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Drug Loading of Mesoporous Silicon[1] ANNE MOFFITT, JEFF COFFER, MENGJIA WANG, Texas Christian University — The nanostructuring of crystalline solids with low aqueous solubilities by their incorporation into mesoporous host materials is one route to improve the bioavailability of such solids. Earlier studies suggest that mesoporous Si (PSi), with pore widths in the range of 5-50 nm, is a candidate for such an approach. In this presentation, we describe efforts to load curcumin into free-standing microparticles of PSi. Curcumin is a compound extracted from turmeric root, which is an ingredient of curry. Curucmin has shown activity against selected cancer cell lines, bacteria, and other medical conditions. However, curcumin has a very low bioavailability due to its extremely low water solubility (0.6μg/mL). Incorporation of curcumin was achieved by straightforward loading of the molten solid at 185°C. Loading experiments were performed using PSi particles of two different size ranges, 45-75 μm and 150-250 μm. Longer loading times and ratio of curcumin to PSi leads to a higher percentage of loaded curcumin in both PSi particle sizes (as determined by weight difference). The extent of curcumin crystallinity was assessed by x-ray diffraction (XRD). The solubility and release kinetics of loaded curcumin from the PSi was determined by extraction into water at 37°C, with analysis using UV-VIS spectrometry.

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