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The drying of *Pelargonium sidoides DC* roots in a solar tunnel dryer in Kenya and the effects on working conditions

Master Thesis in the Department of Agricultural Engineeering

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Abstract

The plant species *Pelargonium sidoides* OC is used as a traditional medicine in South Africa for its antibacterial and immune system stimulating effects. An ethanol extract of the roots is marketed by the German company ISO Arzneimittel as the phyto-pharmaceutical "Umckaloabo®". The present thesis investigates the processing of *Pelargonium* roots as weil as the working conditions on a cultivation site in Kenya. Effects of the newly arising farm enterprise for the local population are compared to development targets that are mentioned in the UN Millennium Oevelopment Goals.

Solar drying of the roots presents an energy-saving preservation method preparing the product for the transport to Europe. The performance of an adequate drying process in a solar tunnel dryer was aimed to achieve a high product quality. Therefore root particles of different shape and size were testdried in varying layer thickness and under varying conditions.

A layer thickness between 0.5 and 1 inch with roots cut into slices up to 3 mm thickness results in a homogenous drying process. Under these conditions roots are dried in one day with clear sky. Under overcast weather conditions additional heat is necessary. To increase the loading capacity of the tunnel dryer a construction concept for a modified greenhouse tunnel dryer was designed. Practical tests must prove the estimated performance.

Quality tests proved that a high product quality can be achieved when international standards for quality assurance are considered by trained staff. Benefits for employees like income, food supply and education contribute to the improvement of major living conditions and meet the targets of the UN Millennium Oevelopment Goals.

The results of this thesis built the basis for the professional solar drying of *Pelargonium* roots and demonstrate the implementation of sustainable technology using renewable energies and improving social aspects for the local people.