

HEV inactivation assessment using viable virus

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Abstract

Hepatitis E is an acute icteric hepatitis caused by Hepatitis E virus (HEV). HEV is transmitted by water supplies in developing countries. Recently, HEV contamination in consumption water was also observed in a developed country (France). HEV is detected in pigs and several other animal species (e.g. wild boars and deer) and it is strongly suspected to be zoonotic. HEV has also been detected in the pork production chain: In a study conducted in a grocery in USA 11% of livers tested were HEV positive and similar data have been observed in Europe also.

People have been infected with HEV by eating raw or undercooked pork/deer meat. In France 5 people died after consuming raw pig liver sausages. HEV average mortality rate varies between 1 and 4%, but in pregnant women may increase up to 25%.

The risk of HEV infection via consumption of HEV-contaminated pig livers raises further public health concern. It is not clear whether cooking conditions are effective in inactivating the virus in the contaminated pig livers.

Only one HEV inactivation study was performed. The objective of Feagins et al. (2007) was to determine if traditional cooking methods are effective in inactivating infectious HEV in contaminated commercial pig livers. Four of five pigs inoculated with HEV-positive liver incubated at 56 °C for 1 hour, developed an active HEV infection.

Our group reproduced Feagins' experiment but replacing the use of live pigs with 3D cell culture. The results confirm Feagins' findings, showing that HEV can maintain its infectivity when heated at 56 °C for 1 hour. This research underlines the potential of the 3D cell culture system of replacing the traditional in vivo infectivity studies and emphasises the necessity for cooking pig liver before consumption.