

Precision Delivery of Probiotics to Enhance Nutrition

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Probiotics that are routinely available to consumers in over-the-counter supplements or in food-products are typically provided in only a few dosage forms (e.g., capsules for supplements, yogurt for foods). Implementation of new products and dosage forms for probiotics relies on addressing harsh environmental conditions (e.g., ambient temperature, high humidity) that decrease probiotic viability during shelf-life storage. Furthermore, the overwhelming majority of current dosage forms do not provide approaches to control delivery after ingestion and cannot ensure (1) probiotic survival through the harsh acidic conditions of the stomach, (2) metabolic activity of probiotics during gastrointestinal transit, and (3) delivery of viable probiotics to the target site (e.g., intestines). Finally, each probiotic strain is unique in both their sensitivities to environmental conditions and in their intended function within the host (e.g., colonization, metabolite secretion, immune system boosting/activating) and thus new approaches to must consider the unique sensitivities and characteristics of each individual probiotic. To date, most approaches to solve these challenges have focused on engineering novel strains of probiotics; as such, there is an unmet need for development and commercialization of advanced delivery systems for probiotics that can be broadly applied across multiple probiotics strains. To this end, VitaKey is developing precision delivery systems for probiotics to ensure viability during probiotic formulation, address stability challenges during storage to ensure probiotic viability throughout shelf-life, and control delivery of probiotics after ingestion to ensure that probiotics arrive to the right place in the gastrointestinal tract, at/for the right time, and in the right amount. VitaKey's precision delivery systems for probiotics will enable the commercialization of the next generation of probiotic supplements and food products geared towards health and wellness. More broadly, VitaKey's precision delivery systems for probiotics can be applied to applications throughout the whole food chain, including the agriculture industry (e.g., animal feed).