Influence of customized cooking methods on the phenolic contents and antioxidant activities of selected species of oyster mushrooms (*Pleurotus* spp.)

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**Abstract** Nutritional value of cooked food has been considered to be lower compared to the fresh produce. However, many reports showed that processed fruits and vegetables including mushrooms may retain antioxidant activity. *Pleurotus* spp. as one of the edible mushroom are in great demand globally and become one of the most popular mushrooms grown worldwide with 25-fold increase in production from 1960–2009. The effects of three different cooking methods (boiling, microwave and pressure cooking) on the antioxidant activities of six different types of oyster mushrooms (*Pleurotus eryngii*, *P. cinctipes*, *P. eryngii* *P. flabellatus*, *P. floridanus* and *P. pulmonarius*) were assessed. Free radical scavenging (DPPH) and reducing power (TEAC) were used to evaluate the antioxidant activities and the total phenolic contents were determined by Folin-Ciocalteu reagent. Pressure cooking improved the scavenging abilities of *P. floridanus* (*>200 %*), *P. flabellatus* (117.6 %), and *P. pulmonarius* (49.1 %) compared to the uncooked samples. On the other hand, the microwaved *Pleurotus eryngii* showed 17 % higher in the TEAC value when compared to the uncooked sample. There was, however, no correlation between total phenolic content and antioxidant activities. There could be presence of other bioactive components in the processed mushrooms that may have contributed to the antioxidant activity. These results suggested that customized cooking method can be used to enhance the nutritional value of mushrooms and promote good health.

**Keywords** Oyster mushroom · *Pleurotus* · Cooking method · Antioxidant activity

**Introduction**

Oxidation is necessary for physiological processes in living system. Free radicals, also known as reactive oxygen species (ROS) are produced during numerous physiological processes. Excessive production of reactive oxygen species leads to oxidative damage and this has been implicated in aging process and many life threatening human diseases including diabetes, inflammation and cancers (Gogevkar et al. 2012; Song and Van Griensven 2008). Living organisms have endogenous antioxidants that act as major defense against oxidative damage caused by the free radicals. However, these antioxidants are often insufficient to prevent the damage. Mushrooms have been recognized as sources of antioxidants as they contain beneficial components and secondary metabolites that can protect against oxidative damage. The antioxidants found in mushrooms are mainly phenolic compounds reported to have protective role against chronic diseases related to oxidative stress (Ferreira et al. 2009). Today, mushrooms are being considered as functional food mainly because of their nutritional values and medicinal importance (Stanets et al. 2005; Elmas et al. 2007; Khan and Tania 2012).

Mushrooms have been part of the human diet for thousands of years. Globally cultivated mushrooms such as *Agaricus bisporus*, *Lentinula edodes* and *Pleurotus* spp. have become popular and the industry is expanding with world production greater than two million tonnes annually (Gogevkar et al