

Synthesis and Preformulation Studies of KTTKS and PAL-KTTKS as Anti-Wrinkle Peptides

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Abstract

Introduction: Skin aging is a complicated process which is one of the major issues in the field of dermatology and cosmetic products. Peptides are one of the novel ingredients included in the anti-aging formulations. KTTKS (Lys-Thr-Thr-Lys-Ser) and its derivative, PAL-KTTKS (Palmitic acid-KTTKS), have attracted a lot of attention in arresting or delaying skin aging, but unfortunately, there are almost no preformulation studies available about them.

Methods and Results: Both peptides were synthesized by solid phase peptide synthesis and identified by Mass spectroscopy technique. UV absorption ability, percentage of crystallinity, melting point, decomposition temperature and thermal behavior of both peptides were analyzed by UV spectroscopy, XRD, TGA and DSC techniques respectively. Partition coefficient was also determined by ACD/chemsketch software. In addition stability studies for the aqueous solution of KTTKS were performed at 32 and 37 °C

The results of UV spectroscopy show the wavelength of maximum absorbance of both peptides is in the vacuum UV range. Based on the results of melting point and TGA apparatuses, KTTKS and PAL-KTTKS decompose at about 154 °C and 112 °C respectively and there is no melting point for them before decomposition. The results of DSC thermograms indicate an endothermic peak at the temperature below 60 °C for both peptides which is probably due to intrinsic structural rearrangement or evaporation of volatile solvents. Crystallinity percentage for KTTKS and PAL-KTTKS are 62% and 32% respectively. cLogp of KTTKS is -3.27 and cLogp of PAL-KTTKS is 3.32.

Conclusions:

The results of this investigation can be employed for the formulation of these peptides for TTD.

Key words: KTTKS; PAL-KTTKS; Wrinkle; Preformulation studies; Skin aging