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Beneficial effect of *Aspalathus linearis* on hepatic Insulin resistance

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Recent studies have reported that plant extracts such as Rooibos (*Aspalathus linearis*), well-known for its use as herbal tea, could play a potential role in the prevention and treatment of metabolic disease. This study aimed to establish whether aqueous and organic solvent-based polyphenol-enriched extracts prepared from “fermented” (oxidized) (FRE) or “unfermented” (unoxidized, green) (GRE) rooibos (10 µg/mL), respectively, can ameliorate palmitate-induced insulin-resistance in C3A liver cells and the liver of obese insulin-resistant (OB/IR) rats. The major polyphenol in GRE was the flavonoid, aspalathin, a dihydrochalcone unique to Rooibos. Palmitate (0.75 mM) was used to induce insulin resistance in C3A cells. Thereafter, cells (with or without palmitate) were treated with FRE or GRE for 3 h and insulin (1 µM for 15 min). Glucose uptake, palmitate uptake and ATP content were determined. OB/IR rats were subsequently treated at various doses (32, 97 and 195 mg/kg BW) of GRE for 12 weeks to confirm *in vitro* findings. Body weights and blood glucose concentrations were monitored weekly and fasting insulin concentrations were assessed after 12 weeks treatment. Protein and gene expression relevant to insulin-signaling, AMPK and lipid metabolism were investigated by Western blot in C3A cells and RT-PCR in liver tissue. Insulin resistance in C3A cells was confirmed by a reduction in insulin-stimulated glucose uptake. FRE and GRE reversed the inhibitory effects of palmitate on insulin-stimulated glucose uptake and ATP concentrations. In the OB/IR rat, GRE lowered elevated insulin concentrations and improved insulin sensitivity. Mechanistically, GRE improved expression of genes and proteins that affected glucose and lipid metabolism *in vivo* and *in vitro*. This study provides evidence that both FRE and GRE could play role in the amelioration of insulin resistance, in spite of qualitative and quantitative differences in phenolic composition.

Biography

SE Mazibuko-Mbeje has completed her graduation and PhD from the University of Zululand in 2014. She is a Senior Scientist at the South African Medical Research Council and is currently a Post-doctoral Research Fellow at the Helmholtz Zentrum in Munich, Germany. She has published two first author papers and co-authored four scientific peer-reviewed papers.

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