The inclusiveness of the ‚Future Food' visions:
Public perceptions of algae, crickets, halophytes, jellyfish and urban food production

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Summary | Food innovations offering new sources of protein as well as new urban food production aims to provide solutions for food production under restricted resources. The alternative protein sources and urban agriculture are not part of the daily lives in Germany. Involving the public in research on food innovations not only helps to increase consumer acceptance (Tuorila & Hartmann, 2020) but also can facilitate more responsible research and innovation. To date, only few studies have investigated consumer acceptance of new food solutions in Germany (Weinrich & Elshiewy, 2019) and little is known about the consumers' perceptions of innovations with longer time horizons. Therefore, the present study investigates the public perceptions of selected food innovations (algae, crickets, halophytes, jellyfish) and urban food production in Germany.

Methods | An online survey (*N*=474) conducted from 16th November 2020 to 22nd May 2021 assessed the public perceptions of algae, crickets, halophytes and jellyfish as new future food sources and questioned preferences of possible locations for urban food production. 66.5% of the participants identify themselves as female, 31.9% as male and 1.5% as diverse. The majority (56.2%) are <40 years old and have completed college (81.0%) and live in a (big) city (72.6%). The participants are only very little involved in food and groceries (*M*=1.81, *SD*=0.59) and little in food production (*M*=2.18, *SD*=0.69). Most describe their eating habits as rather adventurous and adventurous (87.0%) instead of rather traditional and traditional.

Results | The public's perception of how likely it is that the food innovations will become part of the future diet differs ($X^2(3)= 351.6$, $p<.000$). The Wilcoxon post-hoc test shows that the food innovations differ from each other (except for crickets and halophytes) (see Figure 1). Assuming extreme scenarios of the future (no land, no trade), the idea that crickets ($p<.000$) and jellyfish ($p<.000$) become part of the regular diet in the future increases.[3]

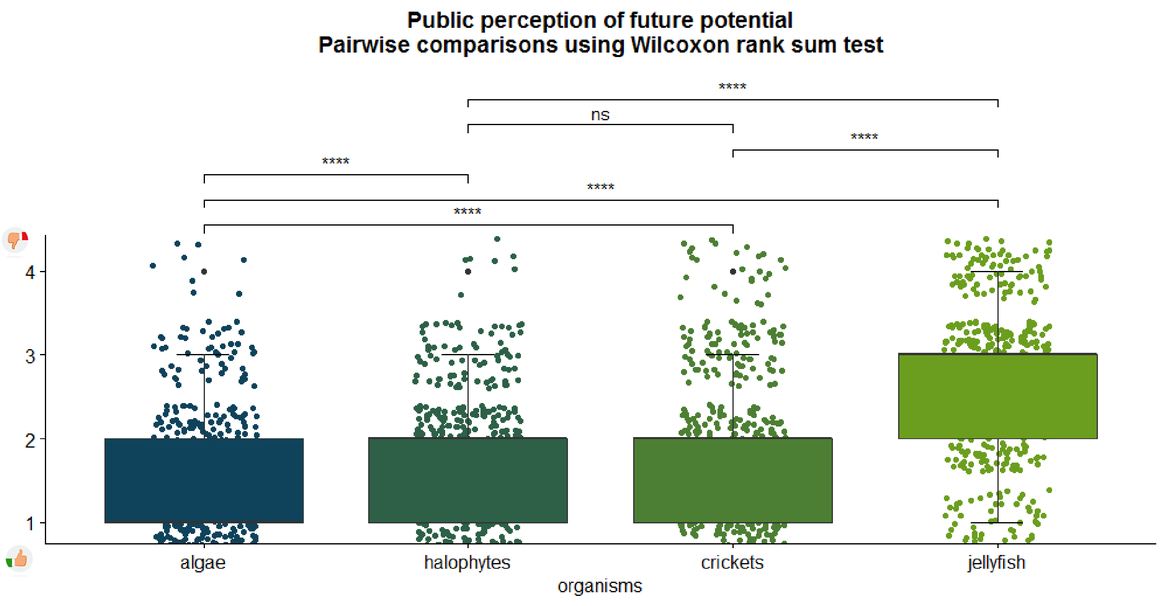

Figure 1 | A 4-point Likert-scale (1=thumbs up, 4=thumbs down) was used. Error bars indicate 95% confidence intervals. Algae (*M*=1.58, *SD*=0.75), halophytes (*M*=1.80, *SD*=0.76), crickets (*M*=1.91, *SD*=0.90), jellyfish (*M*=2.66, *SD*=0.89).
**** $p<.0000$, *ns* not significant

[3]pairwise comparisons using Wilcoxon rank sum test, p value adjustment method: Bonferroni.

