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Manufactured Soil Aggregates for Studying Microhabitats

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Environmental perturbation, anthropogenic or otherwise, can have a profound effect on soil microbiota and essential biogeochemical processes. The general resistance and adaptation of yeasts and other fungi to stressors has been well studied *in vitro* however, the influence of key physical variables, such as how soil structure regulates fungal response to perturbation, is poorly understood. In this study, we developed an approach to manufacture soil macroaggregates that are characteristically similar to their natural counterpart (determined by X-ray CT) and with defined microbial composition. This new tool allowed us to examine the influence of soil aggregation on fungal stress response by manufacturing aggregates with yeast cells either within, or on, the aggregate surface. Environmental stressors including heavy metals, anoxia, and heat stress were applied to these aggregates to capture an array of environmental stressors and assay differences in survival between exo-and-endo aggregate cells. Results generated with this new tool indicate that the location of yeast cells in soil macroaggregates can impact on their survival, in a stressor- and time-dependent manner.