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RESEARCH ARTICLE

Selenium content in meals consumed for lunch by Sri Lankans and the effect of cooking on selenium content

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Abstract: The selenium (Se) content in meals consumed by Sri Lankans for lunch, composed of fixed and random menus, was determined using Hydride Generation Atomic Absorption Spectrometer. The samples were obtained from five districts in Sri Lanka. The Se content (μg/kg) in meals of fixed and random menus was in the range of 48-70 and 53-60 respectively. These values are comparable to the daily requirement of Se (55 μg/kg) prescribed by the World Health Organization and Food and Agriculture Organization of the United Nations. There is no significant difference in Se content in meals consumed by people in the districts of Kandy, Gampaha, Kurunegala, Rathnapura, and Colombo, as well as among individual households in each district. The effects of different cooking methods on the Se content indicate that the level of Se (μg/kg) in fried chicken (30.45 - 52.49) is less than that in a chicken curry (61.38 - 84.25). The percentage loss of Se during cooking for chicken, dahl (*Lens culinaris*) and Gotukola (*Centella asiatica*) were 89.6%, 84.1%, and 79.9% respectively. The present study revealed that Se content in Sri Lankan menus provides the required Se for people. However, the different methods of cooking indicate that there is a loss of Se during cooking.

Keywords: Selenium, Composite meal, Daily intake.

INTRODUCTION

Selenium (Se) is a trace element that is important in human nutrition. This is due to the presence of Se dependent enzymes (selenoenzymes) that help to reduce oxidative stress, DNA damage, coronary heart disease and cancer (Briggs, 1999; Patric, 2004). Deiodinases (Type I, II, III) that contains Se plays an important role in thyroid hormone metabolism, hence deficiency of Se results in defects in the thyroid metabolism (Nerve, 1996).

Suffiecient Se contents in food have been reported in other countries, but not many reports are available from Sri Lanka except a study done on raw rice (Mahagama, 2009), vegetables and cereals (Bandara, 2012; Buwaneka, 2014; Prasanna, 2014). According to literature, Se levels in organ meats and seafood can range from 0.4 – 1.5 μg Se/g, muscle meats 0.1 – 0.4 μg Se/g, and dairy products contain <0.1 – 0.3 μg Se/g (Sunde *et al.,* 2006). Elsewhere, the effects of cooking on Se content has been reported (Higgs *et al.,* 1972; Bratakos *et al.,* 1987). The studies showed that there is a loss of Se during cooking, where part of it can be absorbed by the cooking utensils while some escape in the gaseous phase. However, in spite of substantial losses while cooking fish and meat, their contribution as sources of Se is significant as they contain high levels of Se. Raw vegetables are regarded as poor Se sources for humans (typically <0.1 μg Se/g), with the exception of Brazil nuts and mushrooms which contain high levels of Se. Se content in cereals and grains range from <0.1 to >0.8 μg Se/g (Sunde *et al.,* 2006). Thus, cooking further lowers the Se content in these types of food. While the principal source of Se for most individuals is the daily intake of food and drinking water, these sources ultimately depend on the soil type, climatic conditions in a given geographical area and also the ability of plants to accumulate Se (Dumont *et al.,* 2006).

Cereals and their products are the major source of dietary Se for Greeks but while cooking 5-30% Se can get lost. However, wheat grain and flour do not lose Se when subjected to various other thermal processes such as frying, grilling, boiling and canning (Bratakos *et al.,*1987).

The present study reports the effect of cooking on Se content in three locally consumed accompaniments to rice (chicken curry, dahl curry and *Centella asiatica* fried salad with

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