

SOFTWARE TASK MANAGEMENT IN FOOD ENGINEERING USING HACCP

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Abstract. *The purpose of the paper is to highlight how software task management tools may be applied to food engineering quality assurance. The theoretical underpinnings of quality assurance are briefly reviewed at the outset of this paper, followed by a brief introduction to task management tools that highlights their potential applications across a range of sectors, including the food processing industry. Customer satisfaction, increased productivity, and profit maximization are the objectives of interdisciplinarity.*

Keywords: Task management, Jira, software engineering, food engineering, quality assurance, HACCP

1. INTRODUCTION IN HACCP

Like it is mentioned in literature, HACCP stands for Hazard Analysis and Critical Control Points. It is a systematic approach to food safety that focuses on identifying, evaluating, and controlling potential hazards throughout the food production process. The main goal of HACCP is to ensure that food is safe to eat by preventing, eliminating, or reducing biological, chemical, and physical hazards to acceptable levels [1-3].



Figure 1. HACCP standard for food safety [1].

HACCP is widely used in food manufacturing, processing and handling industries, and it is often a requirement for businesses that export food or wish to obtain certifications like ISO 22000 or others. It helps organizations prevent foodborne illnesses and ensure the safety of their products. An important fact is that implementing HACCP helps businesses minimize risks and ensure the safety of their food products. Setting goals and outlining the operational procedures and resources required to meet quality standards constitute an essential element, known as quality planning [1-3].

HACCP and quality assurance are interconnected in food engineering to create a comprehensive food safety management system. Together, they help protect public health, enhance product quality, and maintain compliance with regulatory requirements.



Figure 2. HACCP standard for food safety [1].

Producers, consumers and authorities all have serious concerns about food safety. The food business relies on a strict and efficient system known as HACCP (Hazard Analysis and Critical Control Points) to guarantee the quality and safety of food items. A safe and wholesome food supply is ensured by HACCP, regardless of the size of the food manufacturing facility [4-5].

In food engineering, quality control represents an essential element, which is demonstrated by tracking and evaluating results to spot any departures from acceptable levels of quality. Methodical processes designed to ensure that quality standards are satisfied throughout the production or service delivery process are examples of quality assurance.

2. HACCP USING QUALITY ASSURANCE IN FOOD ENGINEERING

In food engineering, quality management is continuous improvement, which is exemplified by persistent attempts to enhance goods, services, or procedures through the use of small adjustments or innovations. In food engineering, quality control not only reduces food safety hazards but also improves product uniformity and customer confidence, all of which help food products succeed on the market. Quality control is

essential to guaranteeing that goods fulfill safety, quality, and legal requirements. It entails methodical procedures used to track, evaluate, and enhance food items' quality all the way through production. Also, it is important to mention that quality control frequently entails testing and inspections. Like it is mentioned in literature, compliance with defined norms and benchmarks, which serve as frameworks for quality management systems, is a representation of quality standards. Improving customer happiness, cutting down on failure-related expenses, and increasing overall efficiency within an organization all depend on quality management [6-7].

Quality assurance, which is exemplified by methodical procedures intended to guarantee that quality standards are fulfilled throughout the production or service delivery process, is another crucial element. Additionally, quality assurance includes a number of procedures and guidelines intended to guarantee characteristics like uniformity, dependability, and security throughout the manufacturing process.

It is important to note that quality assurance and quality control are not the same thing. Specifically, the former aims to prevent defects by establishing standards and controls for processes, while the latter entails testing and inspecting materials, processes, and final products to make sure they meet quality standards. Using these quality management strategies can improve the food industry's overall efficacy and profitability while also improving product performance, customer satisfaction, and waste reduction. The main ideas of quality assurance are depicted in the following figure [6,8].



Figure 3. Quality assurance key components [4].

Also, quality assurance refers to the systematic processes and practices used to ensure the safety, quality, and efficiency of food products throughout processing, packaging, storage, and distribution. It blends engineering principles with food science and quality management systems [8].



Figure 4. Quality assurance principles [4].

HACCP becomes a key tool used within quality assurance systems to control food safety risks proactively. It combines quality management systems, food science, and engineering concepts. The following table presents the integration of HACCP into QA systems:

Table 1. Integration of HACCP into Quality Assurance Systems

Quality Assurance elements	HACCP application
Process Control	Identifies Critical Control Points (CCPs) where hazards can be prevented/eliminated.
Monitoring Systems	QA ensures continuous monitoring of CCPs such as temp checks, pH, sanitation.
Corrective Actions	QA mandates documented procedures when deviations from critical limits occur.
Record Keeping	QA uses HACCP logs and documentation for traceability and audit readiness.
Training	QA teams train staff on HACCP principles to maintain safety protocols
Audits & Validation	QA verifies HACCP plan effectiveness through internal audits and validations.

