

Vitamin D-enrichment of sausages by pork offal: is it acceptable to consumers?

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Offal contains an increased vitamin D concentration compared to lean meat⁽¹⁾ and therefore, as an ingredient, may be an innovative strategy to enrich the vitamin D content of meat products to help address hypovitaminosis D reported globally⁽²⁾. However, it is essential that changes in sensory characteristics are minimised to ensure consumer acceptability⁽³⁾. This study aimed to 1) investigate vitamin D-enrichment of various pork offal concentrations (0–40%) on the vitamin D content of pork sausages, and; 2) to determine sensory acceptability and consumer perceptions of vitamin D-enriched pork sausages compared to control.

Sausages were vitamin D-enriched with various concentrations (5%, 10%, 20%, 30% and 40%) of pork offal (heart, liver and kidney; approx. 33% each) or control (0%). Vitamin D₃ and 25(OH)D₃ (µg/kg), were analysed in cooked offal and sausage samples by LC-MS/MS⁽⁴⁾. Vitamin D activity was calculated as: [vitamin D₃ + (25(OH)D₃ × 5)]⁽⁵⁾. Sausages were developed from sausage meat, seasoning blend, rusk, water and casing, and frozen prior to sensory evaluation. Consenting adults (*n* = 50) aged 18–65 years were recruited. Sausages were oven roasted (180°C) until an internal temperature of >75°C was reached. Participants were presented with a trio of sausages (*n* = 1 vitamin D-enriched; *n* = 2 control) each randomized by a three-digit code, in an ascending series threshold test, based on the 3-AFC method⁽⁶⁾. Detection and recognition values were determined by best estimate threshold, calculated by geometric mean of the highest offal concentration missed and the next highest offal concentration (%)⁽⁷⁾. Where participants recognised the sample that was different, they were asked to qualitatively describe the difference. Qualitative results were coded, categorised into themes and presented as frequency of participants (%) for each of the offal sausages (5–40%).

Theoretical vitamin D-enrichment of sausages resulted in a significant increase in mean ± SD vitamin D activity at 20% (17.0 ± 0.7 µg/kg), 30% (19.0 ± 1.0 µg/kg) and 40% (20.9 ± 1.4 µg/kg) offal compared to control (13.2 ± 0.3 µg/kg); *P* < 0.05. Sensory evaluation revealed that 40% of participants detected the vitamin D-enriched sausage (5% offal) and 23% of participants recognised the vitamin D-enriched sausage (5% and 7.1% offal). Eight themes were identified from the qualitative responses (seasoned, stronger flavour, harder texture, disliked taste, unidentified, meaty flavour, softer texture and liked taste). Participants reporting disliked taste (22%) and stronger flavour (22%) were greater at 20% compared to 5% offal concentration (4% and 12% respectively).

In conclusion, theoretical vitamin D-enrichment (20–40% pork offal) significantly increased vitamin D activity in cooked sausages. Preliminary sensory analysis indicates that consumers are aware of the difference with 5–7.1% offal concentration incorporated and may report the product as unacceptable. Further sensory evaluation, ideally with qualitative research, is required to confirm these results in a larger population group.

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