Skin Stabilisation for Fast Regeneration – Lessons from Resurrection Plants

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Abstract

Plants with unique metabolic properties are an ideal source for satisfying the increasing demand for 'natural' active ingredients, as they can produce exceptional compounds. Resurrection plants, to this end, are characterised by the ability to survive extreme desiccation without dying and to revive within a few hours after the addition of water. The Myrothamnaceae family comprising *Myrothamnus flabellifolia* is the only family with woody representatives that can grow to a respectable size.

The resurrection properties of *M. flabellifolia* are based on physical stabilisation (such as leaf morphology, cell-wall composition etc.) and metabolic adaptation. As an example, water loss increases the production of protective constituents such as galloylquinic acids.

This is of major significance for cosmetic applications, because desiccation not only threatens resurrection plants but also the skin. Our own studies and results from the literature suggest that the metabolites from *M. flabellifolia* effectively impart skin protection by:

- improving cell-membrane plasticity
- defending skin lipids against oxidative damage and
- shielding functional components from drought stress.

In conclusion, the unique resurrection properties of *M. flabellifolia* could be convincingly transferred to the consumer suffering from harsh conditions: Myramaze®, a novel extract of *M. flabellifolia*, rapidly regenerated and invigorated stressed skin – for more than 48 hours after a single application.

Introduction

The demand for 'natural' products is steadily increasing. This also increases the need for innovative, nature-inspired active substances. With over 500,000 different species, the plant world provides us with a virtually unlimited source of these substances. Plants with unusual metabolic capabilities are particularly noteworthy because they have the ability to produce potentially sensational chemical compounds.

The desiccation-tolerant 'resurrection plants' are also included amongst the plants with exceptional characteristics: they can be almost completely dried out and then continue their lives after re-watering. This property allows them to survive long periods of drought undamaged. In contrast, most other plants die if they lose 20 to 30% of their water.

Only a few higher plants, about 330 species, can be referred to as resurrection plants and most of these are fern-like plants. Within this tiny group of resurrection plants, there is only one family of plants with woody representatives which can grow to an equivalent size, i.e. Myrothamnaceae. In the Myrothamnaceae family, there is again only one genus, Myrothamnus, with only two species: *Myrothamnus flabellifolia*[1], and *Myrothamnus moschatus*.[2, 3]

Figure 1. Natural Environment of *M. flabellifolia*
The resurrection plant is capable of surviving long periods of drought in a completely desiccated state. After the first rain, it will turn green again within a few hours. Myramaze® is an extract from the dried leaves and twigs of sustainably grown crops near Pretoria. The solvent used is a mixture of water and 1,3-Propanediol.

Adaptation Strategies Against Desiccation

Desiccation tolerance in plants is a complex phenomenon. Today it is known that no single factor is sufficient to achieve drought