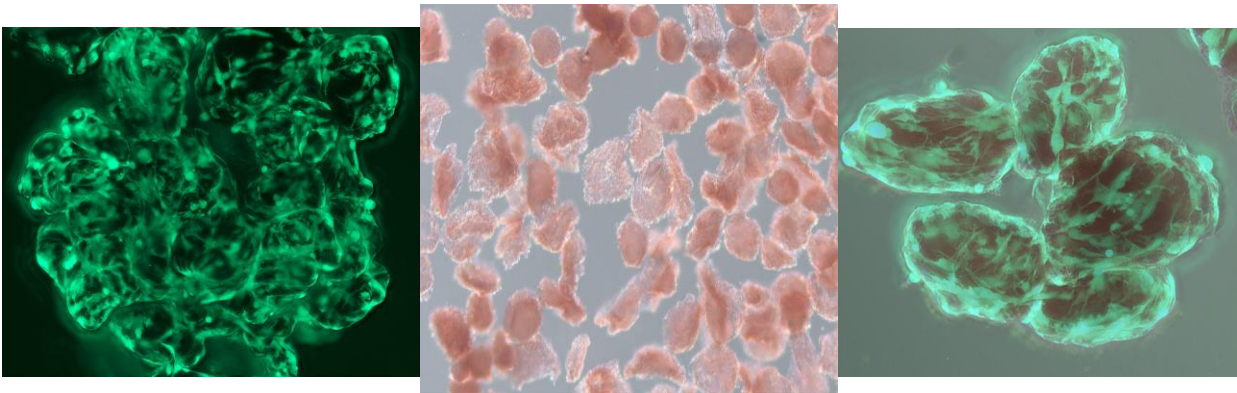




Matrix F.T. Microcarriers: Alginate Microbead Product Feature

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Matrix F.T.'s alginate-based microbeads provide an edible, animal component free structure for cells to grow on to enable scale up of adherent cells in suspension



Introduction

Matrix F.T.'s core technologies are based on electrospinning plant-based polymers for use as scaffolds in the cultivated meat industry. After supplying samples to customers, some expressed desire to work with microcarriers more akin to those used in pharmaceutical industries, and traditional cell culture. These carriers were round and somewhat porous, but were not made of edible material, require extra processing to remove cells from the carrier and are often made from or coated with animal derived components, such as gelatin.¹ **Microcarriers are a critical part of the mass expansion of adherent cells for use in cultivated meat.** To meet customer requests, Matrix F.T. created an electrospayed, edible, ACF microcarrier with the end use of being a food ingredient.

¹ All of Matrix F.T.'s products are animal component-free (ACF), edible and customizable.

Alginate is a natural polymer derived from seaweed that is often used in the creation of beads, due to its ability to form gels. An alginate solution can be supplemented with the desired additives or coatings, such as protein or growth factors.

Electrospraying of alginate beads is a highly scalable process that is capable of producing large quantities of beads that can be easily adjusted to change the size and shape of the beads depending on a customer's cell lines, specific production processes or preferences. The process involves mixing the established compositions of alginate solution with the desired additives and then running the mixture through the electrospraying machine. The beads are then collected and can then be coated or treated for use in various applications. Overall, alginate microbeads are a versatile and efficient microcarrier that can be scaled up to increase cell culture yield of adherent cells in suspension.

Customizable Parameters and Features

- Size 100-300 μm
- Shape: textured, spherical (**Figure 1**)
- Coating and surface treatment
- Plant protein types currently available (soy, pea, corn)
- Wet or dry storage

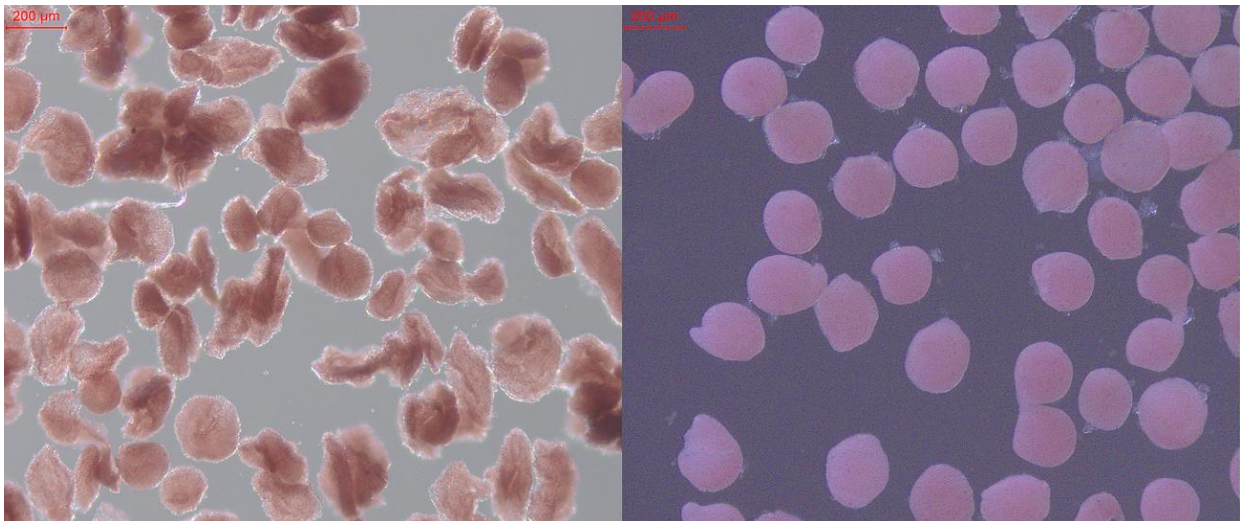


Figure 1. Soy-containing alginate microbeads textured (left) and round (right)

