THESIS INFORMATION

Title: STUDYING THE EFFECT OF CUTTING CONDITIONS AND CUTTING TOOL GEOMETRIC PARAMETERS ON QUALITIES AND EFFICIENCY OF TRA/BASA FISH FILLETING PROCESS.

Major: Manufacturing Engineering
Code: 62.52.04.01
PhD student: Nguyen Tuan Hung.
Advisor: Ass. Prof. Dr. Tran Doan Son.
University: Ho Chi Minh University of Technology – Vietnam National University, Ho Chi Minh City.

Abstract

Facing to the force of quality, quantities and required delivery date from consumed markets for processed products of the Vietnamese Tra, Basa fish in the Mekong Delta, in present, the Vietnamese Fishery Processors do not meet the uniformity in the filleted product quality and required productivity for those products. The main cause of the mentioned problems is the manual filleting which is still applied in all fishery processors in Viet Nam.

For solving this matter, the mechanization in filleting section for replacing the manual filleting method is recommended and is the imperative task. However, the quality and productivity of this solution are mainly depended on the factors of cutting tool and cutting conditions, so, "Studying the effect of cutting conditions and cutting tool geometric parameters on the fillet quality and the filleting productivity for the Tra, Basa fish in Mekong Delta” by the mechanized solution is the core and interested matter. It is also the research purpose of this thesis. The thesis contents are described in 5 chapters as the following:

Chapter 1: Introduction
Chapter 2: Literature review
Chapter 3: Methodology
Chapter 4: Results and discussion

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Chapter 5: Conclusion

Research contents

As the identified research objective, the following matters are focused on:

- Studying the geometric, mechanical, chemical, biological characteristics of the research object for filleting by the mechanized solution based on quality and productivity objectives.

- Building the mechanized filleting solution based on the specific geometric characteristics of the research object and the objectives of fillet product quality and productivity of the filleting process.

- Building the relations between the geometric parameters of cutting tool, cutting conditions and the fillet product quality, productivity of filleting process in initial cutting period and during the real filleting process by mechanized solution for the research object.

Main results

As the accomplished research contents, the new research results in this thesis are archived as following below:

- Determined the destructive force and elastic deformation of researched object tissue.

- Determined the post mortem periods of researched object.

- Determined the most reasonable filleting period based on the fish fillet product quality and the productivity of the filleting process.

- Proposed the locating, clamping, filleting and mechanized filleting model based on the specific characteristics of the researched object and the fish fillet product quality, productivity of the filleting process.

- Determined the relations of the cutting tool geometric parameters, cutting conditions and the fish fillet quality and productivity of the filleting process in the initial cutting period for the mechanized filleting solution.

- Determined the factors of cutting tool and cutting conditions which mainly effect to the fish fillet quality and productivity of the filleting process in the initial cutting period for the mechanized filleting solution.
- Proposed the most reasonable value for the cutting angle of cutting tool and cutting conditions based on the fish fillet quality and productivity of the filleting process in the initial cutting period for the mechanized filleting solution.

- Determined the relations of the cutting tool geometric parameters, cutting conditions and the fish fillet quality during the real filleting process for the mechanized filleting solution.

- Determined the factors of cutting tool and cutting conditions which mainly effect to the fish fillet quality in the real filleting process for the mechanized filleting solution.

**Scientific contributions**

The determined post mortem periods and the reasonable fillet time based on the fish fillet quality and productivity of filleting process are the foundation for determining the most reasonable filleting period for the Tra fish.

The built mechanized filleting solution based on the specific characteristics of the researched object is the foundation for designing the fish filleting machines which replace the present manual filleting and meet the imperative requirements of Vietnamese Fisheries.

The built relations of the geometric parameters of cutting tool, cutting conditions and the fillet product quality and productivity of filleting process in the initial cutting period and the real cutting process for the Tra fish by the mechanized filleting solution are the foundation for researching cutting tools and cutting condition control for the Tra filleting based on the fillet product quality and productivity of the filleting process.

**Practical contributions**

The determined post mortem periods of the Tra fish help the fish processors to plan their work schedule suited to their abilities in processing.

The determined filleting time helps the fish processors to save their cost of post process materials in cold storage section and improve their product quality, productivity and efficiency in their process.
The determined mechanized filleting solution is the found for fabricating the fish filleting machine suited the specific characteristics of Tra fish and replace the present manual filleting which is applied in the fish processors in Mekong Delta.

The determined complete cutting tool parameters for filleting the Tra fish are the foundation for planning the technological process for fabricating them in accordance with the domestic manufacturing abilities and contribute for solving the urgent requirements of filleting tools as mechanized filleting process is executed in industrial scale.

The determined relation of cutting conditions, cutting tool diameter and filleted product quality in real cutting process is the foundation for designing and fabricating the automatic control system of cutting conditions which meets filleted product quality objective.

**Suggestion for the continuous studies**

The applied matters need to be researched based on the results from this thesis for solving the imperative tasks of Vietnamese Fisheries as following below:

- Designing and planning the technological process for fabricating the fish filleting machine based on the built mechanized filleting solution in accordance with the domestic manufacturing abilities.

- Planning the technological process for fabricating the cutting tool for fish filleting machine based on the determined material and geometric parameters in accordance with the domestic manufacturing abilities.

- Designing and fabricating the automatic control system of cutting conditions based on the determined relations of cutting tool geometric parameters, cutting conditions and filleted product quality, productivity of filleting process.

- Designing and fabricating the automatic monitoring system of cutting tool worn rate during the machine operation.

The academic matters need to be researched based on the results from this thesis as following below:

- Researching the effect of cutting tool material on the worn rate in the Tra fish filleting process.
- Researching the effect of cutting tool material and thickness on the cutting tool stability in the Tra fish filleting process.

- Researching the effect of clamping force on the filleted product quality and productivity of the Tra fish filleting process.

Advisor: Asso. Prof. Dr. Tran Doan Son

PhD. Student: Nguyen Tuan Hung