

Effect of processing method on proximate composition of gutted fresh Mcheni (*Rhamphochromis species*) (Pisces: Cichlidae) from Lake Malawi

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Article history

Received: 1 July 2016

Received in revised form:

18 August 2016

Accepted: 19 August 2016

Abstract

The effect of sun drying, smoking, salting and combination of these processing methods on proximate composition of fresh gutted *Rhamphochromis* fish from Lake Malawi were investigated against whole fish as a control. Fresh whole fish had $57.24 \pm 4.57\%$, $49.5 \pm 0.18\%$, $35.8 \pm 0.02\%$, $11.9 \pm 0.04\%$ and $25.6 \pm 0.41\%$ for mean moisture, crude protein, crude fat, ash and energy, respectively. Fish that were salted then later sun dried had significantly high mean moisture content ($16.7 \pm 0.24\%$) while lowest mean moisture content ($9.6 \pm 0.16\%$) was obtained in smoked fish ($P < 0.05$). Smoked fish also retained more crude protein ($45.2 \pm 0.05\%$) while fish that were salted then sun dried had highest mean loss in crude protein ($34.1 \pm 0.07\%$) ($P < 0.05$). Highest and lowest mean crude fat was obtained in sun dried fish ($34.9 \pm 0.02\%$) and salted then sundried ($25.8 \pm 0.16\%$) fish respectively ($P < 0.05$). Fish that were salted then smoked had highest mean ash value ($20.4 \pm 0.23\%$) while lowest mean values ($11.4 \pm 0.15\%$) were recorded in sun dried then smoked fish ($P < 0.05$). Smoked fish had higher mean energy levels ($23.2 \pm 0.04\%$) while fish that were salted then sundried had lowest mean energy levels ($20.1 \pm 0.12\%$) ($P < 0.05$). The general observation was that smoking fish increases protein retention while addition of salt result into loss of protein and fat. Furthermore, smoked fish had lowest moisture content and average fat levels suggesting a longer shelf life. This study recommends smoking as a way to obtaining maximum nutritional quality as well as longer storable product amongst four species of seaweed.

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Keywords

Rhamphochromis

Gutting

Salting

Smoking

Sun drying

Introduction

Fish are a rich source of essential nutrients required by humans of all ages (Abdullahi *et al.*, 2001). In Malawi, it is the major and most affordable source of dietary animal protein. *Rhamphochromis* species (locally known as Mcheni) is one of the most important fishery and preferred by many consumers in Malawi (Kaunda *et al.*, 2003). The fish is characterized by its high fat content which if unprocessed, makes it to spoil fast. Many nutritional studies have demonstrated that nutrients in fish that are required by the consumer are lost during processing (Chukwu and Shaba, 2009; Mansur *et al.*, 2013). This is because when a product is subjected to heating and high concentration of salt, there are a series of chemical and physical changes which result into hydrolysis of protein and polyunsaturated fatty acid compounds, thus increasing digestibility (Tao and Linchun, 2008). Preparation of fish which involves processing and preservation is therefore critical to conserving nutrients. In Malawi, the commonest processing methods for fish are sun drying

and smoking. It is important therefore to determine how these processing methods affect the retention of nutrients in fish. Information which is available on nutrient composition of *Rhamphochromis* fish species in Malawi (Mumba and Jose, 2005) was only for smoked samples that were collected from markets. Thus, no literature is available for the other methods of processing, especially for fish that are gutted and processed. The present study investigated the effects of processing gutted *Rhamphochromis* fish by sun drying, smoking, salting and combination of these methods, on its proximate composition. The possible effects of different processing methods on the nutritive value of this fish species were evaluated; and the values determined were compared with the values from whole fish.

Materials and Methods

Fish sample collection

Fresh fish, *Ramphochromis* species (1,080) (Figure 1) were collected from Lake Malawi and immediately packed in a cooler box and preserved

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