

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF FISH-BASED RICE
PORRIDGE USING SINGLE –SCREW EXTRUDER**

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ABSTRACT

This work was carried out to develop extrudate porridge using a single-screw extruder. The extrudate porridge developed had the texture similar with normal instant rice porridge in market, however extrudate porridge required 5 minutes to serve by heating in microwave oven on medium high level. Rice was used to produce porridge due to availability, price and suitable for children as well as adult people. Low value fish, Carangidae, *Decapteius macrocoma*, shortfin scads were used in this study, and was processed to dried powder, cooked and hydrolysed form to be used in extruder with coarse rice powder.

Preliminary study had been done to produce plain rice porridge using traditional method. Long-grain rice was mixed with broken rice at ratio of 0:100, 25:75, 50:50:75:25, and 100:0 respectively. Each mixture was mixed to produce plain rice porridge. The physical and sensory properties of the each mixture were evaluated. The results obtained showed that plain rice porridge was best prepared using 100% long-grain rice. Physical characteristics of the plain rice porridge were relatively unchanged with the substitution of long-grain rice with broken rice.

Studies had been done to produce direct expanded product using single-screw extruder. The powder mixture was extruded through a single-screw extruder, and the extrudate was cut manually using a scissor or knife as they came out the die to ensure similar pellets size, dried in oven at 60-66°C overnight to moisture content of 5-10% to maintain the shelf life of the product, and degree of expansion, solid density, colour, Water absorption index (WAI) and water solubility index (WSI) were measured. Water absorption and solubility indices of the extrudate were affected by feed moisture. Water absorption index increased significantly with increasing moisture content. However, WSI decreased, while WAI and solid density increased, when percentage of fish content increased. Expansion ratio, measured as area expansion, decreased as the percentage of fish content increased in feed mixture. The feed moisture increased the sectional

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CHAPTER ONE

INTRODUCTION

Rice is a popular, non-allergic, gluten free source of carbohydrates, vitamins, and minerals with a trace of fat (Bhattacharya, 1982). It contains about 6.0% of high quality protein and it is naturally low in sodium. Research efforts are needed to develop this valuable resource into nutritious food products (Yang, 1995).

Rice porridge is a very popular food in the Asian region, particularly in China, Japan, and Korea (Lu, 1987). Rice congee is a type of Asian rice porridge known as “zhaou” or “juk” in several Chinese dialects and Korean, and pronounced “kayu” or “okayu” in Japanese and called “chaio” in Vietnamese (Zhao, 1995). The rice is boiled in many times its weight of water for a long time until the rice breaks down, and becomes a fairly viscous white porridge. It is usually home made and is also available to consumers in the restaurants in freshly cooked form.

Commercial rice porridges based on the state of the products are divided into two-types: quick-cooking rice porridge and ready-to-eat rice porridge (Luh, 1991). According to Jiang et al. (1995), ready-to-eat rice porridge includes three types: plain rice porridge, savoury rice porridge and sweet rice porridge. The preparation of plain rice porridge is rather simple, its essential ingredients are regular rice and water. However, study has yet to be conducted concerning the development of plain rice porridge into a commercial product suitable for local market.

Plain rice porridge is less attractive to consumers because it is basically a bland food and low in nutritional value. Thus, it is often incorporated with ingredients containing