

ALGAE PRODUCTION: INVESTOR FAQs

- 1. What makes algae such a worthwhile proposition for investors with an interest in nutrition and health applications for humans and animals?** The focus on alternative proteins and antibiotic-free proteins, ranging from lab-grown meats to insect biomass production, is attracting investment dollars from around the globe. There will be a global protein production shortfall beginning in 2020, reaching critical proportions by 2030. Innovation in alternative sources likely to be richly rewarded.
- 2. Historically, have algae developers been successful at communicating to the investment community the value proposition of their work, and if not, why not?** The focus has been on biofuel production for the past two decades, ignoring the potential of a sustainable, low-carbon, pesticide-free, herbicide-free, antibiotic-free, non-animal, non-soy source of protein and micronutrients that is 100% edible, unlike corn or wheat where the edible biomass is less than 20% of the entire plant. Algal biomass can be consumed at every link of the food chain, from larval shrimp in aquaculture facilities to poultry feed, to gourmet offerings at fine restaurants and everything in between.
- 3. What recent developments in the field of algae development should potential investors be aware of that could influence their assessments?** Companies like ZIVO are developing new cultivation technologies and new algae-based products, driving down the cost of production and processing in feed, food and supplement market verticals while creating new product categories.
- 4. How is the need to scale-up development from experimental to full commercial production likely to affect an investment in this sector?** There is enormous demand for high-quality nutrition in dozens of market verticals that will likely keep per-ton prices at a premium for a decade or more, providing the incentive to expand production, which in turn spurs innovation in every aspect of production, from capital equipment to farming practices to post-harvest processing. Investment in growers, processors, marketers, and even equipment makers supporting the algal biomass industry holds significant upside potential.
- 5. What is the time horizon for a potential payoff for an investor who is looking to make a profit in this area?** Given the demand and the opportunities across many different sectors, this is a time horizon that can be measured in months and not years. Investment into open pond biomass production can begin to yield returns in 18-22 months where climate is optimal, such as the American Southwest. China is expanding its pond production capabilities on non-arable land and is well-supported by its government.
- 6. What are some of the potential stumbling blocks in the field that an investor should know about before making a decision to invest?** Algal biomass production is farming, and that means growing algae with the lowest possible capital expense, lowest possible operating costs and minimal production losses. Capital efficiency and yield per liter of water are paramount, regardless of the algal specie being cultivated. Initially, investors should be looking at low-volume/high-value market verticals like supplements, vegan

food ingredients, health drink ingredients and the like as production volume builds and economies of scale begins to impact cost per ton. That means investing in producers and brands focusing on algae species or algal by-products like Omega 3 lipids, astaxanthin or non-starch polysaccharides that can command premium prices. As global production capacity builds, algal biomass will find its way into everyday food staples, initially as a protein or nutrition enhancement, and then as a major component of the protein, fiber or vitamin finished product.

7. **What is the takeaway for investors considering an investment in algae?** Any new source of nutrition can't add to the energy deficit of current farming practices, anywhere in the world. We can't continue to expend more energy growing our food than the energy we derive from that food. We can't continue to consume vast quantities of refined sugars or starches and suffer the health consequences. We can't take away arable land already committed to food crops or increase the pollutant load in our oceans. Bounded by that set of constraints is a solution – algae in its many forms and many uses. The innovators growing, processing and marketing algae as a high-value nutritional source – the first to break new ground – will be creating inestimable value, and in the process, improving the quality of life around the world.