

特集：皮膚の物性の測定

皮表角層水分含有量の測定装置および計測法について

小磯 孝司*

On the Measuring Method and Device for Moisture Content of Horny Layer of Skin

Takashi KOISO*

Abstract

Flexibility and glossiness of skin are the properties depending on whether the horny layer covering the skin surface has enough moisture. It is a well known fact that when a piece of horny layer is taken out and made to absorb water sufficiently, it swells and softens, while when it is dried, it becomes very hard and fragile. The horny layer which is an organism properly saturated with moisture functions not to lose the moisture even in dry outdoor atmosphere and performs the function as a very efficient barrier of skin. This can be confirmed in vivo by measuring the transepidermal water loss.

On the other hand, though the moisture retention ability of the horny layer based on its high absorbability can be known in vitro by measuring its weight or impedance to AC, it was very difficult to actually measure it in vivo. Measuring the impedance of the skin electrified with a weak AC has long been practised. There is a report which shows that the inverse number of the impedance of skin when a dry electrode is applied indicated the moisture content of its horny layer, while the permeability of horny layer can be known from the measurement results obtained using a wet electrode. In reality however the impedance of skin horny layer is shown too high and not accurate in these measurements. There is another report in which the moisture of horny layer was surveyed from the impedance using a solution between the electrode and skin, which solution had the equivalent temperature and humidity to those of the environment. But this method is very complicated.

The impedance of skin reduces as the AC frequency (f) increases. A measuring instrument has developed mainly by Assistant Professor Tagami of the Dermatological Class, Hamamatsu Medical College, for separately measuring the capacity and resistance, which were components of said impedance (z), with accuracy using a high frequency of 3.5 Hz. This device can very sensitively, quickly and easily reflect a very small amount of moisture content of horny layer of skin surface. It is an important method for making the basic studies of horny layer and also quantitatively confirming the effects of medicines for external application.