Development of a framework for evidence-based decision-making on how to deal with human pathogens in the microbiome of leafy greens

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INTRODUCTION

The procedure for washing minimally processed leafy greens remains a critical step within the production chain of leafy vegetables, as it is the only step where microbial load could be reduced. However, the washwater could also act as a vector for cross-contamination. In EU Member States, there is no consensus on the use of chemical sanitisers in produce washwater as a means of preventing cross-contamination and there is a lack of harmony concerning the regulations that these states apply. Here, multi-criteria decision analysis (MCDA) could serve as a decision-making aid to make decisions regarding this complex issue that are more supported by evidence (FAO 2017). The purpose of this research was to (1) find out how to apply the principles of multi-criteria decision analysis in food safety risk management; (2) investigate the current risk management decision-making process; and (3) apply MCDA to the leafy greens case study.

METHODOLOGY

A scientific literature study was used to investigate the methodologies used in MCDA applications for food safety risk management. A qualitative appreciation of published case studies looked at the methodologies applied, and included evaluation criteria. Interviews were conducted to gain knowledge on the current implementation of MCDA in risk management strategies. The MCDA methodologies were applied to the leafy greens case study. The most appropriate washing methodology for minimally processed leafy greens was determined, based on an evaluation of weighted performance criteria. The preferences of Belgian stakeholders within the decision context were collected by means of an online stakeholder consultation. Information was aggregated via the PROMETHEE II algorithm.

RESULTS

The inclusion of stakeholder and expert input is lacking in current food safety risk management MCDA applications. In addition, deterministic methods are predominantly being used and sources of bias and uncertainty are generally not taken into account. However, weighting and quantification of evaluation criteria are standard procedure.

DISCUSSION

The application of the MCDA methodologies to the leafy greens case study revealed that washing with potable water (the method commonly applied in Belgium) following performance evaluation is considered the most appropriate control strategy. The positive consumer perception, harmonised regulations and reduced costs in comparison to disinfection methodologies are the most important contributors towards the optimal position.