

Eating insects

How to make it the new normal

Marleen Onwezen, Muriel Verain, Jos van den Puttelaar & Emily Bouwman



WAGENINGEN
UNIVERSITY & RESEARCH



Potential of insect consumption

Rising meat consumption and rapid population growth make a transition to new types of protein, like insects, necessary. Insects are a high quality protein source associated with health and environmental benefits. However, insects are currently far from being a regular part of Western diets. Wageningen Economic Research therefore explored consumer drivers and barriers of insect consumption, to gain insight into strategies that could increase acceptance of insect consumption. Based on two empirical studies we present five possible strategies to increase consumer acceptance of insects.

Current consumption of insects and intention to do so

Similar to the majority of research on insects, our two studies also show that the consumption of insects in the Netherlands is very low (figure 1). In 2016, we found that 15% of the participants had tried insects, and those that do eat insects do not eat it frequently (0.04/0.06 times a week). As a comparison, meat is eaten about 3 times a week. This pattern is visible in both 2016 and 2017, however the self-reported weekly consumption of meat seems to decline in 2017.

The intention to start eating insects is also very low (below 2 on a 7-point scale). As a comparison, this intention is similar to the intention of vegans and vegetarians to eat meat. However, when it comes to *trying insects* half of the participants in 2016 say to be open to that (45.4%), which further increases to 55% in 2017. Thus, the intention to start eating insects is low, but when it comes to trying insects we find that more than half of the participants are open to that.

Research on insects

At Wageningen Economic Research, we have conducted two studies, one in 2016 and one in 2017 to explore consumer acceptance of insects (more details on the method can be found at the end of this factsheet). In 2016, an online survey was conducted to gain insight into which determinants underlie the acceptance of a range of insect-based products including insects as food and insects as feed. In 2017, we continued to look at insects as food or feed and also conducted a short online experiment to test the effect of an emotional or a cognitive message on the acceptance of insect consumption. Results of these two studies give insight into:

- The current consumption of insects
- Who is eating insects and why
- Possible ways to increase insect consumption

It should be taken into account that some of the suggested strategies in this factsheet are based on cross-sectional survey data and future research should focus on further testing these ideas experimentally in real-life settings.

Current consumption patterns

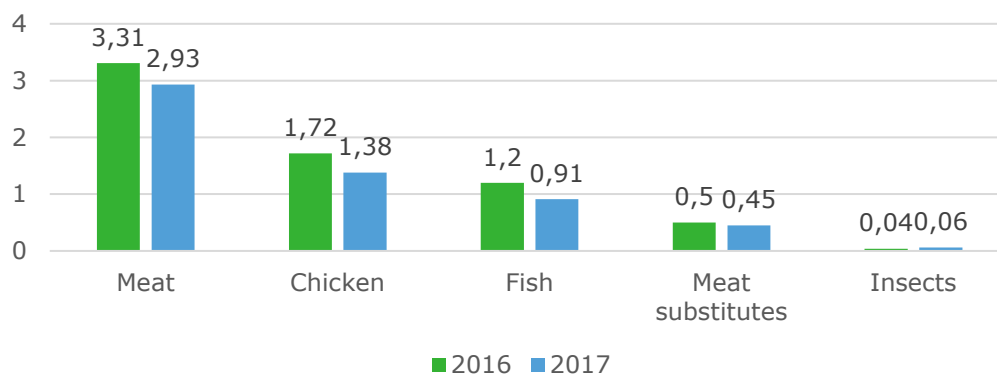


Figure 1 Answers to the question 'How many times do you eat the following products on an average week?'. The numbers in the graph indicate the amount of times that product is eaten in an average week.

Who is eating insects?

Insect-eating consumers have a specific profile. Compared to consumers that do not eat insects, insect-eating consumers are significantly:

- more often male
- more often young
- more often highly educated
- less afraid to try unfamiliar foods (food neophobia).
- less avoidant to think about certain topics that might give them a negative feeling (strategic ignorance). For example, when someone enjoys eating meat, they do not avoid thinking about the circumstances in which the animals live.
- experiencing less negative emotions and less disgust when thinking of insects.

Increasing consumption of insects

Factors that explain consumer acceptance of various insect-based products can help develop interventions towards increasing consumer acceptance of insects. Below we elaborate on five possible ways to increase the acceptance of insects based on the findings of the surveys in 2016 and 2017.

