NEAR INFRARED SPECTROSCOPY, A POWERFUL TECHNIQUE IN HUMAN SKIN STUDY : PART I METHOD RELIABILITY AND INFLUENTIAL PARAMETERS

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Near Infrared spectroscopy (NIR) used on human skin measurement was explored in the past decade. Many publications in different journals and magazines discussed the feasibility of the NIR technique for cosmetic product property studies. Based upon the results of pioneers, we have pursued some work of the NIR instrument coupled with a probe module for skin measurement in vivo and vitro.

In part I of this paper, the specific Near Infrared spectroscopy instrument stability, human subject conditions and other parameters, which could affect the measurements reproducibility are discussed. Second derivative NIR spectra and Principle Components Analysis (PCA) are utilised for data interpretation. In part II of this paper, the relationship of human skin moisture and ageing, the gender information and finally, the discovery of penetration depth of NIR incident light on skin are reported. A theoretical penetration depth calculation equation is proposed. In part III, the study results of a couple of commercial skin care products effect will be described. The skin lotions were applied on human skin (in vivo) in order to exam the NIR feasibility to monitor the changes of moisture level. The results are consistently positive. From our primary study, it can conclude that the NIR is potentially a very powerful instrument for skin condition diagnostics, either for cosmetic and/or for medication purposes.

Key words: NIR spectroscopy, skin measurement, PCA, skin vivo and vitro, skin moisture