CUSTOMIZABLE, REPROGRAMMABLE, FOOD PREPARATION, PRODUCTION AND INVENTION SYSTEM

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Providing astronauts with healthy, appetizing and diverse meals from materials that can be easily stored and transported into space, is a critical ongoing problem in space travel and exploration. Here, we propose a radical new approach to creating meals in space. Our ultimate aim is to design a portable food preparation and production machine, capable of creating food items that emulate the taste, texture, smell and appearance of any desired meal, using a finite and pre-defined combination of ingredients and cooking techniques. Rather than attempting to transport and store a large variety of foods from earth, appetizing, high-quality and varied meals will be created from a small, standardized set of known ingredients. While such technology may seem to be an impossible dream, reminiscent of the food replicators seen on Star Trek, recent innovative work has shown that developing familiar seeming foods from novel and unconventional ingredients may in fact be a realistic possibility (Bernstein 2005).

Nonetheless, the scientific mapping of food-production space remains virtually unexplored. Our approach involves developing a generative food grammar, which can be used to describe and translate the combination of ingredients and food transformations necessary to produce any food item into instructions for our food production machine. We will also attempt to identify a set of food phonemes – fundamental ingredients from which any meal can be assembled. Additionally, in collaboration with Squid Labs, LLC, a firm specializing in the development of novel and innovative hardware, we will begin designing and developing the machine itself, which will need to be capable of performing all standard cooking techniques (e.g. pressure, heat, cold etc.), and of taking the raw ingredients and a meal description, and producing a meal with the desired characteristics. Aside from precisely emulating foods which are difficult or impossible to transport or store in space, one critical contribution our food preparation machine could achieve is the discovery and creation of previously unknown food items. Additionally, once a food machine was installed on a space shuttle or space station, there would be no need for additional food preparation machinery, easing the food preparation process, and saving room. Finally, the base ingredients could be standardized for easy delivery and storage, and customized for maximum nutritive value.