1. Be target-specific, use affective messages for individuals that do not personally feel that health and environment are important

In our studies we found that cognitive factors, coming from reasoning, as well as affective factors, coming from feelings and emotions, play a role in the understanding of acceptance of insect-based products. Furthermore, with unfamiliar products, like fresh insects, affective factors become more important compared to products that are more familiar in the perception of consumers like regular burgers or burgers from livestock fed with insects. In our study in 2017, we experimentally tested the effect of a cognitive message ('research shows') and an affective message ('feel good about yourself') on the acceptance of insect consumption. We found that individuals with low personal norms on health or the environment are more willing to try insect-based products that are positioned with affective messages ('feel good about yourself') compared to cognitive messages ('research shows'). Thus, affective messages seem to be most relevant for a specific target group, namely those that do not feel morally obligated to act healthy or sustainable.

We also found differences in affective associations between various insect-based products. Insect burgers are associated with more negative emotions: consumers experience mixed feelings

surrounding the consumption of an insect burger (figure 2), insect burgers lead to more disgust compared to chicken burgers (fed with insects), and insect burgers lead to less positive emotions compared to chicken burgers (fed with insects).

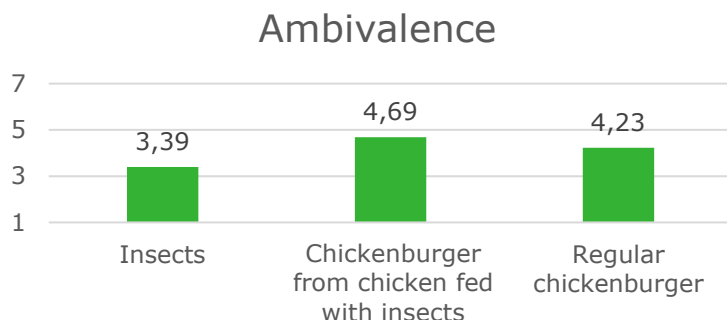


Figure 2 Average score of answers to 3 questions with 7-point scales: '...' gives me contradictory feelings (1) to no contradictory feelings (7), '...' gives me an awkward feeling (1) to no awkward feeling (7) and '...' gives me mixed feelings (1) to no mixed feelings (7).

2. Trying insects leads to liking insects, even when it is tried by others

When consumers are asked how insects taste, many consumers have “no idea”. Consumers that do have an idea, mainly have negative taste perceptions, like Grose, Filthy, Hard, Mealy and Tough. Whereas consumers that have eaten insects before, have more positive taste perceptions, namely Crunchy, Crispy, Tasty and that it tastes like Chicken. Thus the idea of eating insects is quite negative, however once consumers have tried insects, they become more positive. Although experimental studies are necessary to investigate if this effect occurs due to selection bias, this finding is a first indication that insects are positively evaluated once they are tried and thus that they have potential. It also indicates the relevance of trying insects and becoming more familiar with insects. Furthermore, sharing with each other that you have eaten insects (and liked it) can also have a big impact on acceptance for insect consumption. Our study shows that the social norm, what other around you do, had the largest impact on intention to eat insects (beta .52).

3. Insects as food: start by introducing processed insects or fried insects.

Consumers seem to have a preference for processed insects and fried insects (compared to fresh insects) when we ask what type of insects they are willing to try (figure 3). Furthermore, fried insects are perceived as more innovative and easier to prepare compared to processed insects. And fried insects are perceived as more safe with lower hygiene risks compared to insects in general. However, it should be noted that the intention to eat different types of insects is similar (figure 4).

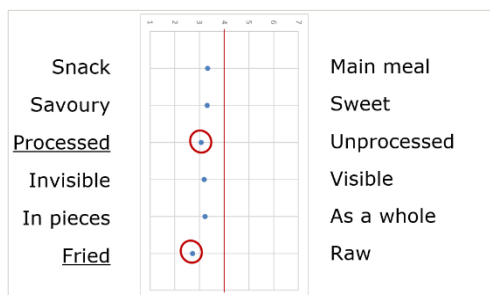


Figure 3 Answers to the question: 'I would like to try insects when...' on a 7-point scale. With 4 as 'I would like to try both'

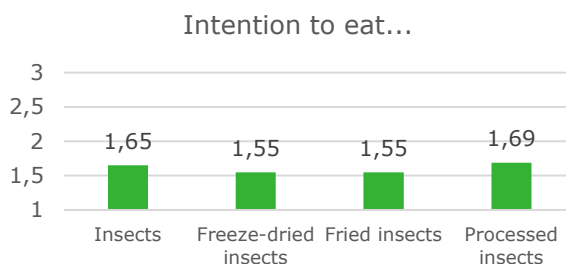


Figure 4 Answers to the questions: 'I am planning to eat ... in the coming week' and 'I think it is likely that I will eat ... in the coming week' on a 7-point scale ranging from totally disagree (1) to totally agree (7).

