

EFFECT OF HYDRATION ON SKIN PERMEABILITY

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dc.description The water handling properties of the stratum corneum (SC) are key to both the barrier function and the condition of the skin. Water in the SC can be differentiated into tightly bound water, bound water and free water. These different kinds of water are associated with the different characteristics of the skin including elasticity, permeability etc. In this study we have tried to better quantify the water content of the stratum corneum as a function of its water activity. This was done by establishing a model for water sorption in the SC based on existing data and additional data generated in our laboratory. The water content measurements by different techniques seemed to agree well. The BET isotherm for water sorption into natural polymers was used as a model to describe the water content of the SC. It has long been known that hydration of stratum corneum increases its permeability. However this effect

has not been fully quantified and the mechanism is not completely understood. We studied the transport properties of a model hydrophilic compound, niacinamide, under controlled hydration conditions. Hydration was altered using salt solutions of different water activity. By performing two complimentary studies of permeation and uptake/desorption in combination with water sorption measurements it was possible to calculate the transport parameters D (diffusivity), K (partition coefficient) along with the SC thickness h for fully hydrated and partially hydrated SC. These transport parameters were constant at low water activity and increased sharply in the regions of higher water activity (above 75% RH).

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