In food engineering, quality assurance ensures that every step of food processing, packaging, and distribution meets established safety and quality standards. Also, quality assurance in food engineering is all about making sure food products are safe, consistent, and meet regulatory and consumer standards.

The applicability of HACCP in quality assurance for food engineering ensures a preventive, structured, and data-driven approach to food safety. Quality assurance systems leverage HACCP to enforce control, consistency, and compliance, making it indispensable in the design and operation of food processing systems.

3. TASK MANAGEMENT IN FOOD ENGINEERING

As stated in the literature, task management tools are software applications used to create, assign, track, and complete tasks individually or as part of larger projects. They help teams stay organized, on schedule, and accountable. The following table presents Core Features of Task Management Tools [9-10]:

Table 2. Core Features of Task Management Tools

Feature	Description
Task Creation	Create tasks with details, deadlines, and owners
Assignment	Assign tasks to team members or roles
Due Dates & Scheduling	Set due dates, priorities, and recurring tasks
Dashboards	Visualize task progress using boards, lists, or timelines
Notifications	Alerts for due tasks, updates, or status changes
Integrations	Connect with other tools
File Sharing & Notes	Attach documents, comments, or checklists to tasks

For a variety of fields of industry, including food engineering, Jira may be used by a team to manage a process, ensuring that each task is tracked, completed on time, and documented for later use [9-10].

Jira is a project and task management tool from Atlassian that allows teams from different fields of industry to plan and track tasks, assign responsibilities, monitor progress with boards and reports and to customize workflows for specific operations. While Jira is traditionally used in software development and IT, it can absolutely be adapted for food engineering, especially in areas like Quality Assurance, HACCP task tracking, project management, and compliance workflows.

Considering a pastry factory with a food engineer and several pastry chefs and bakers, with the help of task management software, a food engineer may assign tasks to employees and monitor their progress in real time.

Following Jira project creation, the food engineer should set up the project's name, key, and other details, as well as adjust process parameters. Employees in the food industry may increase production, decrease waste, and improve efficiency by managing activities well.

In the following figure is represented a high-level task division for a food product.

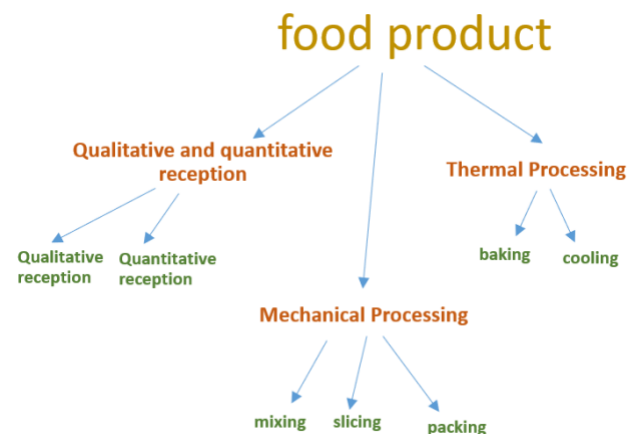


Figure 5. Task division for food product

Food engineers can establish an organized framework for guaranteeing food safety by integrating task management with HACCP concepts. Businesses can increase compliance and lower risks in food manufacturing processes by establishing a culture of continuous improvement, monitoring procedures, and clearly defining tasks. Developing detailed plans for new product development, including timelines, resource allocation, and milestones are mandatory in order to increase profitability and customer satisfaction.

In the following figure are represented the divided tasks and subtasks for oat bars production process, emphasizing the necessity of task monitoring for the food industry to advance and maintain transparency [14]

