Section 4 | Mud therapy1 |

04-3 Development of a method for quality assessment of Japanese Biofango mudtherapy protocol by tensiometric approach

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Introduction: The link between the hydration state and the functional effects of formulations and natural systems has been demonstrated by several studies. Measurement of skin hydration has been used to assess barrier function integrity in vivo and stratum corneum (SC), hydration may increase after the topical application of natural or formulate systems. Thermal muds have great hydration properties thanking at its high water contain due to presence of clays minerals. Our work was focused on the evaluation of skin’s hydration potentialities of Japanese Biofango. Objectives: Mudtherapy increase the hydration state of skin and modify its selective permeability favouring the permeation of therapeutic substances product by maturation process. Our goal was the development of a tensiometric model for assessment and optimisation of Japanese Biofango mudtherapy protocol by the evaluation of skin hydration measuring water contact angles on skin surface. Our work was performed at Sanraku-en spas centre (Tonami-Japan).

Materials and Methods: Biofango was constituted by Kunigel, Kaolinite, and WakuraDiatomite contains montmorillonite. BFM mixture was prepared and collected from Sanraku-en maturation plant. Samples were stored at –25°C. Skin’s hydration state analysis were performed before and after treatment by contact angle method (CA) using DSA 2-Kruss Dynamic Tenskinmeter water as liquid test and accordingly to traditional Sanraku-en/Biofango protocol. Four subjects with different ages, sex and weights (KS, YS, MO, and KM) were considered as test. Sanraku-en mudtherapy protocol’s steps were (a) first blood pressure measurement, (b) water’s CA measurements on left and right arm before treatment, (c) thermal bath (8’), (d) water’s CA measurements, (e) BFM mudtherapy (20’), (f) water’s CA measurements on polish skin, (g) shower (3’), (h) water’s CA measurements, and (i) final blood pressure measurement.

Results: CA of water on subject KS skin showed elevated levels before (CAt0>89.5 deg) and after (CAtf>89.5 deg) treatment. YS subject showed increases of skin hydration after treatment (CAt0>89.5 deg, CAtf=40.27 deg), MO showed more increase of skin hydration than YS (CAt0 >89.5 deg, CAtf=20.12 deg), and KM (CAt0>89.5 deg, CAtf=41.30 deg) showed an hydration state similar to YS. Regarding YS subject, we optimized its mudtherapy by the inversion of
bath (CAt0>89.5 deg, CAtf>89.5 deg) with mudtherapy phases. As results a major increase of hydration state respect normal protocol (CAt0>89.5 deg, CAtf =30.4 deg) reflecting on skin moisturize after bath phase also (CAt0>89.5 deg, CAtf=87.43 deg).

**Conclusions:** Analyses of hydration state of skin by measurement of water’s contact angles consented to evaluate the capability of Biofango BFM to modify the selective permeability of stratum corneum. Thanking to the method developed was possible to optimise and personalize Sanraku-en protocol.

**Keywords:** Biofango project, Skin hydration, Contact angles, Tenskinmeter, Mudtherapy

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