

Assessing the costs versus the effectiveness of dioxin monitoring in bulk milk

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Dioxins are environmental pollutants present in the agri-food chains. The negative consequences associated with their presence in food are not only related to human health but also to the food businesses operators embedded in the food chains. Food and feed dioxin-monitoring programs aiming to detect, control and reduce the presence of dioxins in food chains have been implemented. However, to date, the costs and effectiveness of such programs have not been assessed. This study aims to quantify the costs and effectiveness of bulk milk dioxin monitoring to optimize the sampling and pooling strategies for a selected set of contamination scenarios. Two different optimization models were built using a linear programming methodology. The first model aims to minimize the monitoring costs subject to a minimum required effectiveness, while the second model aims to maximize the effectiveness of monitoring for a given monitoring budget. This study shows that a higher level of effectiveness is possible but at higher costs. Monitoring with 95% effectiveness aiming to detect a single contaminated farm with a tank milk concentration equal to the EC legal action level (i.e. 2 pg TEQ/g fat) would cost €2.6 million per month. A large reduction in monitoring costs (at the same level of effectiveness) is possible at intermediate incident sizes (i.e. 73% reduction when two farms are contaminated at 3 pg TEQ/g fat), which is close to the smallest incident aimed to be detected. Both models enable the analysis of the costs and the effectiveness of bulk milk dioxin monitoring programs, offering quantitative support to risk managers of the food industry and the food safety authority. Additionally, this study proves that the effectiveness of monitoring depends not only on the performance of the detection tests but also on the number of samples collected.

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The monetary burden of cystic echinococcosis in Iran

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Cystic echinococcosis (CE) is a globally distributed parasitic infection of humans and livestock. The disease is of significant medical and economic importance in many developing countries, including Iran. However, the socioeconomic impact of the disease, in most endemic countries, is not fully understood. The purpose of the present study was to determine the monetary burden of CE in Iran. Epidemiological data, including prevalence and incidence of CE in humans and animals, were obtained from scientific literature and as well as official government reports. Economic data relating to human and animal disease, including cost of treatment, productivity losses, and livestock production losses were obtained from official national and international datasets. Monte Carlo simulation methods were used to represent uncertainty in input parameters. The overall annual cost of CE in Iran was estimated at over US\$200 million, including both direct and indirect costs. CE has a considerable economic impact on Iran, with the cost of the disease estimated to be approximately 0.03% of the country's gross domestic product. Establishment of a CE surveillance system and implementation of a control program are necessary to reduce the economic burden of CE on the country. Cost-benefit analysis of different control programs is recommended, incorporating present knowledge of the economic losses due to CE in Iran.