

Impact of Microwave Heating Temperatures on the Pharmaceutical Powder Characteristics

Authors : Maha Al-Ali, Selvakannan Periasamy, Rajarathinam Parthasarathy

Abstract : Drying temperature is an important factor impacting the physicochemical properties of the dried materials, particularly the pharmaceutical powders. Drying of pharmaceuticals by using microwave radiation is very limited, and the available information about the interaction between the electromagnetic radiations and the pharmaceutical material is still scarce. Therefore, microwave drying process is employed in this work to dry the wet (moisturised) granules of the formulated naproxen-sodium drug. This study aims to investigate the influences of the microwave radiation temperatures on the moisture removal, the crystalline structure, the size and morphology of the dried naproxen-sodium particles, and identify any potential changes in the chemical groups of the drug. In this work, newly formulated naproxen-sodium is prepared and moisturized by wet granulation process and hence dried by using microwave radiation at different temperatures. Moisture analyzer, Fourier-transform infrared spectroscopy, powder X-ray diffraction, and scanning electron microscope are used to characterise the non-moisturised powder (reference powder), the moisturised granules, and the dried particles. The results show that microwave drying of naproxen-sodium at high drying temperature is more efficient than that at low temperatures in terms of the moisture removal. Although there is no significant change in the chemical structure of the dried particles, the particle size, crystallinity and morphology are relatively changed with changing of heating temperature.

Keywords : heating temperature, microwave drying, naproxen-sodium, particle size

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