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Title:Estimation of crystallinity of trehalose dihydrate microspheres by usage of terahertz time-domain spectroscopy
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Abstract:Crystalline state of pharmaceutical materials is of great importance in the preparation of pharmaceutics because their physicochemical properties affect bioavailability, quality of products, therapeutic level, and manufacturing process. In this study, we have estimated the crystallinity of trehalose dihydrate microspheres by measuring terahertz (THz) spectroscopy. The commercially available trehalose dihydrate takes in general a crystalline state, but trehalose dihydrate microspheres prepared by using spray-drying method are in an amorphous state. We have prepared amorphous anhydrous trehalose by using melt-quenched method from crystalline trehalose dihydrate. We have measured the absorbance of trehalose dihydrate containing amorphous anhydrous trehalose (0%, 25%, 50%, 75%, and 100%) using THz time-domain spectroscopy (THz-TDS) to prepare calibration curves. Using the calibration curves, we have estimated the crystallinity of trehalose dihydrate microspheres prepared by using spray-drying method. Our results suggest that THz-TDS is well suited to distinguish crystallinity differences in pharmaceutical compounds. (c) 2012 Wiley Periodicals, Inc. and the American Pharmacists Association J Pharm Sci 101:34653472, 2012
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