The preference for urban food production areas are divided into places for self-cultivation and for industrial mass cultivation (see Figure 2). The likelihood of growing the food innovations in the illustrated places in the future are considered more likely for public places (*M*=1.89, *SD*=0.93) than for self-cultivation (*M*=2.33, *SD*=0.97) ($X^2(3)= 78.47$, $p<.000$).

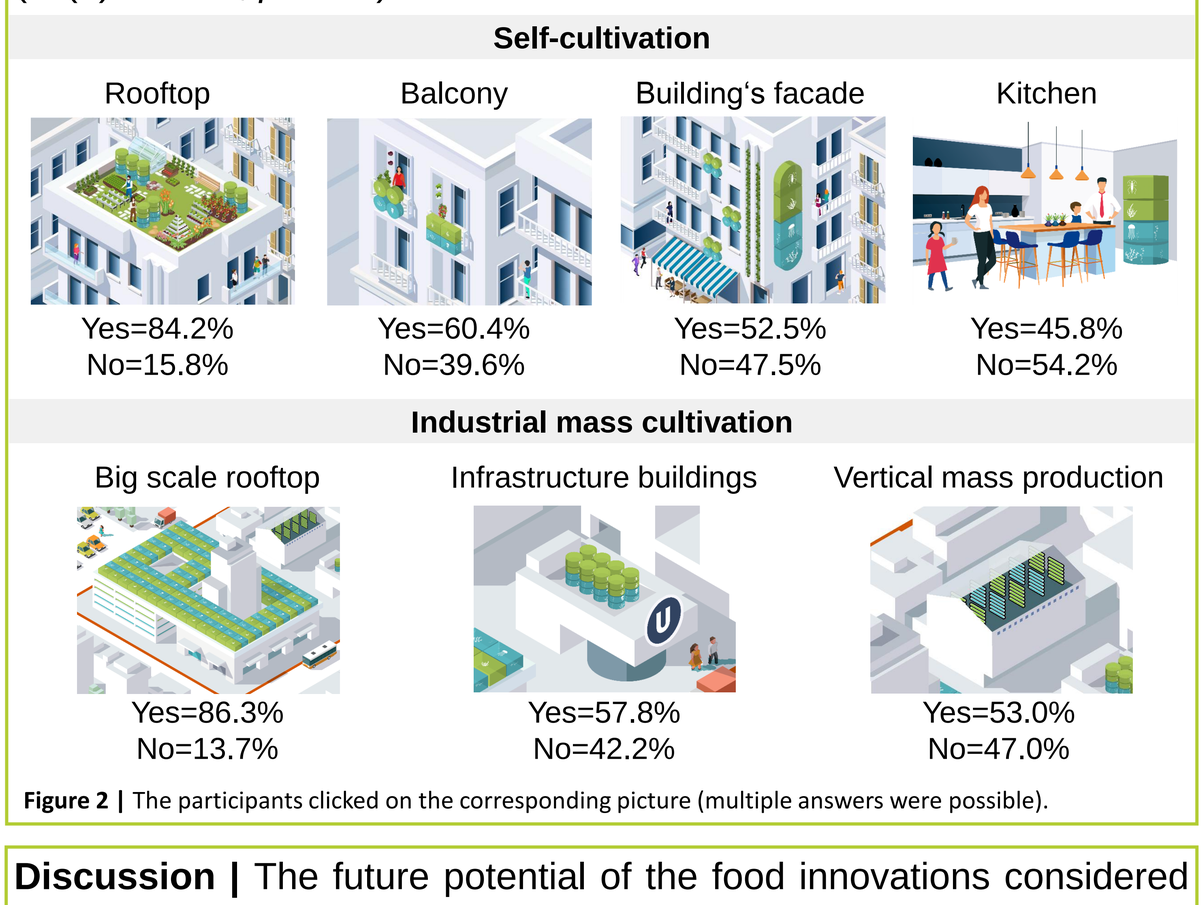

Figure 2 | The participants clicked on the corresponding picture (multiple answers were possible).

Discussion | The future potential of the food innovations considered here is perceived differently by the public. Accordingly, commercialisation of foods based on the food innovations might be difficult. However, the results show that under the assumption of extreme future scenarios, the future potential of rather rejected food innovations increases significantly. The results have implications for the responsible research and innovation in the area of new protein sources and urban food production.

References |

Tuorila, H., & Hartmann, C. (2020). Consumer responses to novel and unfamiliar foods. *Current Opinion in Food Science*, 33, 1-8.
Weinrich, R., & Elshiewy, O. (2019). Preference and willingness to pay for meat substitutes based on micro-algae. *Appetite*, 142, 104353.

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