

The Integration of Edible Insect-Based Foods in Everyday Diet in Western Society

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Realising the boundaries of our planet's finite and heavily depleted resources the food and agricultural production sector is facing major challenges regarding the requirements to feed more than 9.7 billion people by the year 2050 [1]. While trying to secure future generation's prosperous life on Earth it is important to emphasise on sustainable and worthwhile ways of achieving this. However, western society is currently living in abundance of readily available, affordable and high quality food from of a large variety of sources while developing countries and crisis zones are struggling to feed their people which are buffeted by malnutrition and disease due to quantity and quality of available food [2]. What we need are innovative solutions for facing the challenges of limited land and water resources, overfished oceans, effects of climate change, distribution deficiency and food waste, etc.

Since the United Nations Food and Agriculture Organization's report on edible insects and their potential for increasing food security in 2013 [2] academic research on this topic has been increasing and new evidence about the many advantages of insects for human consumption has been published. From the environmental perspective, the rearing of insects requires a lot less land and water than livestock and also emits fewer greenhouse gases [3]. Due to the cold-bloodedness of insects they show a significantly higher feed conversion rate than mammals [4]. More than 2000 edible insect species [5] offer a range of different nutritional profiles which can in fact be comparable to meat [6]. Furthermore, the risk for zoonotic infections like diseases that can spread from animal to humans (e.g. influenza H5N1, SARS, BSE) is predicted to be lower for insects than for conventional livestock [7]. Easy rearing possibilities that do not require a lot of resources and space can improve the livelihood of people. This is especially relevant for fighting malnutrition of the poorest in developing countries [8]. From a psychological point of view, the mass-rearing of mammals leads to inhumane living conditions for the animals (darkness, overcrowded spaces), these same conditions though lead insects to flourish [9].

Insects have always been part of human diet and are currently consumed by over two billion people worldwide, mainly in Asia, Africa and Latin-American countries. In western society, however, they are not culturally accepted as a food and most people are disgusted by the thought of eating insects [10]. Furthermore, the globalisation and spreading of western values among many cultures worldwide has led to the fact that also in countries where insects are a part of traditional culinary culture more and more people stop consuming them as they are socially rated as food for primitive and poor people [11]. From a rational perspective, there is no reason why insects should be inferior to other animals and why people should not eat them but people's decisions are not always rational and many socio-cultural and psychological factors lead to negative emotional responses like disgust and fear towards insects.

Ongoing research on how to make entomophagy – the eating of insects by humans – an accepted and normal behaviour in developed countries has been focussing on psychological factors influencing the consumer acceptance of insect based foodstuffs like food neophobia [12,13] and disgust [3,9]. Furthermore, personality profiling of ideal consumers [11] and strategies to increase consumer acceptance as for example using vague visual and descriptive product cues [14] or using measures of sensory-liking and food appropriateness [6], familiarity and sweet or savoury taste combinations [10] as predictors for consumer acceptability. Much of the research has been performed without actual consumer tasting and focussing on willingness to try the product rather than long-term adoption of entomophagy

as a normal eating behaviour. Therefore, it is suggested to focus further research efforts on reaching a knowledge base on strategies and interventions that support true adoption and habitual consumption of insect-based foods as well as implications for developing suitable, appealing and sustainable products.

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