

# ROOIBOS – THE NEW “WHITE TEA” FOR HAIR AND SKIN CARE

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## Abstract



The cosmetic industry is always on the look out for the next novel raw material. Theoretically, in the case of botanical ingredients, the palette of possible extracts is as varied as the number of plants. It takes just a little research into the herbal supplement area, or the use of plants in local or traditional medicine, to find a plant that could have very interesting properties for cosmetic products. We have seen extracts such as ginseng, ginkgo, green tea and more recently white tea make the transition from the functional food area into cosmetics. In this article I would like to introduce you to Rooibos or Red Bush Tea, an exciting new botanical ingredient from Cosmetochem International Ltd., produced using their novel dual phase extraction process as either a liquid (Herbasol® MPE Rooibos) or powder (Herbasec® MPE Rooibos). Its antioxidant and anti-inflammatory properties, well documented in the literature, and the results from an independent study conducted on behalf of Cosmetochem International, showing a significant improvement in hair growth and condition, makes it an interesting new proposition for cosmetic formulators and marketers alike.

## History of Rooibos

Rooibos or the Red Bush plant (*Aspalathus linearis*) is a hardy

shrub which is indigenous to the North Western Cape of South Africa, in the area of the Cederburg Mountains<sup>1,6</sup>. It is a member of the legume family, Fabaceae. The plants can survive in extreme and nutrient poor conditions because of their very deep tap roots<sup>3,5</sup>. The Rooibos plant is a green shrub that grows between 1.5 and 2 metres high, with fine needle-like leaves (Fig. 1). In fact the name is misleading because neither is it red in its natural habitat, the colour develops later during the fermentation process, nor is it a true tea (from the tea plant *Camellia sinensis*).



Fig. 1: Rooibos plant

Its leaves and stems are used to make herbal tea that is caffeine-free, low in tannins (about half that of black tea<sup>5</sup>) and rich in minerals and flavonoids, which are known to be antioxidants<sup>6</sup>. This “tea” has been consumed by locals for over one hundred years but it was unknown outside South Africa until it was “discovered” in 1904 by Benjamin Ginsberg, a Russian immigrant, who began to trade it from the local mountain inhabitants<sup>2</sup> and pack and sell it<sup>2</sup>.

However it wasn't until later in the 1930's that Dr. P.E le Fras Nortier, a local doctor and amateur botanist, realised its commercial potential and initiated its cultivation in plantations by local farmers<sup>3</sup>.

Rooibos tea is one of the few indigenous plants to have become a major commercial crop for the region<sup>4</sup>. The method of cultivation and harvesting has changed little over the years, except for the introduction of more automation<sup>34</sup>.

The plants are cut, bruised, either by hand or mechanically, and allowed to ferment in mounds before being spread out to dry in the sun. It is this fermentation process that gives the plant its typical red colour and hence its name. Rooibos is then sterilised by steam and dried in commercial driers before being

sifted and packed. Fig. 2 shows processed Rooibos tea. 4,500-6,000 tonnes of Rooibos tea were produced in 1999/2000 and the domestic market absorbs 70-75% of the annual production<sup>27</sup>.

## Rooibos and medicinal properties

Like many plants which are used in cosmetics, Rooibos tea has a long history of medicinal use. It has been and is recommended for wide range of ailments:

- stomach and digestive problems
- antispasmodic properties
- allergies such as hay fever and asthma



Fig. 2: Rooibos tea, fermented, dried and processed

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- skin problems such as eczema, nappy rash and acne; applied topically it has a soothing effect on the skin
- nervous problems, it acts as a relaxant and aids sleep
- ageing related problems due to its antioxidant activity

Rooibos was "rediscovered" in the 1960's by Annique Theron<sup>10,11</sup>, a South African mother, when looking for a solution for her baby who had severe problems with colic. She found that a local health drink, Rooibos, appeared to alleviate the condition and went on to discover and document the positive effect it had both internally and applied topically against a wide variety of allergic conditions<sup>10</sup>. This resulted in her setting up her own cosmetic and toiletry business in South Africa of which Rooibos is still a key ingredient.

