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EFFECT OF PARBOILING ON MINERALS AND HEAVY METALS OF SELECTED SRI LANKAN TRADITIONAL RICE VARIETIES GROWN UNDER ORGANIC FARMING

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ABSTRACT

The study was conducted to evaluate the effects of parboiling treatment on the minerals and heavy metals of six Sri Lankan traditional rice varieties; Kalu heenati, Pokkali, Gurusinghe wee, Kahawanu, Sudu murunga and Unakola samba. Metals were determined by using ICP-AES and AAS. Parboiling can be considered as a suitable rice processing method for Pokkali and Kahawanu and not for Kalu heenati and Unakola samba in order to furnish the recommended daily intake of the micronutrients. Un-parboiled Kalu heenati and both un-parboiled and parboiled Kahawanu can be considered as the most suitable rice varieties for daily consumption in order to maintain the recommended daily intake of iron. It was identified that Pokkali rice contained the highest iron content of 29.5 mg/100 g. This amount has further increased by 66.7% after parboiling. Therefore both parboiled and un-parboiled Pokkali can be considered as the best dietary supplement among these rice varieties for iron deficiency and for pregnant mothers. Selected heavy metals including As, Cd, Pb and Cu were not detected in the selected Sri Lankan traditional rice varieties.

Key words: Heavy metals, Parboiling, Sri Lanka, Traditional rice varieties

INTRODUCTION

In ancient times, over 2000 different varieties of rice are said to be grown all over the Sri Lanka (Amarasingha *et al* 2013). With the current trend of global awareness of the benefits of organic food and medicinal properties of Sri Lankan traditional rice varieties (STRV), and nowadays need of traditional rice is becoming very high. Organic farming relies on ecofriendly techniques which preserve the nutritional values and sustainability of the environment. Almost all the STRV were organically farmed, which relies on techniques such as crop rotation, green manure, compost, biological pest control and depends on ancient irrigation systems for a sustained water supply. The trend of organically farmed STRV is becoming popularized as a result of the negative impact of agrochemicals and fertilizers to the environment and human health.

STRV show high nutritional value, different texture, appearance, aroma and taste compared to improved rice varieties. Previous studies of twenty five indigenous rice varieties showed bio-activities such as antioxidant, anti-amylase, anti-glycation and anti-inflammatory properties and higher nutritional composition compared to improved varieties (Abeysekera *et al* 2013). Nutrient rich food play a vital role as a way to decrease the growing numbers of children and women in Sri Lanka affected by nutrient deficiencies, including Iron Deficiency Anemia (IDA).

Parboiled rice is the major staple throughout South Asia. About one-fifth of the world's rice is parboiled (Bhattacharya *et al* 1985). Hence, parboiling can be regarded as one of the most popular processing methods in the rice industry. This includes soaking paddy, steaming at high or atmospheric pressure, and

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