



Section

Fields (of activity)

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Stability of hepatitis E virus in meat products

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Key words

Hepatitis E virus, inactivation, meat products

Aim of the study

The study was performed to investigate the stability of hepatitis E virus (HEV) during the manufacturing of specific meat products in order to assess the associated risk of HEV transmission. Three products were selected due to suspected higher risk: (i) spreadable liver sausage prepared from pig liver, which potentially contains high HEV amounts, (ii) raw sausage, which is manufactured without any heating step that might inactivate HEV and (iii) raw sausage with large diameter intended for heating by the consumer, where the specific heating conditions can be critical for successful HEV inactivation. In addition, comparison of infectivity data with that of qRT-PCR should assess the utility of PCR data for infectivity prediction.

Material and methods

Cell-culture-adapted HEV genotype 3 strain 47832c was propagated in A549/D3 cells, collected and concentrated by ultracentrifugation. The virus was spiked into the specific meat preparations and thereafter subjected to traditional manufacturing protocols, which included heating of the liver sausages and curing of the raw sausages. The raw sausages intended for heating by the consumer were readily purchased and inoculated with HEV before application of different heating regimes. In all cases, samples were taken at different manufacturing steps and HEV was extracted. HEV infectivity was analyzed by immunofluorescence of inoculated cell cultures and the presence of HEV-RNA was analyzed by RT-qPCR.

Results and significance

For the spreadable liver sausages, the results show that HEV is efficiently inactivated during the usual heating step in a 70°C water bath for 30 min, which led to 70°C core temperatures for 8-18 min depending of used casing material. HEV infectivity was completely destroyed (> 4 log reduction) after reaching the 70°C core temperature for 2 min, whereas the HEV-RNA decreased only marginally. For the raw sausages, HEV infectivity decreased only slightly (<1.5 log reduction) during the ripening process of 3 weeks and the HEV-RNA amounts remained stably high. The samples of the raw sausages intended for heating by the consumer could not be analysed due to methodological problems with the heated sample type. Temperature data indicated that 70°C core temperatures were not reached in this sausage type after heating in a 75°C water bath for 60 min, whereas at 80°C a core temperature of 70 °C was reached after 45 min.

The results indicate that spreadable liver sausages do not pose an HEV infection risk for the consumer if the heating step during their manufacturing is performed correctly. In contrast, HEV infectivity is not completely inactivated during manufacturing and ripening of raw sausages. Therefore, these meat products may pose a risk for consumers if starting material with high levels of HEV-contamination is used. HEV inactivation data could not be determined for the raw sausages intended for heating by the consumer. However, the preliminary temperature data indicate that heating conditions at >80°C should be applied to reduce the risk of remaining infec-

tious HEV in these large diameter sausages. Detection of HEV-RNA by PCR cannot be used to predict HEV infectivity.

Publications, posters and presentations

Schilling-Loeffler, K., Meyer, D., Wolff, A., Palacios, J.S., Reich, F., Johne, R.: Stability of hepatitis E virus during the production of pork meat products. Poster, 33rd Annual Meeting of the Society for Virology, Vienna, March 25 to March 28, 2024.

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