

# Development and assessment of efficacy of an anti-cellulite formulation containing bentonite from Porto Santo Island

Desenvolvimento e eficácia de uma formulação anti-celulítica contendo bentonite da ilha do Porto Santo

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## Abstract

**Introduction:** Clays are part of the natural resources that have become prominent in cosmetic treatments and wellness. The relevant physical, chemical and thermal properties of bentonite clay from Serra de Dentro, Porto Santo Island, allow its use in cosmetic and therapeutic applications. In this work we developed an anti-cellulite gel formulation containing 10% of Ivy extract, 10% of Horse Chestnut Extract and 20% of Bentonite clay (Smectitic),  $d_{50} < 180 \mu\text{m}$ , from Porto Santo Island. After physicochemical characterization of the formulation, efficacy tests were performed on volunteers who had gynoid hydrolipodystrophy, commonly referred as cellulite.

**Methodology:** The evaluation of the viscosity of the formulation was performed at 20 °C using a rotary viscometer Brookfield DV-E (Germany). Texture analysis was conducted in compression mode. These assays were performed in a texturometer Stable Micro Systems TA-XT2i (UK) and the maximum force (firmness) and the negative area (adhesiveness) were evaluated. To test the effectiveness of the formulation it was applied at 40-40°C, for 20 minutes on the thighs of the volunteers. Centimeter measurements were taken before (T0), after 4 treatments (T1/2) and after 8 treatments T1 (2 times a week during 4 weeks). The observation of the appearance and texture of the skin was also performed before and after the treatments. The differences between T0, T1/2 and T1 were evaluated statistically

using Student's t test (paired samples, bilateral). Differences were accepted as statistically significant at  $p < 0.05$ .

**Results and Discussion:** The developed formulation containing bentonite from Serra de Dentro, Porto Santo Island, showed characteristics of firmness and adhesiveness suitable for dermal application.

After application there was a decrease in the thigh girth of all volunteers. The effect "orange peel" skin improved with the treatment applied and leg swelling decreased in volunteers with fluid retention. After application, all the volunteers showed an improvement in the texture and appearance of the skin: the skin was smoother, hydrated and with tighter pores, and with greater firmness.

**Conclusion:** The results of this study demonstrated that the formulation developed with bentonite has anti-cellulite effect, improves the appearance of the skin and works well to combat fluid retention presented by some of the volunteers.

**Key words:** Bentonite, Anticellulite, Porto santo, Cosmetic effect

**Palabras clave:** Bentonita, Anticelulítico, Porto Santo, Efecto cosmético