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GLYCEROL-SILICONE ELASTOMERS AS ACTIVE MATRICES WITH CONTROLLABLE RELEASE PROFILES

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Drug release regimes must be controlled for optimal therapeutic effect. While it is relatively straightforward to create first order release matrices, it can be challenging to avoid an initial burst. Matrices with zero-order profiles are perceived to be beneficial in many cases, but are even more difficult to formulate. We describe the straightforward synthesis of elastomeric composites prepared from silicone in which the active is dispersed in glycerol.[1] The release of glycerol-soluble actives from films of these materials was shown to be tunable with respect to the order of release (zero- or first-order) simply by changing glycerol content. Importantly, release from the elastomers showed no burst effect. The discrete glycerol domains embedded within a silicone matrix act as reservoirs for active substances. Upon contact with aqueous media the active substances are released from matrices exhibiting zero-order, near zero-order or first-order release kinetics. Various parameters that could influence the release process include glycerol content, glycerol domain size or membrane thickness are thoroughly investigated, elucidating guidelines for creating matrices capable of delivering active substances at desired rates. Additionally, the composites proved to absorb significant amounts of liquid water (up to 1850 % of sample mass), a feature that can be tuned by manipulation of the composite structure.[2]

1. P. Mazurek, S. Hvilsted, A.L. Skov, Polymer, 87:1-7, 2016.
2. P. Mazurek, M.A. Brook, A.L. Skov, Langmuir, 34:11559-11566, 2018.