Universidad Continental

FACULTAD DE INGENIERÍA

Escuela Académico Profesional de Ingeniería Industrial

Tesis

Time Improvement in the Production of Broiler Ovens for Grilled Chicken

Leo Daniel Spatz Carrera
Nayeli Xiomara Arrieta Rojas
Pool Davis Espinoza Rimari
Herbert Antonio Vilchez Baca

Para optar el Título Profesional de
Ingeniero Industrial

Huancayo, 2024

INFORME DE CONFORMIDAD DE ORIGINALIDAD DE TRABAJO DE INVESTIGACIÓN

A	:	Decano de la Facultad de Ingeniería
DE	:	Herbert Antonio Vilchez Baca Asesor de trabajo de investigación
ASUNTO	:	Remito resultado de evaluación de originalidad de trabajo de investigación
FECHA	:	2 de Abril de 2024

Con sumo agrado me dirijo a vuestro despacho para informar que, en mi condición de asesor del trabajo de investigación:

Título:
Time Improvement in the Production of Broiler Ovens for Grilled Chicken

URL / DOI:
https://www.scopus.com/record/display.uri?eid=2-s2.0-85183459175&origin=resultslist&sort=plf-f&src=s&sid=b263bd8e5f26cd5c67ab10ba497844b9&sot=b&sdt=b&s=DOI%2810.1109%2FARACE60380.2023.00033%29&sl=34&sessionSearchId=b263bd8e5f26cd5c67ab10ba497844b9&relpos=0 / 10.1109/ARACE60380.2023.00033

Autores:
1. Leo Daniel Spatz Carrera – EAP. Ingeniería Industrial
2. Nayeli Xiomara Arrieta Rojas – EAP. Ingeniería Industrial
3. Pool Davis Espinoza Rimari – EAP. Ingeniería Industrial
4. Herbert Antonio Vilchez Baca – EAP. Ingeniería Industrial

Se procedió con la carga del documento a la plataforma "Turnitin" y se realizó la verificación completa de las coincidencias resaltadas por el software dando por resultado 9 % de similitud sin encontrarse hallazgos relacionados a plagio. Se utilizaron los siguientes filtros:

- Filtro de exclusión de bibliografía — SI [X] NO [ ]
- Filtro de exclusión de grupos de palabras menores — SI [X] NO [ ]
  N° de palabras excluidas **(en caso de elegir "SI")**:15
- Exclusión de fuente por trabajo anterior del mismo estudiante — SI [X] NO [ ]

En consecuencia, se determina que el trabajo de investigación constituye un documento original al presentar similitud de otros autores (citas) por debajo del porcentaje establecido por la Universidad Continental.

Recae toda responsabilidad del contenido del trabajo de investigación sobre el autor y asesor, en concordancia a los principios expresados en el Reglamento del Registro Nacional de Trabajos conducentes a Grados y Títulos – RENATI y en la normativa de la Universidad Continental.

Atentamente,

La firma del asesor obra en el archivo original
(No se muestra en este documento por estar expuesto a publicación)

Time Improvement in the Production of Broiler Ovens for Grilled Chicken

Leo Daniel Spatz-Carrera
Department of Industrial Engineering
Universidad Continental
Huancayo, Peru
73385374@continental.edu.pe

Nayeli Xiomara Arrieta-Rojas
Department of Industrial Engineering
Universidad Continental
Huancayo, Peru
71431092@continental.edu.pe

Pool Davis Espinoza-Rimari
Department of Industrial Engineering
Universidad Continental
Huancayo, Peru
44825951@continental.edu.pe

Herbert Antonio Vilchez Baca
Department of Industrial Engineering
Universidad Continental
Huancayo, Peru
hvilchez@continental.edu.pe

***Abstract*— According to the INEI in May 2023, the consumer price index in Metropolitan Lima increased by 2.67%, which increased the price of grilled chickens, with a demand of 150 million chickens per year, which requires more quality ovens to be manufactured in a short period of time. This work develops the improvement of production times in the production of ovens for grilled chicken. In order to improve production times, the direct observation method had to be used to find out the processes in the production stage and the time taken for each process, after which the possible causes that generate delays in the manufacturing stage were evaluated, detecting in the painting stage and a route diagram that was not productive, then it was evaluated by means of the analysis of DAP, DOP that allowed to examine the processes in detail and propose a new workflow with a curing lamp and a new route diagram, in addition to them improvements were considered in the production of oven to detect by sensors the state of the cooking of chickens and the option of cuts of chickens in 1/8, 1/4, ½, whole chicken and through simulation in FACTORY I / O was placed a robotic arm to add potatoes or salad. Finally, with proposal 2, production was increased by 100% and production times were reduced by 45.18% considering a yield of 80% in the drying stage by means of the curing lamp.**

Keywords*— *Ishikawa Diagram, Path Diagram, Time Taking, Mechanical Design.

I. INTRODUCTION

According to the National Institute of Statistics and Informatics (INEI), in May 2023, the consumer price index in the Metropolitan Lima area showed an increase of 0.32% with an accumulation of 2.67% in the fifth month, representing an increase of 1% in the price of grilled chicken in restaurants [1-2]. Grilled chicken is a representative dish of Peruvian gastronomy as it represents 20% of annual production in the poultry sector, with more than 150 million chickens per year. Peru is one of the largest per capita consumers of chicken meat in Latin America, ranking in the Top 4 in consumption, accounting for 2% of Peruvian GDP, 14% of gross value, 65% of the agricultural subsector and providing 460,000 jobs [3-4]. As it is a highly demanded product, it is necessary to analyse the processes and improve the production of the metal structure that makes up the oven, as it is a highly demanded product.

The low production capacities and high customer requirements lead to time and cost, but undoubtedly the work team and the availability of machines to carry out the activities have a significant influence, for which the Lean Manufacturing philosophy is used to reduce times by 21% and the Plan Do Check Act (PDCA) cycle was implemented to identify, analyse, verify and implement activities to create an adequate management of the parts produced in the industry [5-6].

The production processes in metal structures integrate detection systems based on laser technology for the analysis of the external environments of the component, for which conventional temperature sensors were used to evaluate under conditions of high gunpowder charges, dense vapours and smoke, being functional as it withstood a temperature of more than 1600°c [7-8].

To improve efficiency in the production of thin metal sheets and ensure adequate quality, a machine vision analysis was performed to mediate the finished dimensions of the metal sheets by means of primitive recognition based on contour minutiae using K-cosine, which is complemented by microcontrollers that allow automatic counting of the produced parts [9-10].

This work was carried out with the aim of improving the production of ovens for grilled chicken by means of the engineering of methods reducing the times and increasing the production by means of an analysis of diagram of Ishikawa, DAP, DOP, diagram of route, managing to increase the production a 100% and reducing the 45. 18% of the production times and adding mechanical complements to have a more uniform cooking in the chickens and the customer's choice of