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Laser marking of film-coated ibuprofen tablets

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Introduction: The world we live in has undergone a true revolution thanks to laser technology. The unique characteristics of the laser made it an important tool in a wide range of applications, including the field of pharmaceuticals. For instance, laser marking of oral solid dosage forms (OSDFs), which will be the focus of this study. Many benefits can be found with this type of marking, basically in terms of the unique identification of OSDFs, drug tracking, personalized medicines and anti-counterfeiting. **Materials and methods:** The homogenous powder mixture of Ibuprofen and different excipients was directly compressed and film-coated according to specific conditions. Several types of aqueous coatings have been conducted in this research. Two layers of coating were applied to the surface of the tablets. The first layer was a white functional acrylic-enteric coating, and the second was a colored immediate-release (HPMC-based) coating (for marking). Later, different QR codes were made on these tablets by ablating specific areas of the upper layer with the laser at particular parameters. Laser-ablated tablets were tested for several physicochemical parameters (mechanical properties, disintegration time, surface roughness). While Raman spectrometry and scanning electron microscopy was used to evaluate the effect of the laser on the coating. **Results and discussion:** The tablets had uniform appearance, colour, shape and physicochemical properties. In addition, most of QR codes on the surface of these tablets were readable (by using a smartphone), especially the brown ones. The studied laser has a high repetition rate and energy, which would achieve the marking speed required in the industry. However, the lasered tablets disintegrated in a simulated stomach medium within minutes. Furthermore, friability results were not affected by the codes, while the hardness of all tablets generally decreased after the laser marking. **In conclusion,** present parameters of the laser marking cannot be used in enteric-coated tablets and it requires further optimization to maintain at least the functional properties they had before laser exposure.

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