Purple Riceberry Is Neuroprotective and Enhances Cognition in a Rat Model of Alzheimer's Disease

Alzheimer's disease, a neurodegenerative disease characterized by progressive memory loss and cognitive impairment, is the most common type of dementia in aging populations due to severe loss of cholinergic neurons in a specific area. Oxidative stress is known to be involved in the pathogenesis of this condition. Therefore, the cognition-enhancing and neuroprotective effects of rice berry (Oryza sativa), a purple-pigmented rice that is rich in antioxidant substances, was evaluated. Young adult male Wistar rats, weighing 180-220 g, were orally given rice berry once daily at doses of 180, 360, and 720 mg/kg of body weight for a period of 2 weeks before and 1 week after the induction of memory deficit and cholinergic lesions with AF64A, a specific cholinotoxin, via bilateral intracerebroventricular administration. One week following AF64A administration the rats were evaluated for spatial memory, neuron density, acetylcholinesterase activity, and hippocampal lipid peroxidation products. Our results showed that rice berry could significantly prevent memory impairment and hippocampal neurodegeneration in hippocampus. Moreover, it also decreased hippocampal acetylcholinesterase activity and lipid peroxidation product formation. These results suggest that rice berry has potential as an effective agent for neurodegeneration and memory impairment in Alzheimer's disease.[1]

Anthocyanin-rich Riceberry bran extract attenuates gentamicin-induced hepatotoxicity by reducing oxidative stress, inflammation and apoptosis in rats

Liver plays an important role in the detoxification and metabolic elimination of various drugs and harmful substances. The damaging effects on the liver tissue treated with gentamicin are multi-factorial and their mechanisms remain unclear. This study aimed to investigate the possible protective effects of anthocyanin-rich Riceberry bran extract on gentamicin-induced hepatotoxicity in rats. Riceberry bran extract was given by oral administration 30 min before gentamicin injection for 15 consecutive days. Serum levels of liver marker enzymes, AST and ALT, were significantly elevated and the total serum protein level was markedly reduced in gentamicin-treated rats. Gentamicin injection led to the significant

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increase in hepatic MDA level and decrease SOD expression. Liver inflammation and apoptosis were observed in gentamicin-treated rats as indicated by the increases in NF-κB, TNF-αR1, COX2, and iNOS, caspase-3, Bax, and decrease in Bcl-XL expressions. Riceberry bran extract significantly prevented gentamicin-induced the elevations of serum AST, ALT and the reduction of serum total protein. These were related to the inhibition of oxidative stress, inflammation and apoptosis in Riceberry bran extract treatment. These findings suggest that anthocyanin-rich Riceberry bran extract can prevent liver dysfunction and damage induced by gentamicin, possibly through its antioxidant, anti-inflammatory and anti-apoptotic effects.[2]

Effect of Riceberry oil (deep purple oil; Oryza sativa Indica) supplementation on hyperglycemia and change in lipid profile in Streptozotocin (STZ)-induced diabetic rats fed a high fat diet

Riceberry oil (RBBO) has been described as having a high level of antioxidants and functional properties. The aim of the present study was to determine the effects of RBBO on changes in blood glucose, insulin levels, and GLUT4 transporter as well as lipid profiles in Streptozotocin (STZ) - induced hyperglycemic rats fed a high-fat diet. Seventy male Sprague-Dawley rats, aged six weeks and weighing 196.09 ± 10.46 g, were randomly divided into two groups: the first group of 20 rats was fed with a basal diet and another group of 50 rats were fed with a high fat (HF) diet. After two weeks, rats fed the HF-diet were induced to hyperglycemia by two doses of STZ injections (20 and 30 mg/kg; i.p.). Normal rats were divided into two groups: one group fed with basal diet (NC) and another group fed with basal diet with the oil source replaced with 5% RBBO (NR). Diabetic rats were randomized into five groups of 10 rats each as follows: untreated diabetic rats (DMC) fed a high fat (HF) diet alone; and 4 treated groups fed with high fat + 5% RBBO (DMRL); HF + 7.5% RBBO (DMRM); HF + 15% RBBO (DMRH); and HF + metformin 300mg/kg BW (DM-MET), respectively. All rats were given free access to their diet and water for 12 weeks. After 12 weeks of supplementation, significant improvement of blood glucose, insulin, HbA1C, intraperitoneal glucose tolerance and GLUT 4 transporter level were observed in the RBBO supplemented groups compared to the DMC group. Significant reductions in TC, LDL-cholesterol, TG and TG/HDL ratio were

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also shown in rats fed with RBBO when compared to those of diabetic rats. Findings in the present study demonstrate that RBBO, a nutraceutical food, may be useful as an alternative food supplement for the alleviation of hyperglycemia and dyslipidemia conditions.[3]

[3] nternational Food Research Journal 20(2):873-882 · January 2013

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