UNIVERSITI TEKNOLOGI MARA

# EFFECT OF PROCESSING ON THE PROTEIN QUALITY AND THE TEXTURE PROFILE OF CANNED TERRESTRIAL SNAIL *Achatina fulica*

MOHD IRWANI HAFIZ BIN SAHID

MSc

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## Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of University Teknologi MARA. It is original nd is the result of my own work, uless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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|---|---|
| Name of Candidate | MOHD IRWANI HAFIZ BIN SAHID |
| Candidate's ID No. | 2002202153 |
| Programme | MASTER OF SCIENCE |
| Faculty | APPLIED SCIENCES |
| Thesis Title | EFFECT OF PROCESSING ON THE PROTEIN QUALITY AND THE TEXTURE PROFILE OF CANNED TERRESTRIAL SNAIL *Achatina fulica*. |
| Signature of Candidate | Irwani |
| Date | 9/7/07 |

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## ABSTRACT

The edible terrestrial snail, *Achatina fulica* is at present under utilised in Malaysia. It is not consumed because of the stigma of it being classified as a pest. The aim of this work is to evaluate the nutritional and textural quality and changes of the meat of *Achatina fulica* under different processing conditions, namely, the brine concentration (1-4%) and sterilisation time (30 and 45 minutes at 121.1°C). Physico-chemical analysis (proximate analysis, mineral content, pH, caloric value), changes in protein and the amino acid content before and after processing, canning medium analysis for presence of amino acids, and texture evaluation were conducted. Physico-chemical analyses were determined using well-established methods, amino acid content were determined by the AccQ.Tag Method, while texture determination (TPA) was conducted using the TA-XT2 texture analyser.

The proximate analysis conducted in this study reveals that the meat of Malaysia's wild *Achatina fulica* is nutritious. It is high in protein, at 11.30% (raw). It contains all the essential amino acids. It is also high in calcium (0.24%), low in fat (1.25%) and caloric value (99.75kcal), with neutral pH (7.38). The change of protein content of the meat of *Achatina fulica* canned at different brine concentrations and sterilisation times were minimal, showing significant difference for brine concentration of 4% at 30 minutes sterilisation time and all range of salt concentrations at 45 minutes sterilisation time ($p<0.05$). Changes in amino acid content were also minimal, with significant differences observed for Histidine, Lysine, Methionine, Tryptophan, Arginine, Isoleucine, and Leucine. However, loss of Histidine, Lysine, Methionine and tryptophan were observed in all treatments. Canning medium analysis showed presence of amino acids, suggesting that solubilisation of protein is one mechanism that caused the reduction of protein content during canning. However, the loss was not significant ($P<0.05$). The texture profile analysis of the meat of *Achatina fulica* canned at different processing condition showed some changes within the experimental treatments, however, these were not significantly different ($P<0.05$).

# CHAPTER 1

# INTRODUCTION

## 1.1 Demand for Escargot

In France *"Escargot" Bourgeonaise* is a standard menu item in most restaurants and bistros. "Escargot" is the French word referring to the edible land (terrestrial) snail from the *Helix Pomatia* specie. A premium delicacy, most high-end restaurants around the world served escargot as an appetizer. Aside from *Helix Pomatia*, other helicidae such as *Helix Aspersa* and *Helix lucorum* are also well accepted and currently available in the market especially mainland Europe.

People have consumed escargot for thousands of years and millions worldwide are still consuming them (Murphy, 2001; Michelson, 1998). There has been evidence of the Stone Age people lived exclusively on snails. The Greek loved them as a delicacy and the convents during the Middle Ages kept them as a food source during lent (Michelson, 1998). Today, the demand for escargot consists of traders (importer and exporter), food outlets (restaurant and hotels) and industry (food processor).

It was reported that in the 1970s, the French consumed about 40,000 tonnes of snails annually. In order to meet the nation's needs, France imported 7,000 tonnes of snails in 1979 from the snail's exporter worldwide (Lim, 1983). The demand for snails has continuously increased over the year. In 1992, snails' consumption increases to about 14,000 tonnes annually with a total import of 26,674, 000 ECU (ITC, 1993). Table 1.1 shows the import and export quantity of snail and snail products by France between 1990 and 1992. The major snail exporters to France are Greece, Turkey, Germany, Hungary, Poland and Indonesia.