

Supply Chain Evaluation for the Plant Extracts Industry in the Eastern Caribbean

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Abstract: Market research has shown that the demand for increasing essential oils, fragrances and flavours in aromatherapy, and food and beverages, is expected to remain a key driving factor in the global marketplace. This could effectively double to about US\$15b by 2025 from about US\$7b to US\$8b as estimated in 2018. Additionally, the Oleoresin market was estimated to be about US\$1.2b in 2014, increasing to US\$1.7b in 2025. The Eastern Caribbean has a long history of essential oil production, specifically bay oil in Dominica, nutmeg oil in Grenada and anise oil in Trinidad. Unfortunately, the bay oil and nutmeg oil operations have been negatively affected by hurricanes and the anise oil operation has been closed down. Due to the buoyancy of global markets in both essential oil and oleoresin markets, it is appropriate to bring these traditional industries back into full production, and to expand the range of products to be marketed. The potential of this expansion was investigated using an in-depth evaluation of the 5 stages of the complex supply chain in the small island states, namely: 1) Agricultural production of raw material, 2) Extraction of the crude essential oil/oleoresin by steam distillation/supercritical fluid extraction, 3) Transportation of the crude extracts to a separation plant to recover valuable components, 4) Transportation of the valuable components for final consumer products to be produced and packaged, and 5) Marketing of the final consumer products. The potential for introducing new products has identified the additional crops which could be considered for commercial exploitation: root crops (turmeric, vetiver), shrubs (basil, hot peppers), trees (ylang ylang). The analysis has led to a number of conclusions. Firstly, management of agricultural production is key to the success of the operation. Secondly, steam distillation extraction can only produce essential oils, whereas supercritical fluid extraction can extract both essential oils and oleoresins, but at a rather higher capital cost. Finally, there would be a move towards major production and distribution of commercial products after the new businesses are established. These new businesses would contribute to the fulfillment of a sustainable supply of crops to the process plant.

Keywords: Essential oils, oleoresins, supply chain, techno-economic feasibility