RAPID ALERT SUPPLY NETWORK EXTRACTOR (RASNEX) TOOL TO MINE UNSTRUCTURED SUPPLY CHAIN INFORMATION FROM FOOD AND FEED CONTAMINATION NOTIFICATIONS.

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INTRODUCTION

Competent authorities of member countries use the Rapid Alert System for Food and Feed (RASFF) to report information on 1) any direct or indirect human health risk 2) any serious risk to animal health or the environment arising from food or feed. In the case of foodborne disease outbreaks, it is of utmost importance to rapidly identify the involved supply chain actors and withdraw the causative products from the market, since the impact on human and/or animal health and the economy is growing with the increasing lengths of such outbreaks. The mapping of relevant supply flows allows for the identification of additional nodes or sources of contaminated goods.

A major challenge for risk managers is to gain and maintain an overview of any currently ongoing contamination events, as relevant information is continuously updated and is often provided through the RASFF system in non-standardised formats. Recent food related incidents in Europe illustrated that there is a need for a software system to support investigations on supply chains as well as exposure assessments in crisis situations. To meet these needs, the Rapid Alert Supply Network Extractor (RASNEX) [1], an open-source tool, was developed.

METHODOLOGY

RASNEX is programmed in the Konstanz Information Miner (KNIME) [2, 3] framework, since it is centred on data mining and data science and makes use of FoodChain-Lab [4], which was developed by the German Federal Institute for Risk Assessment (BfR). RASNEX is available free of charge at https://doi.org/10.5281/zenodo.4322555.Parts of the data processing KNIME nodes are code snippets written in Python 3.7. Successful usage of the RASNEX tool requires the installation of the KNIME Analytics Platform integrated with Python 3 and of the FoodChain-Lab extension.

RASFF notifications, providing information about contamination events, constitute the source of the workflow and are to be chosen according to the related inquiry. RASNEX may be employed for specific notifications as well as for multiple RASFF notifications related to a certain good (e.g. chicken eggs, pet food, etc.).

RESULTS

RASNEX can extract all the actors involved in an ongoing or previous chemical contamination event or biological agent outbreak from the structured parts of RASFF notifications and compile the extracted information in sheets, thereby enabling the use of this data for further analysis with other tools (e.g. Excel, RACE [5], FoodChain-Lab and others).

RASNEX generates a graphical mapping of all of the actors of the supply network provided and extracted by the software, who are involved in the contamination events of interest. In addition, the tool screens the “additional information” section and the follow-up-documents for the involved parties and products that were not reported in the main section of the RASFF notifications.

DISCUSSION

RASNEX is a user-friendly tool that performs an automated data cleaning from the RASFF notifications thus facilitating and tremendously accelerating the extraction of the information that is relevant at both national and European level. In this first step, RASNEX hasfocused on the extraction of data on the main and related products from the major sections of an RASFF notification. RASNEX is being continuously improved to also enable the extraction of data from the additional information section (free text fields) and attached documents (e.g. PDF files, Excel spreadsheets in various forms). In the course of a collaborative project between BfR and the European Food Safety Agency (EFSA), RASNEX is being further developed to address this limitation. This further development hints at the future modifications to the RASFF system that will facilitate future data exchange and interpretation.

References:

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