

# Assessing the effects of Rooibos on gut health



South African Rooibos Council



ABioSA STUDENT RESEARCH

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Shana De Bruyn-Orr is a biomedicine sciences PhD candidate at the Cape Peninsula University of Technology. She presented her research at the first African Biotrade Festival in September 2023.



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## About Rooibos

Rooibos (*Aspalathus linearis*) is a member of the Fabaceae plant family found in the Cederberg region of South Africa's Western Cape province.

It received Geographical Indicator status in 2014, with its stick-like leaves and branches being used to make teas, cosmetics and pet supplements.

Caffeine free, low in tannins and rich in antioxidants, Rooibos is a potential complementary medicine. Indigenous Khoisan used Rooibos as a traditional remedy for arthritis, and digestive and dermatological issues. Its antioxidant, weight loss and anti-inflammatory properties are well documented.

Two main forms of Rooibos are available to consumers. Green Rooibos is not fermented, with different processes being used to prevent oxidation. The leaves are dried by hot air in a closed unit immediately post-harvest, ensuring minimal exposure to the sun and oxygen and resulting in the green colour.

Red Rooibos is air dried under the sun, undergoing the oxidation process and producing the familiar reddish-brown colour. The differences between the two extend to a change in the active ingredients and health properties.

## Research summary

De Bruyn-Orr's research investigates the anti-inflammatory effects of green and red Rooibos extracts on the human gut, and whether it has significant restorative effects on the gut barrier. She aims to determine the suitability of Rooibos as a pre-treatment for inflammatory-related stomach issues.

The research explores the small intestine and associated low levels of polyphenol bioavailability, the extent and rate at which polyphenols – naturally occurring compounds found in plants, are absorbed and used by the body.

Aspalathin is the bioactive component in Rooibos, with established blood glucose lowering properties. Rooibos has low bioavailability, meaning very small amounts of Aspalathin are absorbed by the gut. Low absorption results in limited benefits.

De Bruyn-Orr is exploring the low levels of polyphenol bioavailability in the small intestine by introducing nanotechnology to create a compatible drug delivery system.

Higher bioavailability may lead to better absorption and increased health benefits.

Her research into Aspalathin has shown significantly higher antioxidant capabilities for green Rooibos due to its method of processing.

The study was mainly focused on pre-treatment of cells with Rooibos prior to inflammation. De Bruyn-Orr's work advocates for the commercial use of Rooibos as a novel anti-inflammatory treatment.



## Research process

De Bruyn-Orr applied High-Performance Liquid Chromatography analysis to both types of Rooibos. This analytical technique separates, identifies and quantifies components. This determined a notable difference in their phenolic content (bioactive plant component).

The Aspalathin content, an antioxidant polyphenol compound unique to Rooibos, is higher in green Rooibos. This difference is attributed to the processing of the tea. As health benefits have been shown to be associated with polyphenols, it is anticipated that green Rooibos tea will provide promising results in De Bruyn-Orr's anti-inflammatory study.

Various tests conducted determined that green Rooibos is richer in antioxidants.

To test for cell viability, IPECJ2 cells were pre-treated with Rooibos extracts for 24 hours following exposure to 10µg/ml of lipopolysaccharide (LPS) for 24 hours to induce inflammation.

Neither green nor red Rooibos had adverse effects, with cell viability remaining above the 80% ATP production requirement categorising a non-toxic state.

The test also determined that, in an uninflamed gut, green Rooibos was shown to decrease cell death, or apoptosis. When inflamed, green Rooibos continued to display this, doing so more efficiently than corticosteroid dexamethasone, a common medication used for decreasing inflammation. Red Rooibos did not protect cells from apoptosis.

Green Rooibos may have the ability to protect cells from entering cell death where inflammation is present. This may be due to its increased polyphenol content. At an extract concentration of 0.1 and 0.05 mg/ml, green Rooibos decreases inflammation. Red Rooibos decreased inflammation slightly at 0.05 mg/ml.

When an intestinal barrier ultimately weakened by inflammation is pre-treated with green Rooibos at 0.1 mg/ml, barrier integrity was substantially increased – as measured against the relative mRNA expression of the ZO-1 gene.

At lower concentrations of green Rooibos, the barrier remained weakened. Red Rooibos showed a minimal increase in barrier integrity. When cells were not inflamed, 0.05 mg/ml of red Rooibos increased barrier integrity.

## Results

Processing methods impact the abundance of polyphenols in the Rooibos. The fermentation process resulting in red Rooibos decreases its potential benefits.

Green Rooibos shows potential as an anti-inflammatory pre-treatment. Pre-treatment has been evidenced to protect gut cells against inflammation and aid in protecting and restoring the intestinal cell barrier.

The effectiveness to improve or protect the gut against inflammation is also shown compared to a commercial drug, thereby giving a choice for alternative natural plant-based products.

De Bruyn-Orr is assessing the viability of using nanotechnology as a drug delivery system. This would offer a novel approach to increasing the active compounds within the stomach, specifically the small intestine, and help with better absorption.

De Bruyn-Orr's findings have been published in a scientific journal, with more publications planned.