

Newsletter February 2022

Anxiety-reducing properties of Rooibos

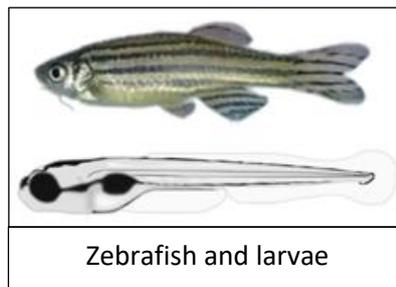
Colloquially, Rooibos has always been known for its calming and soothing properties. In a recent study, the cytoprotective activity of green rooibos in neuronal cells was investigated to explain these observed effects in cells. Prof Carine Smith from the Division of Clinical Pharmacology at Stellenbosch University conducted the study in collaboration with researchers from the University San Jorge and the University de Zaragoza in Spain.

The study primarily focused on investigating the cytoprotective activity of green rooibos with a 41% polyphenol count used in neuronal cells. The study also searched for the antioxidant and enzyme inhibitory properties using cell free systems, neuronal cell culture and zebrafish larval models.

The use of zebrafish as an animal model is an innovative option as the zebrafish genome was completely sequenced and most zebrafish genes are common to humans with 84% of genes known to be associated with human disease having zebrafish counterparts.

In particular, zebrafish exhibit a wide range of complex behaviours including social, anxiety, and memory, that may be useful for

modelling neurological and psychiatric diseases. Neuro-2a, which are brain tissue derivative cells, were treated with different concentrations of green rooibos extract (GRE) and an oxidizing agent, hydrogen peroxide. GRE exerted significant cytoprotective properties in Neuro-2a cells, particularly when exposed to a lethal dose of hydrogen peroxide, intended to induce oxidative stress leading to cell death. GRE reportedly increased cell survival by more than 100%. The GRE was able to scavenge free radicals in



a manner similar to vitamins C and E. This is the first study illustrating the neuro-protective effect of rooibos in zebrafish larval models. Zebrafish larvae were exposed to a light-dark anxiety assay and the distance moved when exposed to lower concentrations of GRE showed decreased activity levels similar to those seen in diazepam-treated larvae. This change in behaviour in zebrafish suggested a decrease in anxiety after being supplied with GRE. The antioxidant effectiveness of GRE far exceeded that of blueberry, cranberry or cherry, and could be considered a “functional brain food”.



Prof Carine Smith

Dominant trends in the tea sector

In SA, the hot tea category is forecast to register the fastest value growth at a compound annual growth rate (CAGR) of 7.5% over the next three years and is the largest in volume terms, registering sales of 33.1 million kg in 2020.

In top-end retail, the tea market grew 0.4% in volume to 14 kilo-tons and 3.8% in value to R2.6 billion over

the last 12 months. The black tea segment is the largest within the tea category contributing 47.8% value (R1.2 billion), followed by Rooibos with 30.8% (R788 million) and speciality teas with 21.4% (R547.6 million).

The pandemic increased speciality tea sales all over the world, as consumers boost their immunity and

general health, COVID-19 solidified the market for immune-boosting products. This trend might see more tea products being positioned as superfoods with added functional ingredients like probiotics, adaptogens and vitamins.



Rooibos: being rooted

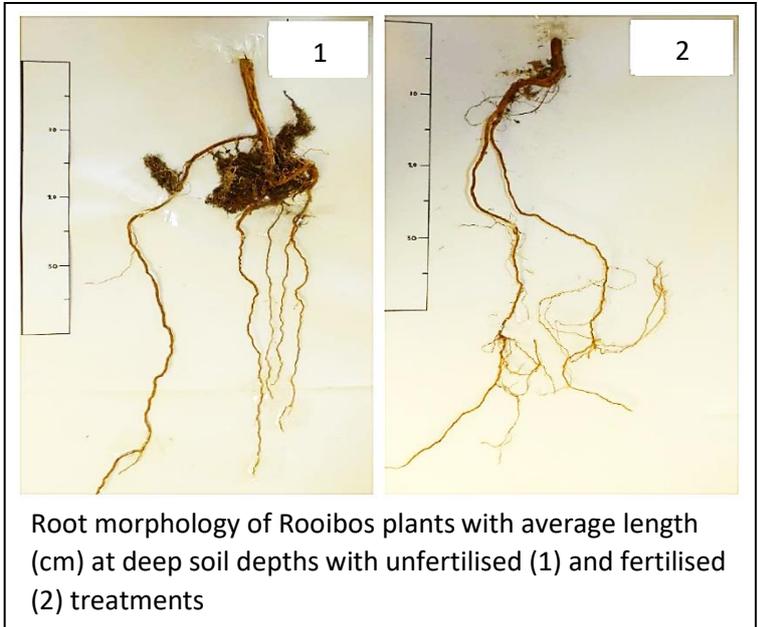
One of Rooibos' adaptations to dry spells is a long tap root that can reach 3m. Also, like most other legumes, such as peas, it has nodules that provide an oxygen-free place for anaerobic bacteria that can "fix" nitrogen from the air into a form living things like itself and other plants can use.

The application of fertiliser had a noticeable negative effect on biomass production and root distribution of Rooibos plants. The high phosphorous content in the soil solution caused by the application of nitrogen, phosphorus and potassium (NPK) fertiliser reduced the biomass production and thinner taproots. Fertiliser application did not increase the number of N-fixing nodules of Rooibos plants.

Soil depth had a noticeable effect on biomass production and root growth of Rooibos. It was evident that the shallow soils restricted root growth and decreased the shoot biomass over a prolonged period. Therefore, results have shown that deeper soils are more favourable for Rooibos plants in terms of root growth and better production.

This study was the first project of its kind to investigate the effects of fertiliser and soil depth on soil water balance and Rooibos production. Results showed that inorganic fertiliser of 20 mg.kg⁻¹ N, 30 mg.kg⁻¹ P and 20 mg.kg⁻¹ K killed most of the Rooibos, and that Rooibos likes deep, cooler soils with higher SWC than shallow soils for optimum Rooibos production.

Further research of inorganic fertiliser is required to establish the best inorganic NPK fertiliser to increase the



Root morphology of Rooibos plants with average length (cm) at deep soil depths with unfertilised (1) and fertilised (2) treatments

Rooibos production. Since there are only a few studies done on diffusivity coefficients, pedo-transfer function, evaporative demand and pore air relative humidity, these factors may help to solve the problem on how Rooibos can survive in drought conditions.

The research study was done by Roeline van Schalkwyk as part of a Masters of Soil Science thesis.

Gardening with Rooibos & a bit of cinnamon



Used Rooibos tea bags can easily be recycled as a natural fertiliser in the garden, as it contains nutrients and trace minerals good for plant growth. Rooibos tea leaves also

enrich the soil by increasing the nitrogen level and give earthworms something to munch on. If you're planting cuttings, rather put ground cinnamon on the stem of the

cuttings you want to root instead of growth hormone. Cinnamon acts as a potent fungicide and will encourage the stem to produce more stems, while helping to prevent the fungus that causes damping-off disease.

One of the best-kept secrets is to

break open steeped Rooibos tea bags and to sprinkle the tea leaves around the plants to deter snails and other unwanted pests, as it is a very effective biological pest deterrent. Also, rooibos doesn't increase the soil's acidity. The efficient microbes in the soil (the good bugs) actually thrive on rooibos tea leaves. The tea reduces the germination of weeds through the formation of an insulating layer above the soil, thus facilitating cleaner seed beds and pot plants. Rooibos is also low in tannins and is beneficial to both plant and root development.