

Category	: International Rice Research Conference
Select Theme	: Pathways to health and nutrition
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Keyword 1	: Nutrient-dense rice
Keyword 2	: Nutraceuticals
Keyword 3	: Glycemic index
Title of Entry	: Resistant starch and pro-anthocyanidins: key moieties owing anti-diabetic potential in Indian pigmented rice varieties
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Abstract : Type 2 diabetes mellitus (T2D) is a pandemic that currently affects about 450million people worldwide. T2D is characterized by a sustained hyperglycemia due to the persistent damage in insulin secretion by pancreatic β -cell dysfunction or loss and by insulin resistance at the peripheral tissues. Pro-anthocyanidins, which are major antioxidants capable to tackle the oxidative stress of pancreatic β -cells along with slow digestible (SDS) and digestion resistant starch (RS) known to minimize blood sugar spike, are the emerging two key moieties contributing towards cascade effect in diabetes management. More than the content, the composition and combinatorial mode of action have to be investigated, where traditional pigmented rice varieties are a great source. In this direction, in the present study the phenolic profiling of differentially Indian pigmented varieties - black (Chakhao) and red (Njavara) revealed a variation of 70.2 to 82.5mg/g in pro-anthocyanidin content, which is negligible in white rice (PB1509). Although the apparent kinetics of antioxidant potential of both red and black rice has been found as 40 μ mol of TE/g but they may differ in intrinsic kinetics which was dependent on phenolic pool and composition. Starch profiling of SDS and RS fractions in black and red rice varied from 5-20mg/g, which is 2-5% higher as compare to white rice. The possible role of these two bio-actives in anti-hyperglycemic activity was further validated using streptozotocin (STZ) -induced diabetic mice model. Once STZ induced diabetic condition had been established, two weeks treatment with black and red rice successfully decreased plasma glucose as compared with white rice treatment. Compared to black rice, red rice had shown a significant reduction in plasma glucose by ~27% with concomitant decrease in the destruction of pancreatic acinar tissue. These findings indicates that in insulin-sensitive tissues, pro-anthocyanidins and RS assist in modulating blood sugar spike and to protect β -cells by improving the oxidative/inflammatory state, thus aid in T2D management. Fortification/ bio fortification of these bio-actives can brighten the menu for diabetics in future, but indeed the nutrigenomics behind the anti-hyperglycemic action of red rice need to be further investigated.

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