

Towards the Production of Epa: a Developing Country Perspective

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ABSTRACT

Omega-3 fatty acids have an attractive market potential as human nutraceutical supplements, as ingredients in functional foods and as animal feed supplements. The current market for these products is dominated by fish oils, which contain omega-3 fatty acids and are marketed in oil filled gel capsules or added to food or feed. Apart from an undesirable taste, the use of fish oils also results in the overexploitation of natural fish stocks. Many consumers are also seeking vegetarian alternatives to animal derived foods. Microalgae are considered alternate sources for omega-3 fatty acids. The two most common omega-3 fatty acids are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Since microalgal oil rich in EPA is limited, efforts are focussed towards increased production of high purity EPA. This provides a window of opportunity for a supply of competing products that are rich in algal EPA. Recently the CSIR developed a technology for the production of EPA by an indigenous algal isolate designated Isolate A23.2. The process developed by the CSIR integrates multiple unit operations such as biomass and EPA production in a raceway pond system and various downstream processes which enabled production of product intermediates, which were used in the production of several end product prototypes such as functional foods, drinks and nutraceuticals. An intensive process development programme resulted in optimised growth and EPA production and the system was demonstrated to be operationally robust. The techno-economic assessment of the raceway system indicated an attractive business case especially when the business is operated at pilot or production scale. South Africa has significant climatic advantages, experience in algal production and a dire need for job creation and growth in the Bio-manufacturing Sector, therefore commercialization of this technology will provide opportunities for job creation of semi-skilled people and further skills development to support a growing algal cluster.