Protective Effect on Oxidative DNA Damage and Antiproliferative Activity of Standardized γ-Oryzanol-Rich Extracts from Thai Purple Rice Bran

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ABSTRACT

This study was carried out to investigate the protective effect of standardized γ-oryzanol-rich extracts on oxidative DNA damage induced by Fenton reaction and antiproliferative activity against human cancer cells. Six cultivars of Thai purple rice were collected in northern Thailand. Rice bran was extracted with hexane/ethyl acetate mixture and the extract was evaporated to obtain crude rice bran oil. Each rice bran oil was further purified by column chromatography to obtain the γ-oryzanol-rich extract. The extracts contained γ-oryzanol in the range of 1.17 – 7.54 % w/w, in which GAM THOR exhibited the highest γ-oryzanol content. The extracts containing more than 5.0 % w/w γ-oryzanol (GAM THOR, GAM DOI MUSUR and GAM SUKHOTHAI-2) were selected to be standardized with γ-oryzanol and then the protective effect on oxidative DNA damage and antiproliferative activity against four human cancer cell lines (HT-29, HCT 116, MDA-MB-468 and PC3) were investigated. The extracts (10 µg/ml) exhibited a protective effect on oxidative DNA damage induced by Fenton reaction as compared with standard quercetin (lower than 5 µg/ml). Furthermore, all of the extracts exerted antiproliferative activity against human cancer cell lines in a dose-dependent manner. GAM THOR exhibited the highest antiproliferative activity against HT-29, HCT 116, MDA-MB-468 and PC3 with an 50% inhibition concentration value of 52.18 ± 1.21, 40.58 ± 5.69, 48.59 ± 2.40 and 51.61 ± 1.30 µg/ml, respectively. From these findings, γ-oryzanol-rich extracts from Thai purple rice bran show potential as chemopreventive supplements or in nutraceuticals.

Keywords: γ-Oryzanol, Thai purple rice bran, DNA damage, Antiproliferative activity

INTRODUCTION

Reactive oxygen species and reactive nitrogen species play an important role in human cancer development (Wiseman and Halliwell, 1996). Reactive oxygen species and reactive nitrogen species have been demonstrated to possess