

Swart AC, Schloms L, Smith C, Storbeck KH, Roos M, Marnewick JL & Swart P, PharmaNutrition, Rooibos tea: A functional food in the management of metabolic disorders. Abstracts of Pharma Nutrition 2013 / PharmaNutrition 2 (2014) 75–119

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[O9] **Rooibos tea: A functional food in the management of metabolic disorders** (Abstract)

A.C. Swart 1,\* , L. Schloms 1, C. Smith1, K.H. Storbeck 1, M. Roos 1, J.L. Marnewick 2, P. Swart 2 1 University of Stellenbosch, South Africa 2 Cape Peninsula University of Technology, South Africa

**Introduction:** Rooibos (*Aspalathus linearis*), a South African herbal tea rich in polyphenols, is consumed globally. Consumption improves glucose tolerance in mice and lipid profiles in humans at risk for cardiovascular disease (CVD), and inhibits angiotensin-converting enzyme, suggesting a potential role for Rooibos in the management of metabolic-related diseases. We investigated the effect of Rooibos on glucocorticoid biosynthesis and inactivation, and on adrenal cytokine secretion.

**Methods:** Glucocorticoid production in H295R cells and cortisol inactivation by 11-hydroxysteroid dehydrogenase (11HSD) in CHO-K1 cells were assayed in the presence of Rooibos. Plasma steroids in rats and humans at risk for CVD were analyzed following Rooibos consumption. All steroids were quantified by UPLC–MS/MS. IL-6 and IL-10 expression in rat adrenals was determined by immunohistochemistry. Results: Rooibos reduced ( $P < 0.001$ ) glucocorticoid biosynthesis in H295R cells: cortisol (4.9-fold), corticosterone (5.2-fold); 11HSD1 activity was inhibited and the cortisol:cortisone ratio decreased (68%). In rats, Rooibos lowered corticosterone (35%,  $P < 0.05$ ), 11-dehydrocorticosterone (18%) and the corticosterone:11-dehydrocorticosterone ratio (20%). In humans, cortisol:cortisone ratios decreased in both males and females with only female cortisol levels being decreased (17%). Testosterone levels were increased and the corticosterone:testosterone ratio significantly reduced in rats (59%) with a marked reduction in the cortisol:testosterone (28%) in males and females. Increased dehydroepiandrosterone-sulphate (DHEA-S) levels in females (21%) led to reduced cortisol:DHEAS ratios (36.8), while male ratios were reduced (15%), plasma levels were unchanged. These ratios, when elevated, are positively associated with metabolic syndrome and CVD. Immunohistochemical analysis showed that Rooibos increased IL-10 secretion and inhibited IL-6 secretion in cortical tissue.

**Discussion:** Rooibos inhibited in vitro glucocorticoid production during experimental stimulation of the stress response and altered 11HSD1 activity, favouring glucocorticoid inactivation. Lowered plasma glucocorticoid levels and improved steroid ratios, together with the increased anti-inflammatory (IL-10) and reduced pro-inflammatory (IL-6) secretion, suggest that Rooibos may serve as a protective agent in metabolic diseases.

**Keywords:** Rooibos tea polyphenols; Stress and metabolic disorders; Glucocorticoids; 11-Hydroxysteroid dehydrogenase

<http://dx.doi.org/10.1016/j.phanu.2013.11.023>