Eukreas: An Integrated Framework for the Effective Traceability of Greek Meat - Abstract

Spiridoula V. Margariti [1], Jeries Besharat [1], Dimitris Salmas [1], George Pachoulas [1], Giannis Botilias [1], Chrysostomos Stylios [1,2], Dimitrios Kafetzopoulos [4] and Dimitris Skalkos [5]

[1] *Laboratory of Knowledge and Intelligent Computing, Department of Informatics and Telecommunications, University of Ioannina, Kostaki, Arta, GR47100, Greece*
[2] *Industrial Systems Institute, Athena R.C. Platani, Patras, GR26504, Greece*
[4] *Department of Business Administration, University of Macedonia, GR54636 Thessaloniki, Greece*
[5] *Laboratory of Food Chemistry, Department of Chemistry, University of Ioannina, 45110 Ioannina, Greece*

Summary

A problem that small and medium-sized Greek enterprises operating in the production and marketing of meat and meat products are facing is the design and development of effective traceability systems. Traceability is a valuable tool for businesses, used to gain consumers' confidence, add value to their products, square with the law and regulations, monitor their production and decrease the probability of product recalling. The purpose of this work is to design and develop an efficient and computerized system adapted to the needs of Greek production.

The needs and requirements of all the stakeholders (businesses, works, authorities and consumers) were considered. Based on agile methodology and the SCRUM technique, the development team decided on the architecture of the entire traceability system.

The purpose of the system is to make information immediately available when needed to the participants of the supply chain and/or the consumers (forwards and backwards), preserve and upgrade Greek production, ensure the viability and profitability of the business. The main objective of the proposed meat traceability system is the satisfaction of the requirements related to health and safety, verified quality, advertising, legal issues. The means to achieve these objectives is a developing Information System that provides functions for the: (a) Collection and recording of information, (b) Storage and processing of data, (c) Handling of requests.

The performance indicators of the system are defined as: the speed of retrieval of information on the product (location, procedures and tools used), reliability, consistency (guarantee of flexibility, compatibility, durability).

The process of traceability includes the following stages: input of animals to the farm (animal registration), breeding, leaving the farm/entering the slaughterhouse, processing/standardization, export, and sale. The role of the traceability system is to capture and store information on every stage along with the supply chain related to the food produced.

The building components of the system are: the management module for user management, communication management, traceability management and data mining by applying a set of algorithms. The user management consists of modules that can be accessed by any actor, including the system administrator, system users and consumers. Communication management arranges the communication between actors and systems or between systems, while traceability management is a part of the system used for product traceability.

Emerging digital technologies, such as IoT and cloud computing, in combination with communication technologies are the base of the system. A mobile application facilitates the users' interaction with the system.

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EMAIL: smargari@cse.uoi.gr (A. 1); jeries.besharat@kic.uoi.gr (A. 2); salmasdimitris@kic.uoi.gr (A. 3); pachoulas@kic.uoi.gr (A. 4); jbotilias@kic.uoi.gr (A. 5); stylios@uoi.gr (A. 6); dimkafe@uom.edu.gr (A. 7); dskalkos@uoi.gr (A. 8)
ORCID: 0000-0002-2014-1332 (A. 1); 0000-0003-4647-4810 (A. 3); 0000-0002-4135-7474 (A. 4); 0000-0002-6034-7271 (A. 5); 0000-0002-2888-6515 (A. 6); 0000-0002-0081-9409 (A. 7); 0000-0002-7771-2845 (A. 8)

A prototype has been built and implemented for a food manufacturing company. It meets all the specifications required for the detection of fakes in manufactured products. A meat traceability system has been built from scratch for a Greek meat manufacturing company. Using web technologies (CSS, html, JavaScript, Apache server), programming languages, open-source platforms, databases (e.g., MongoDB) and a set of hardware (server, printer, desktop/laptop, smartphone/tablets), the implemented system meets all the requirements for meat traceability.
This digital system automates the traceability process, is efficient and user-friendly, and reduces the cost of traceability and the probability of errors. The system's behavior and performance were checked by using Loader.io, namely a free tool for system testing.

Keywords
Traceability, meat traceability systems, system performance

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