4. Use positive associations and decrease negative associations

Consumers seem to have some accurate perceptions about the positive side of insects and their potential. When consumers are asked about the positive associations they have with insects, they name Healthy, Crunchy, Proteins, Taste, Nutritional Value and Meat substitute.

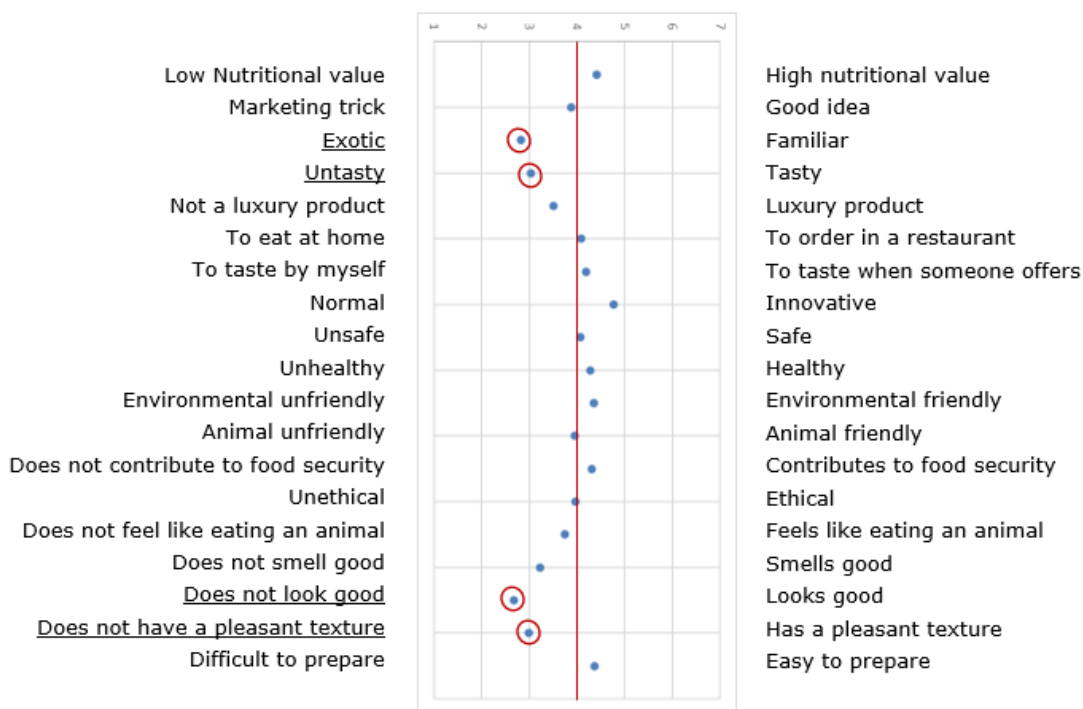


Figure 5 Answers to the question: 'What is your perception of insects?' on a 7-point scale.

They also perceive insects as natural, convenient and as something that can help with weight control. Using these terms when communicating about insects to consumers, can confirm the positive associations consumers already have and therefore might be effective. On the other hand, insect consumption is still a big step for many consumers. When consumers are asked about their negative associations with insects, words like Grose, Strange Idea, Not appealing, Creepy and Diseases come up. Insects are also seen as exotic, untasty, as not looking good and as not having a pleasant texture (figure 5). These associations form a barrier for consumers to eat insects. Interestingly, animal welfare is less a barrier for the consumption of insects compared to the consumption of farm animals. This knowledge can be used in the communication about insects to take away consumers' current fears. For example, use the exotic image that insects have as something positive.

5. Insects as feed preferred over insects as food

Another good place to start with introducing insects, might be by using insects as feed for livestock. Meat burgers from livestock fed with insects have potential above insect burgers, because burgers from livestock fed with insects:

- are more likely to be consumed than insect burgers, as consumers have a higher **intention to consume** burgers from livestock fed with insects (see figure 6 for the intention to eat beef burgers and figure 7 for the intention to eat chicken burgers).
- are perceived as more **healthy** and more **sustainable** than regular chicken burgers, however they are also perceived as less **affordable**.
- are associated with less **disgust**, compared to insect burgers.
- are evaluated more positively than insect burgers, as consumers have a higher **attitude (affective & cognitive)** and more **positive emotions** towards burgers from livestock fed with insects.

However, burgers from livestock fed with insects are also associated with more **ambivalence**, compared to regular chicken burgers and insect burgers (see figure 2).

