however, insects as food has made a type of “class journey” – being not only considered

inappropriate “low class food”, but also being trendy and consumed as convenient food in urban environments. In fact, curiosity may drive intentions to try, irrespective of actual liking<sup>17</sup>. This, along with acquired familiarity may be a key factor in increasing acceptance<sup>21, 22</sup>. Another promising method to increase willingness to eat insects is to offer products made from processed insects<sup>23</sup>. Further, as stated by Tan et al. (2014) the promotion of insects should not solely focus on communicating its functional benefits but should pay due attention to creating products that suit consumer expectations in their own cultural context.

Methodological reflections include the targeted group of respondents. Students are the consumers of tomorrow and their age and education level impact their feeling of disgust. In future studies it would be interesting to look at acceptance among a variety of ages and in larger populations. Other methodological concerns may be the way the FDS scale was combined with questions regarding familiarity and intention to include insect in the diet. A questionnaire set up in this manner may trigger the thought of contamination whereupon the respondents may perceive the insects as a contaminants<sup>21,24</sup>.

### **Conclusions**

There were some cultural differences between Swedish and Thai students in regard to their disposition to react with disgust to certain food-related stimuli as measured by the Food Disgust Scale. Swedish students were more concerned than those from Thailand about putting animal cartilage into the mouth and by eating with dirty silverware in a restaurant. Thai students were on the other hand more disgusted than Swedes by eating hard cheese from which mold was cut off or to eat apple slices that has turned brown when exposed to air. Almost all Swedish students were familiar with insects as food while a somewhat smaller share of the Thai students were familiar with entomophagy. The intention to include insects in the diet was however similar between the groups. Approximately one third of the respondents planned to incorporate insects in their future diets.

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