



Potential of Solar UV Radiation for the Psoriasis Clearance in Low and Mid-Latitudinal Regions: A Theoretical Approach

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Artificial UV radiation due to fluorescent tubes is commonly used in the psoriasis therapy in phototherapy cabinets. There were limited number of empirical studies supporting usefulness of solar UV radiation in the psoriasis therapy. We examine if solar UV radiation is enough strong for the psoriasis clearance in selected low latitudinal site (San Diego, USA) and mid latitudinal site (Belsk, Poland). The analytical formula of the action spectrum for the psoriasis clearance is reconstructed taking into account the past results, obtained in the early 1980s, which estimated the effectiveness of psoriasis therapy on UV wavelength. The psoriatic action spectrum is used for weighting the medical cabinet UV spectra, and the solar spectra measured in San Diego and Belsk. The cumulative dose of the psoriatic UV irradiance, equal to 0.45 J/cm^2 (equivalent to 14 J/cm^2 dose by the narrow band TL01 tubes) for skin phototype II, is taken by a patient during standard therapy (in the Medical University of Lodz) after 20 whole body exposures in the phototherapy cabinet. We assume that the solar therapy will be carried in the same time schedule, i.e. total 20 solar exposures are taken during ~ 7 weeks but each exposure is in 2-hour period centered on the local noon. Using the UV spectra collected at San Diego and Belsk for the period 1996-2008 and 2000-2010, respectively, we find that the cumulative doses exceeding the threshold of 0.45 J/cm^2 are found throughout significant part of the year, i.e. in the February-October period (San Diego) and in the April-August period (Belsk). These periods are shortened roughly two times for the solar exposure scenarios keeping low risk of the erythema appearance. Thus, the solar therapy could be effectively and safely used for the psoriasis clearance even in the midlatitudes in the summer part of the year. There is a need for more precise calculation of the psoriatic action spectrum.