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Anti-inflammatory effect of black rice in *Aggregatibacter actinomycetemcomitans* stimulated macrophages via inhibition of NF- κ B pathway

Beom-Su Kim^{1#^}, Joo-Yi Kang^{2#}, Kang-Ju Kim³, Hyun-Jin Kim^{4*} & Yong-Ouk You^{2*}

¹Carbon Nano Convergence Technology Center for Next Generation Engineers (CNN), Chonbuk National University, Jeollabuk-do 54896, Republic of Korea

²Department of Oral Biochemistry; ³Department of Oral Microbiology and Immunology; ⁴Institute of Biomaterial Implant, Department of Oral Anatomy, School of Dentistry, Wonkwang University, 344-2, Shinyong-dong, Iksan 54538, Republic of Korea

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Periodontitis, which results from infection and inflammation, is one of the most common inflammatory diseases. Some studies have shown that plant extracts can inhibit inflammation in periodontitis. However, the anti-inflammatory effects of black rice extract (BRE) have not yet been investigated. Here, we investigated the anti-inflammatory activity of BRE *in vitro* on *Aggregatibacter actinomycetemcomitans* (*A. a*) stimulated RAW 264.7 macrophages. The results showed that BRE did not affect cell viability at concentrations ranging from 0.015 to 0.5 mg/mL, but toxicity was observed >1 mg/mL. *A. a*-induced nitric oxide (NO) production and iNOS protein expression were inhibited by treatment with BRE. In addition, BRE inhibited the gene expression of pro-inflammatory cytokines, such as IL-6, IL-1 β and TNF- α , and blocked NF- κ B p65 translocation as well as I κ B α and IKK α/β phosphorylation. Moreover, the DPPH and ABTS radical scavenging activity results showed that BRE exhibits strong antioxidant activity in a dose-dependent manner. This study found that BRE exerts anti-inflammatory activity via inhibition of NF- κ B signaling and antioxidant activity. The above finding suggests that BRE can be used as a potential therapeutic agent for treating inflammation in periodontitis.

Keywords: Antioxidant activity, Antiradical activity, *Oryza sativa*, Periodontitis, Purple rice