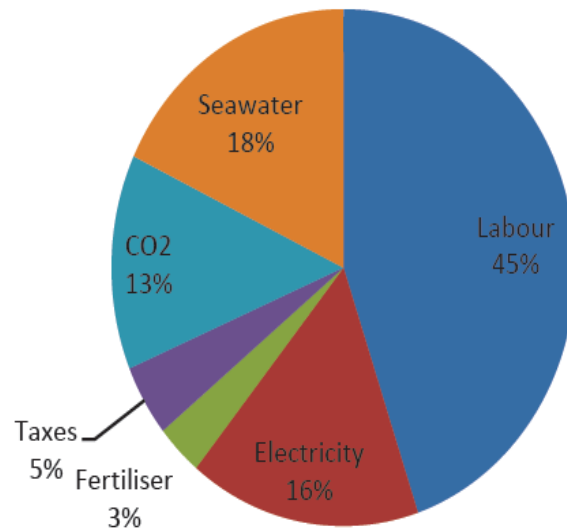


### 2.2.7. Case Study – Seambiotic Israel

Seambiotic was founded in 2003 in Israel. The founders had a long track record in algae research and commercial cultivation, primarily through a related company called Nature Beta Technologies Ltd (NBT) in Eilat, Israel.

A brief overview of NBT Ltd is worthwhile, to demonstrate current commercial reality and known markets for microalgae. Since 1988 NBT cultivates *Dunaliella*, a salt-loving algae species, at 10 ha of open-pond facilities.

The algae is processed, dried and inserted in capsules. The food supplement or nutraceutical” is high in  $\beta$ -carotene, and it is sold via door to door sales in Japan at a retail price of about \$4,000/kg. The cost to produce is \$17/kg and about 70 t/year are produced. The operational costs are \$1.1m per year, which are further broken down in Figure 21. Of note are the high charges for supply of pure CO<sub>2</sub> and charges for supply of clean seawater.



**Figure 21: Production Costs of Microalgae for Nutraceuticals (Ben-Amotz)**

Seambiotic was established to develop new environmental end-uses for microalgae. R&D pilot studies have been carried out at the Israeli Electric Corporation's power station located on the Mediterranean shore near the city of Ashkelon. Open-pond facilities were built, with the facility to use flue gas from the power-plant stack and to have sea water without charges.



**Figure 22: Open-pond Test Facility at Ashkelon (*Seambiotic*)**

According to the company (Ben-Amotz, 2008), trials on several species have been successful, with some species productivity of 20 g/m<sup>2</sup>/day. Using abundant flue gas instead of purchasing CO<sub>2</sub> has pushed productivity up by 30%. Maintaining original inoculation species proves a challenge, the whole culture sometimes changes to a diatom species. The algae are harvested via low-cost self-flocculation technique.

Samples have been converted to biodiesel and showed 12% w/w daf yield of biodiesel from microalgal biomass. Seambiotic are of the opinion that production costs could be as low as \$0.34/kg, based on a comparison with the NBT operating cost and scale of operation. At 12% yield, this is still over \$2.80/kg of biodiesel feedstock. The intention is to make the process profitable through the co-production of omega-3 poly-unsaturated fatty acids (PUFAs) which are a valuable human and animal feed additive. If natural selection of the species is allowed to occur, maintaining consistency in output and oil quality will prove a significant challenge.

Stated from:

**"A Review of the Potential of Marine Algae as a Source of Bio-fuel in Ireland"**

February 2009, Report prepared for Sustainable Energy Ireland.