Research on the health potential of Rooibos, in Japan at the Institute for Medical Research and Aging (sic) (AICHI)<sup>29</sup>, the Kyoto Prefectural University of Medicine<sup>7</sup> and the Institute of Medical Science, Tokyo<sup>8</sup> and in South Africa in the Department of Food Science at the University of Stellenbosch<sup>21,22,23,26</sup> and the Department of Chemistry at the University of the Orange Free State<sup>14,19</sup> has led to a much better understanding of the medical benefits of Rooibos. Unfortunately, to date, there have been no extensive clinical trials carried out.

## Constituents in Rooibos

Research has shown that Rooibos tea is caffeine-free<sup>5,6</sup>,

low in tannins<sup>5,6,14</sup>, high in minerals such as calcium and fluoride<sup>5</sup>, and contains high levels of antioxidants such as vitamin C, the flavonol quercetin<sup>15,19,21</sup>, the flavonol glycosides isoquercitrin<sup>15,19,21</sup> and rutin<sup>15,21</sup>, the flavones luteolin<sup>19,21</sup>, orientin and iso-orientin<sup>15,20,21</sup> and their 4'-deoxy analogues, iso-vitexin and vitexin<sup>14</sup>, five additional flavonoid glycosides and the dihydrochalcone apalathin<sup>14,16,19,21</sup>, which is unique to *Aspalathus linearis*. It also contains hydroxylated benzoic and cinnamic acids<sup>19</sup> and other phenolic carboxylic acids<sup>19</sup>. Low levels of three condensed tannins have been identified, catechin, procyanidin B3 and a profistininid triflavonoid<sup>14</sup>.

An average 150 ml cup of rooibos tea contains approximately 1.5 mg of quercetin<sup>24</sup>.

## Rooibos as a cosmetic ingredient

Although Rooibos is sold internationally as a health drink up until now it has rarely been used outside South Africa as a cosmetic raw material. Cosmetochem International is the first manufacturer to introduce this ingredient into cosmetics produced outside South Africa and in 2001 applied for an INCI/CTFA name: Rooibos (*Aspalathus linearis*) extract.

From the point of view of the cosmetic formulator the most important characteristics of Rooibos are related to its antioxidant, anti-inflammatory and antimicrobial<sup>19,36,37</sup> properties and also to recent independent research conducted on behalf of Cosmetochem International showing that it improves hair growth and condition<sup>12,13</sup>.

## Antioxidant and free radical scavenging properties

Recent studies have shown that Rooibos tea possesses significant antioxidant and free radical scavenging properties due to substances that mimic the activity of super oxide dimutase SOD<sup>7,8,14,22,23,30,31,32</sup>. Super oxide radicals are produced in the body both as a result of normal metabolism and also by exposure to microorganisms, UV, pollution and smoking, among other things. The super oxide dimutase enzymes are the body's way of "mopping up" excessive quantities of these free radicals which, if left, will cause irreversible cellular damage, resulting in lipid peroxidation, protein denaturation and DNA mutation. In cases of cellular ageing the body becomes less able to deal with these free radicals bringing about degenerative changes that are seen in ageing.

Pre-treatment of cultured mouse cells with Rooibos tea extract was shown to protect them against oxidative stress when treated *in vitro* with H<sub>2</sub>O<sub>2</sub><sup>8</sup>. In another Japanese study the administration of Rooibos tea was shown to suppress the age-related accumulation of lipid peroxides<sup>34</sup>.

