



Tropentag, September 19-21, 2012, Göttingen -  
Kassel/Witzenhausen

“Resilience of agricultural systems against crises”

## Iron, Zinc, Carotenoids, Bioactive Compound, and Antioxidant Activity of Indonesian Black Colored Rice

IGNASIUS RADIX A.P. JATI, DONATUS NOHR, HANS KONRAD BIESALSKI

*University of Hohenheim, Institute for Biological Chemistry and Nutrition, Germany*

### Abstract

Black rice (*Oryza sativa* var Malang) is one variety of rice which has dark colour. In Indonesia black rice has only been used in a small amount as an ingredient in traditional ceremony. The objective of this research were to investigate the effect of boiling on iron, zinc, carotenoids, phenolic, and anthocyanin contents of back rice, and the antioxidant activity of the extract using DPPH, FRAP, superoxide radical scavenging, and linoleic acid bleaching methods (TBARS).

There were no significant differences on iron and zinc contents between raw and boiled rice. The iron content for raw and boiled rice were  $1,66 \pm 0,42$  and  $1,87 \pm 0,39$  mg/100g, respectively, and the zinc content were  $2,24 \pm 0,22$  and  $2,0 \pm 0,50$  mg/100g, respectively. Boiling could significantly decrease the anthocyanin and phenolic contents. The anthocyanin content were 205,54 and 52,59 mg cyanidin equivalent/100g for raw and boiled rice, respectively. The phenolic content were 728,9 and 553,04 mg catechin equivalent/100g, respectively. For carotenoids, lutein was the major compound identified, followed by  $\alpha$ -carotene,  $\beta$ -carotene,  $\beta$ -cryptoxanthine, lycopene, and zeaxanthine. The contents for raw extract were 1106,49; 547,90; 50,70; 11,40; 7,80; and 3,57 ng/100 g, respectively. There were no significant differences between raw and boiled sample.

The antioxidant activities were significantly reduced by the boiling process. Scavenging activity against DPPH was reduced from 87,49 % to 61,4 %. Feric reducing/antioxidant power (FRAP) was reduced from 1101,24 to 758,05 mmol Fe [II]/mg extract, superoxide radical scavenging was reduced from 72,14 % to 46,39 %, and inhibition of TBARS formation for raw sample was 0,54  $\mu$ mol and 1,05  $\mu$ mol for boiled sample.

Based on the results black rice could potentially be used as a substitute for white rice in Indonesian diet. The iron, zinc, and carotenoids content of black rice could give a better contribution than white rice for micronutrient intake. Moreover black rice has bioactive compounds such as anthocyanin and phenolics, which could act as natural antioxidant.

**Keywords:** Anthocyanin, antioxidant activity, black rice, carotenoids, micronutrient, phenolic