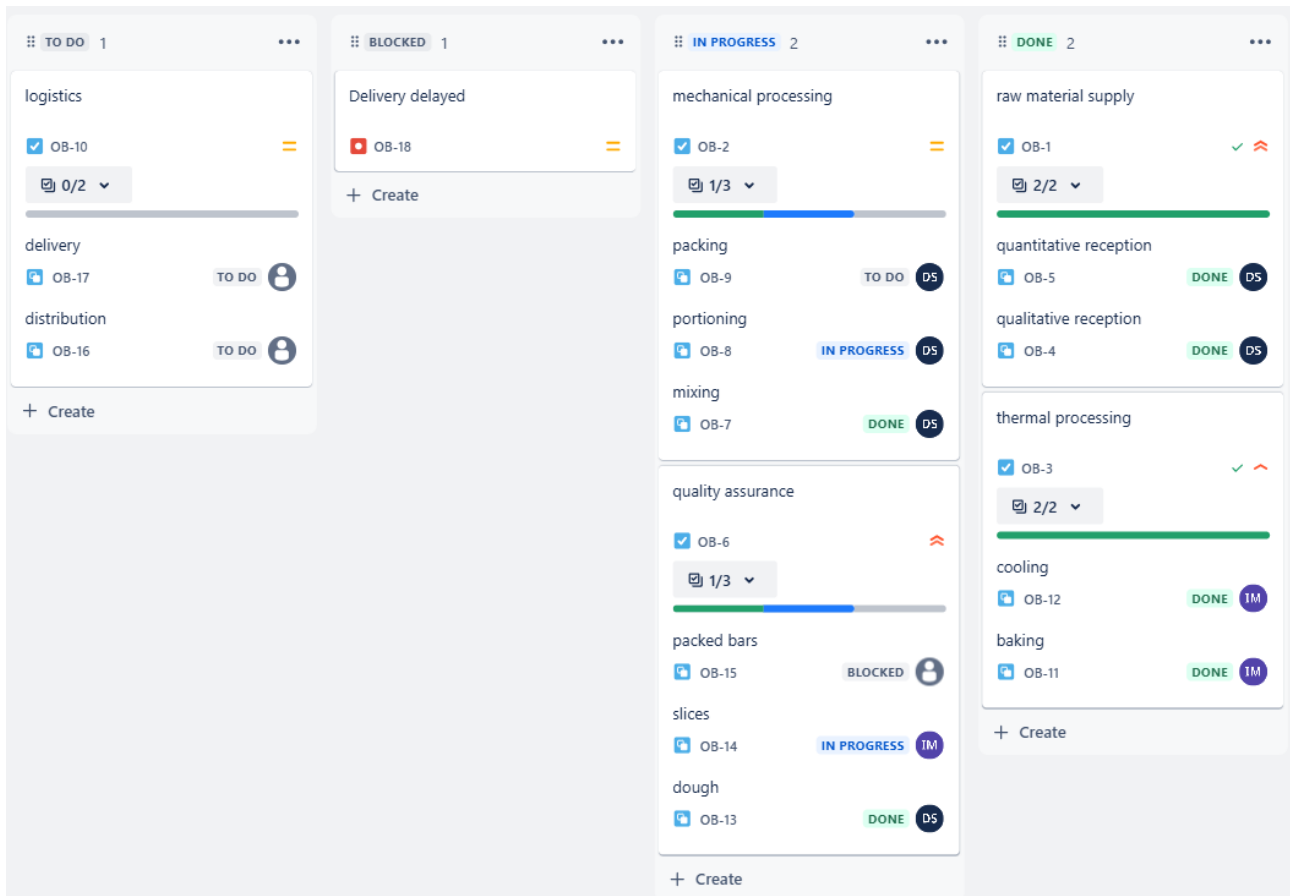


Figure 6. Oat Bar Jira Project.

Task management software in food engineering involves organizing and overseeing various processes to ensure efficient production, quality control, and compliance with food safety standards. Food manufacturers can improve product reliability, guarantee safety requirements, and stay competitive in the market by integrating these quality management methods into their operations [11-13].

The application of task management in food engineering emphasizes the methodical planning, execution, monitoring, and organization of food production process to guarantee the best possible productivity and resource use on a plant. It entails allocating and scheduling duties associated with food engineer and pastry chefs and bakery workers. In food engineering, task management entails planning and supervising a variety of procedures to guarantee effective production, quality assurance, and adherence to food safety regulations [11-13].

Another important aspect that should be taken into consideration is analyzing and improving production processes to increase efficiency, reduce waste, and enhance product quality. Also, implementing systems to monitor and test food products at various stages of production ensure they meet safety and quality standards.

4. CONCLUSIONS

The paper's goal is to demonstrate the potential applications of software task management technologies for food engineering quality assurance. This paper begins with a brief discussion of the theoretical foundations of quality assurance and HACCP principles. Also, the paper provides a brief overview of task management technologies, emphasizing their potential uses in a variety of industries, including the food processing sector. The goals of interdisciplinarity include profit maximization, enhanced productivity, and customer pleasure.