The antioxidant and free radical scavenging activity of Rooibos has been compared with green, black and Oolong teas<sup>18</sup>. With a DPPH ( $\alpha, \alpha$ -diphenyl- $\beta$ -picrylhydrazyl) radical scavenging method, both fermented and unfermented Rooibos extracts were found to be stronger free radical inhibitors than either black or Oolong tea but slightly less than green tea on a mass equivalent basis. Research at Cosmetochem

International (unpublished) using a DPPH HPTLC method, supports the view that teas that are less fermented, such as green tea, tend to show higher levels of antioxidant activity. Although the water soluble solids of green, Rooibos, Oolong and black teas contain roughly the same amount of flavonoids and polyphenols, the water soluble matter of Rooibos tea leaves is approximately half of that of black tea, making the amount of antioxidant activity of Rooibos in the same volume of extract much less<sup>18</sup>. The processing conditions of the Rooibos tea has shown to have a significant effect on the level of antioxidants present<sup>25,31</sup>.

## Anti-inflammatory properties

In addition to the initial research of Annick Theron<sup>10</sup> other research has shown that Rooibos exhibits both anti-viral and anti-inflammatory properties *in vitro* and is effective against various dermatological diseases *in vivo* (when taken as a beverage), including acne, atopic dermatitis and in one case protection against photosensitisation<sup>14</sup>. Rooibos tea is often used to bathe children with allergic skin conditions at the Allergy and Asthma Clinic at the Red Cross Memorial Hospital in Cape Town<sup>5</sup>.

## Antimutagenic and antimicrobial properties

There are also various research studies which have shown that Rooibos tea possesses both anti-mutagenic<sup>21,28,31</sup> and antimicrobial activities<sup>28</sup>.

There is currently work in progress on the evaluation of compounds from Rooibos tea, as microbial inhibitors<sup>26</sup>. Polysaccharides isolated from Rooibos tea leaves have demonstrated antiviral properties *in vitro* experiments<sup>35,36</sup>.

## Improved hair growth

Studies were initiated by Cosmetochem International at an independent laboratory (Dermascan, France) to study the effect of the use of Herbasol<sup>®</sup> MPE Rooibos in a hair lotion on a group of healthy persons who were suffering from the problem of hair loss<sup>13</sup>. A 90 day trial was conducted comparing a hair lotion containing 10% Herbasol<sup>®</sup> MPE Rooibos with a placebo lotion. 5 ml of the alcoholic solutions were applied daily. MPE Rooibos is a concentrated extract of Rooibos produced by a novel dual phase extraction process which ensures the production of an extract with the widest spectrum of plant actives i.e. polar, semi-polar and non-polar<sup>12</sup>.

The efficacy of the products was evaluated using a videotri-

chogramme, which determines:

- hair density (total number of hairs)
- number and proportion of telogen hairs (hairs where growth has ceased)
- number and proportion of anagen hairs (hairs which are still growing)
- hair growth speed of anagen hairs

After 90 days results showed that:

- **Hair growth speed**
  - There was a significant increase of the hair growth speed in the lotion containing MPE Rooibos compared with the placebo.
  - An increase in the hair growth speed was observed with 89% of the volunteers.

- **Product efficacy** – results from a subjective evaluation questionnaire by the volunteers showed:
  - 67% rated hair loss as zero or low
  - 78% saw an improvement (low to medium)
  - 45% saw low to medium re-growth of hair
  - 63% of volunteers found a positive effect on the fra-