Product Usage

Cell culture

Alginate microbeads are designed to support cell attachment and growth for adherent cells grown in suspension. Cell seeding time and density, microbead loading concentration, media, and duration of growth can be optimized to increase performance and yield based on the cell type. Matrix F.T. evaluates alginate microcarrier designs in-house to understand their performance and make recommendations based on the product-type to streamline protocol development for customers according to alginate microbead format and composition. Cell culture methods and results include cell and microbead loading optimization, live/dead cell staining and cell quantification.

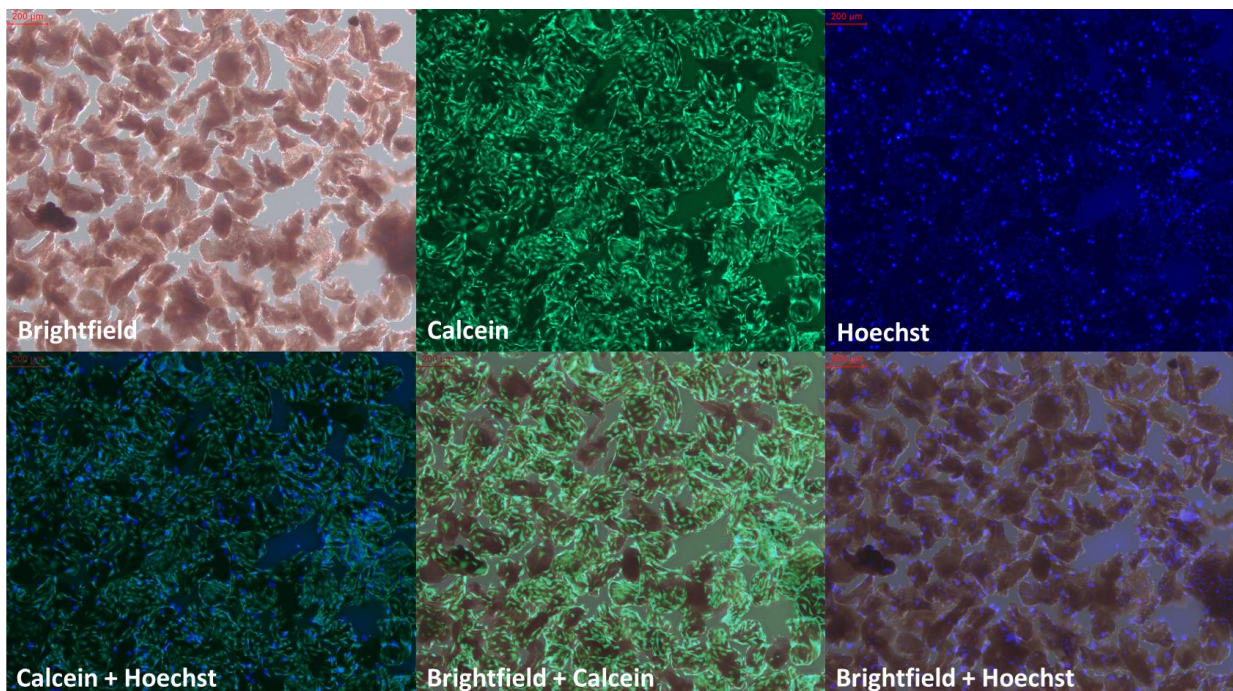


Figure 2. A soy alginate microbeads seeded with C2C12 cells after 3 days in suspension culture with brightfield, Calcein live cell (green) and nuclear Hoechst (blue) images.

Matrix F.T.'s microcarriers as a food ingredient

Microbeads are a critical part of the mass expansion of adherent cells for use in cultivated meat. However, the vast majority of available microcarriers for cell culture are not edible and require extensive washing of cells from the microcarriers and then thorough separation of the microcarriers from the harvested cells. This washing and separation process is expensive and can significantly affect the harvest yield of a batch of cells. For this reason, it is crucial to have microcarriers that are edible to reduce the impact of some microcarriers being incorporated into the final product or to eliminate the need to remove the cells from

the microcarriers at all. **Figure 3** below shows a food product containing Matrix F.T. alginate microcarriers.



Figure 3. A food product containing Matrix F.T. alginate microbeads before cooking (left) and after (right)

Want to work with us?

We offer customized R&D services to the cellular agriculture industry and are experts in finding your ACF, plant-based microcarrier and/or scaffolding solutions to aid in scaling your process.

We also offer a [free sample kit](#) with a variety of scaffolding products and will work in an iterative design process with your company as part of our Contract Research Services. Please contact sales@matrixfood.tech to learn more about our product offerings or to order samples.

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