The goals of interdisciplinarity include profit maximization, enhanced productivity, and customer pleasure. Quality Assurance in food engineering makes sure that all food manufacturing, packaging, and distribution processes adhere to predetermined safety and quality requirements. HACCP turns into a crucial instrument in quality assurance systems for proactive risk management in food safety.

Quality assurance in food engineering is all about making sure food products are safe, consistent, and meet regulatory and consumer standards. It blends engineering principles with food science and quality management systems.

REFERENCES

- [1] Rosak-Szyrocka, Joanna, and Ali Abdulhassan Abbase. "Quality management and safety of food in HACCP system aspect" *Production Engineering Archives*, vol. 26, no. 2, Sciendo, 2020, pp. 50-53. doi.org/10.30657/pea.2020.26.11
- [2] Youn, Sukyung, Sneed, Jeannie, "Implementation of HACCP and prerequisite programs in school foodservice", *Journal of the American Dietetic Association*, Volume 103, Issue 1, pages 55 – 60, doi: 10.1053/jada.2003.50002
- [3] James S. Cullor, "HACCP (Hazard Analysis Critical Control Points): Is It Coming to the Dairy?", *Journal of Dairy Science*, Volume 80, Issue 12, 1997, Pages 3449-3452, ISSN 0022-0302, [https://doi.org/10.3168/jds.S0022-0302\(97\)76322-7](https://doi.org/10.3168/jds.S0022-0302(97)76322-7).
- [4] El-Tanboly, E.S., El-Hofi, M., Abd-Rabou, N., Youssef, Y.B., Ibrahim, O. and Kholif, A. Waste Reduction by Improved Quality Control And Hadzad Analysis And Critical Control Point (HACCP) Implementation: A Case Study From Edfina Company For Presrved Foods, Alexandria, Egypt. *Malaysian Journal of Halal Research*, Sciendo, Vol. 4 (Issue 1), (2021) pp. 23-30. <https://doi.org/10.2478/mjhr-2021-0006>
- [5] Szczyrba, Anna, and Manuela Ingaldi. "Implementation of the FMEA Method as a Support for the HACCP System in the Polish Food Industry" *Management Systems in Production Engineering*, vol. 32, no. 3, Sciendo, 2024, pp. 357-371. <https://doi.org/10.2478/mspe-2024-0034>
- [6] Brennan Hugh, *Food Industry Quality Control Systems*, Syrawood Pub House, ISBN 9781682863336
- [7] Wainwright, Stevie. "Perspectives on Quality and Quality Assurance in the Management Consulting Sector" *Management Consulting Journal*, vol. 5, no. 2, Sciendo, 2022, pp. 111-121. <https://doi.org/10.2478/mcj-2022-0013>
- [8] Lisa Jordan, *Health and Quality Control in Food Industry*, CALLISTO REFERENCE, 2015, ISBN 1632394170
- [9] G. -, F. Nicoară and P. Pătraşcu, "AGYLE Methodology Applied in Supply Chain Management," *2023 17th International Conference on Engineering of Modern Electric Systems (EMES)*, Oradea, Romania, 2023, pp. 1-4, doi: 10.1109/EMES58375.2023.10171719.
- [10] Mesaros, D., Rusu, T.. and Mesaros, I. Agile Scrum Applied in Agricultural Processes. *The Scientific Bulletin of Electrical Engineering Faculty, Valahia University of Targoviste*, Vol. 22 (Issue 1), (2022) pp. 1-5. <https://doi.org/10.2478/sbeef-2022-0010>
- [11] Mesaros, D., et al. "Quality Assurance Using Agile Applied in Organic Herbs Conditioning" *The Scientific Bulletin of Electrical Engineering Faculty*, vol. 24, no. 2, Valahia University of Targoviste, 2024, pp. 47-51. <https://doi.org/10.2478/sbeef-2024-0020>
- [12] M. D. Monica *et al.*, "AGILE Project Management Using Jira in Processing of Food Industry," *2023 17th International Conference on Engineering of Modern Electric Systems (EMES)*, Oradea, Romania, 2023, pp. 1-4, doi: 10.1109/EMES58375.2023.10171760.
- [13] Mesaros, D., Coroian, A., Longodor, A.L. and Rusu, T. Agile Project Management in Food Industry. *The Scientific Bulletin of Electrical Engineering Faculty, Valahia University of Targoviste*, Vol. 22 (Issue 2), (2022) pp. 65-69. <https://doi.org/10.2478/sbeef-2022-00>
- [14] Patrick Li, *Jira Software Essentials Plan, track, and release great applications with Jira Software*, Packt Publishing Limited, 2018, ISBN: 978-1-78883-608-1