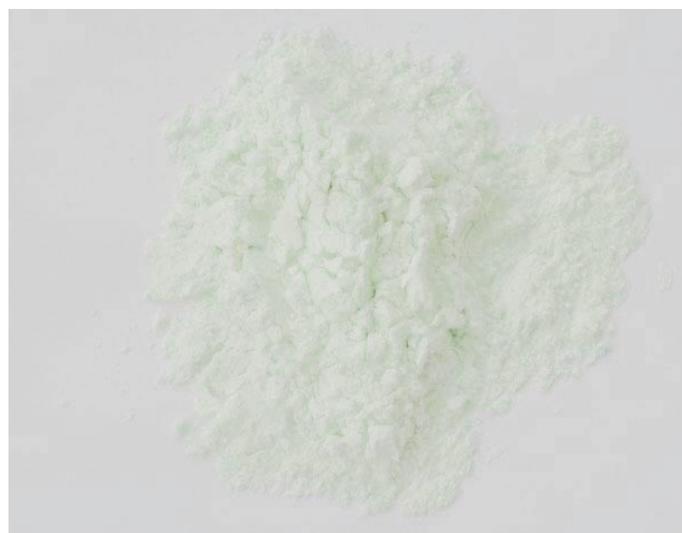


Fig. 3: Herbasol<sup>®</sup> MPE Rooibos powder extract

grance and smoothness of hair

- 67% liked the general aspect of their hair

- **No undesirable reactions** (irritation or allergy) were recorded

## Herbasol<sup>®</sup> MPE Rooibos – a dry powder formulation

A powder version of MPE Rooibos has been recently developed which has the same high concentration of actives found in the Herbasol<sup>®</sup> MPE liquid version but with the added advan-

tage that it is a very pale colour (Fig. 3). This is especially suitable for formulation into white or pale coloured skin care products where darker liquid extracts may cause problems of discolouration and solid or powder cosmetics. In addition, all plant extracts in the the Herbasol<sup>®</sup> range are solvent free, preservative free and contain 100% plant-derived ingredients.

## Suggested cosmetic applications

The following cosmetic related activities of the plant are extracted from the literature:

Properties	Suggested cosmetic applications*
<ul style="list-style-type: none"> <li>● Increased hair growth, prevents hair loss<sup>13,30</sup></li> <li>● Adds brilliancy<sup>30</sup> &amp; smoothness<sup>13</sup> to the hair</li> </ul>	<ul style="list-style-type: none"> <li>● Haircare products</li> </ul>
<ul style="list-style-type: none"> <li>● Good for acneic skin<sup>7,10</sup></li> <li>● Anti-inflammatory<sup>5,10,14</sup></li> <li>● Antimicrobial<sup>26,28</sup></li> <li>● Soothing<sup>10</sup></li> </ul>	<ul style="list-style-type: none"> <li>● Products for anti-acne, problem or blemished skin</li> <li>● Baby products</li> <li>● Aftersun products</li> </ul>
<ul style="list-style-type: none"> <li>● Antioxidant<sup>7,14,21,22,31,32</sup>,</li> <li>● Free radical scavenger<sup>14,21,30</sup></li> <li>● Tightens skin adds gloss &amp; smoothness<sup>12</sup></li> </ul>	<ul style="list-style-type: none"> <li>● Skin care products especially those for mature skins</li> </ul>
<ul style="list-style-type: none"> <li>● Powder form (100% plant-derived ingredients)</li> </ul>	<ul style="list-style-type: none"> <li>● Solid products e.g. deodorants &amp; blemish sticks</li> <li>● Powder based products e.g. colour cosmetics (eyeshadow, face powder, mascara etc.)</li> <li>● Products marketed as “natural” or purely botanical-based</li> <li>● Transparent or colourless formulations</li> <li>● White or pale-coloured skin care products</li> </ul>

\* Disclaimer : These suggestions are given in good faith but it is recommended that all appropriate tests are carried out by our customers in their formulations.

## Conclusions: Why use MPE Rooibos in cosmetic formulations?

So what makes Herbasol® or Herbasec® MPE Rooibos worth a second look for new formulations?:

- It's new – green tea, white tea and now Rooibos, Red Bush tea
- It's an ethnobotanical extract – a growing trend
- It has a long documented history of medicinal use
- Antioxidant and free radical scavenging properties documented in the literature makes it an interesting ingredient for anti-ageing products and products for mature skins
- Anti-inflammatory properties make it suitable for products for sensitive or problem skin or for after sun or baby products
- It has independent lab data to show it improves hair growth and condition
- It is a concentrated extract produced by a novel dual phase extraction process developed by Cosmetochem International and is available as both a liquid and a powder (pale coloured)

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