



# Development and Efficacy of Tonic Formulation Containing a Green multi-functional Active: An Innovative Cosmetic Strategy for Scalp with Dandruff

Sturion, Eder<sup>1</sup>; Wada, Joeni<sup>1</sup>; Spadoto, MarianE<sup>1</sup>; Monteiro e Silva, Silas Arandas<sup>2</sup>

<sup>1</sup>Natura - Research and Development, São Paulo, Brazil;

<sup>2</sup>Natura - Innovation and Claim Support Department, São Paulo, Brazil.

## Introduction:

Dandruff is a chronic scalp condition affecting greater than 50% of the population, in some regions of the map. In addition to desquamation (primary symptom), dandruff can be associated with several additional discomfort.

Dandruff is restricted to the scalp, and involves itchiness, flaking skin without visible inflammation [3]. It is also more prevalent in males than females [4,5]. Dandruff starts at puberty, reaches its peak incidence and severity at the age of about 20 years old, and becomes less prevalent among people over 50 [5].

Since this skin condition involves an imbalance of the microbiota (especially regarding the Malassezia genus with manifestations of scalp sensitivity), some of the cosmetic leather care strategies may involve the use of active substances such as: ketoconazole, bifonazole, miconazole, cyclopirox olamine, selenium sulfide and zinc pyrithione [3].

Zinc pyrithione is a commonly used antifungal agent that reduces Malassezia proliferation, however, it includes undesirable side effects on the hair fiber then this project aimed to develop and characterize the efficacy of scalp tonic formulation containing an innovative dandruff-fighting consisting of a green multifunctional xylitol derivative.

## Materials & Methods:

### **Material**

A scalp tonic formulation containing a green multi-functional xylitol derivative was investigated as being a dandruff-fighting product.

### **Methods**

The studies were planned and conducted according to the determinations of Resolution 466/12 of the National Council of Health on Regulatory Guidelines and Standards for Research Involving Humans.

### **Assessment of the anti-dandruff effect by image analysis**

The purpose of this method was to assess the efficacy of the hair tonic formulation on the anti-dandruff effect by image analysis. Thirty-three (33) volunteers were recruited (with dandruff: light to severe). Mean age: 36 ± 10 years old. Gender: 85% female and 15% male. This study was performed during approximately 3 months.

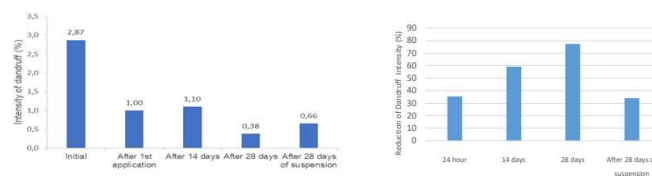
### **Assessment of the anti-dandruff effect via micro images**

Five micro images from the scalp were registered in the initial status (baseline condition), after the first application, after 14 and 28 days of the treatment and after 28 days of suspension of the use of the hair tonic formulation by using a microcamera VisioScan® VC20 plus (Courage Kazaka).

### **Assessment of the function of the cutaneous barrier of the scalp by evaporimetry**

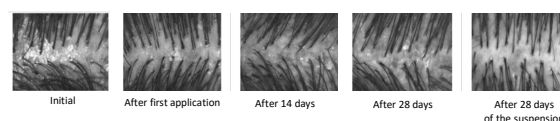
The purpose of this study was to assess the improvement efficiency of the cutaneous barrier of the scalp of volunteers with disturbance expressed predominantly by the clinical condition of pityriasis (dandruff) through evaporimetry technique. The TEWL measurements (E) were carried out using a Tewameter® TM Nano probe coupled to Multi Probe Adapter, MPA 5, (CKeletronics, Germany).

## Results & Discussion:



The values of dandruff intensity, obtained after one application, after 14 and 28 days of treatment and after 28 days of suspension of the use of the hair tonic formulation were compared to the values obtained at the beginning of the study by using the Student's t-test, bimodal, paired, considering a 95% confidence interval. After the first application of the investigational product, there was a significant reduction in the dandruff intensity. It was possible to observe that 97% of the research subjects showed reduction in the intensity of dandruff.

After 14 days of in-home use of the hair tonic, there was a significant reduction in the dandruff intensity. It was possible to observe that 91% of the volunteers showed reduction in the intensity of dandruff. After 28 days of in-home use of the hair tonic, there was a significant reduction in the dandruff intensity. It was possible to observe that 97% of the research subjects showed reduction in the intensity of dandruff. After 28 days of suspension of the use of the product, there was a significant reduction in the dandruff intensity. It was possible to observe that 88% of the volunteers showed reduction in the intensity of dandruff.



## Conclusions:

The assessment of the anti-dandruff effect and the skin barrier of the scalp were investigated through image analysis and Evaporimetry technique. It was possible to obtain a formulation in accordance to the stability and feasibility to the cosmetic treatment for leather care and to help combat the signs of dandruff. After the first application and after 28 days of scalp tonic home-use, there was a significant reduction on the dandruff intensity. It was possible to observe that 97% of the volunteers showed reduction on the intensity of dandruff in both conditions. Moreover, a significant decrease in scalp TEWL rate respectively after the first application (5.2%), after 14 days (5.6%) and 28 days (17.1%) and 28 days after the product suspension (7.7) of hair tonic formulation was achieved due to the usage of the treatment. These results indicate that the formulation provided significant improvement in the efficiency of the scalp cutaneous barrier. Therefore, it was possible to obtain a new tonic formulation for the care of the scalp

## Aknowledgments:

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