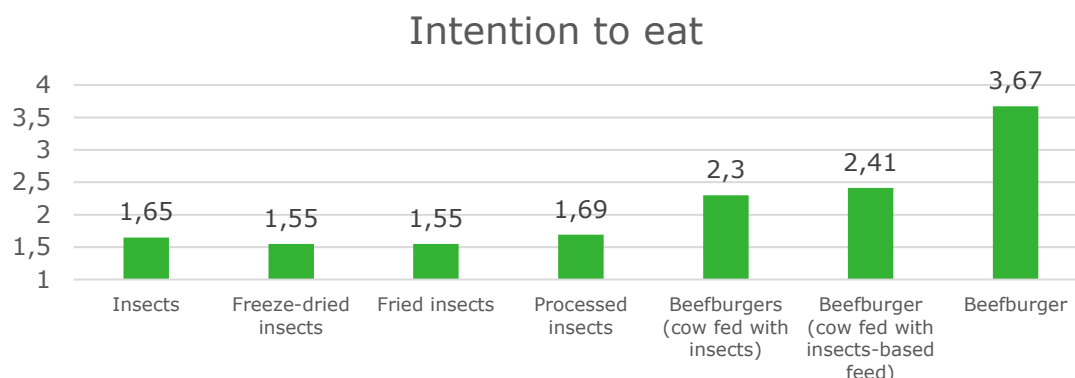


Figure 6 Answers to the questions: 'I am planning to eat ... in the coming week' and 'I think it is likely that I will eat ... in the coming week' on a 7-point scale ranging from totally disagree (1) to totally agree (7).

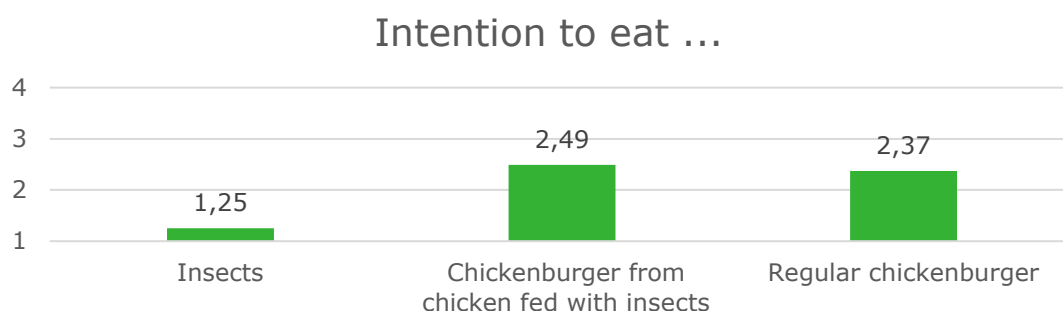


Figure 7 Answers to the questions: 'I am planning to eat ... in the coming week' and 'I think it is likely that I will eat ... in the coming week' on a 7-point scale ranging from totally disagree (1) to totally agree (7).

Ideas future research

Further research is needed on how to introduce insects as food and feed. As mentioned before, the strategies mentioned in this factsheet are mainly based on cross-sectional survey data and they need to be further tested in an experiment in real life including actual consumption, to know what the effect is on consumer acceptance and consumption of insects. Some ideas for future research questions are:

- Is it more effective to enhance the positive perceptions of insects or to diminish the negative perceptions surrounding insect consumption?
- What are the effects of letting consumers try insects?
- Which type of social norm (such as behaviour of family, friends or professionals) has the largest impact on acceptance or consumption of insects?
- Are certain approaches more effective for different segments of individuals?

Method

Study 2016

An online survey was conducted in the Netherlands with 2,654 respondents, of which 48.8% was male, with a mean age of 47 years. Respondents were randomly divided to one of seven conditions. Each condition contained the same questions, though specified to one of six insect-based products plus a control product (meat burger): fresh insects, dried insects, fried insects, processed insects, fresh insects as feed, processed insects as feed, meat burgers.

Study 2017

An online survey was conducted in the Netherlands with 1,001 respondents, of which 51.3% was male, with a mean age of 50 years. First respondents were introduced to either an insect-based burger, a burger from a chicken that ate insects or a chicken burger. Subsequently, the respondents were asked a range of questions regarding this specific product. Second, an experiment was introduced in the survey to explore how consumers react to different insect-based products. Respondents were randomly divided to one of 6 groups of a 2 (framing: cognitive versus affective) by 3 (content: health, environment, both) design for each specific product category. Framing of cognitive versus affective messages were framed via a message on the product starting with "research reveals.." (cognitive) versus "feel good about yourself.." (affective). Content was varied by including different main rational arguments for consumption of insects to assure that differences do not occur due to framing (environment, health, or both arguments were included).

Contact

Wageningen Economic Research Marleen Onwezen
PO Box 29703 Researcher
2502 LS Den Haag T +31 (0)70 335 8175
www.wur.eu/economic-research E marleen.onwezen@wur.nl

wur.eu