

Effects of formulation and process conditions on chemical composition, color parameters, and acceptability of extruded insect-rich snack

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First published: 28 March 2021

<https://doi.org/10.1111/jfpp.15499>

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Abstract

A ready-to-eat, protein-rich snack was developed using a blend of nixtamalized maize (*Zea mays* L.) flour and grasshopper (*Sphenarium purpurascens* Ch.) meal, and an evaluation of the effects of the formulation and extrusion processing on the chemical composition, color parameters, and acceptability of the extrudates was conducted. The increase in extrusion temperature (120–180°C) decreased the moisture (8.14–5.91 g/100 g) and lipid content (2.20–1.95 g/100 g) and increased aroma (3.82–4.24), texture (1.61–4.82), flavor (2.67–4.52), and overall acceptability (2.88–4.67). The increase in the grasshopper meal proportion (0–40 g/100 g) decreased the carbohydrate content (89.45–65.39 g/100 g), and whiteness index (68.51–47.14) and increased the protein (5.33–22.51 g/100 g) and ash contents (1.67–7.88 g/100 g), color difference (30.98–52.30), and browning index (24.28–39.77). The acceptability of the snack was oriented toward extrudates that had a color with a high L^* (Corr = 0.74), with yellow tones b^* (Corr = 0.73), and a whiteness index (Corr = 0.72). Therefore, the best products were those obtained at 167.8°C, proportion of grasshopper meal = 8.11 g/100 g, and a feed moisture content of 18.81 and 21.19 g/100 g, respectively, with a protein content of 13.27 and 13.66 g/100 g.

Practical applications