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Quality Assurance and Preservation of African Leafy Vegetables Considering Technological and Health Aspects for the Reduction of Food Losses and the Improvement of Health and Nutritional Value, Storability and Food Safety

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Abstract

African indigenous leafy vegetables (ALV) play a significant role in food security of smallholder farmers in rural and urban/peri-urban areas. Currently, the magnitude of pre- and postharvest losses of ALVs in Kenya can reach up to 50%. Losses are attributed to inadequate conditions during production and to rapid decay of products during transport, storage and marketing. Inadequate postharvest handling and facilities for storage and transport, inappropriate processing methods for product preservation, insufficient hygiene conditions in the markets and poor infrastructure aggravate these problems, causing massive losses along “the field to consumer” chain.

In many parts in Africa, subsistence smallholder farmers cannot afford construction of expensive cold storage facilities, thus after harvesting ALVs, simple methods are applied. Alternative technologies such as on-farm evaporative coolers, modified atmosphere packaging and postharvest treatments need to be explored for adoption. The commonly used, local preservation methods (blanching, solar-drying, fermentation), however, still result in significant loss of nutritional product quality and in microbiological contamination. Thus, one major aim in subproject 4 and 5 of the HORTINLEA consortium (Horticultural Innovations and learning for improved Nutrition and Livelihood in East Africa as part of

the BMBF “GlobE - Global Food Security” program) is to identify and characterise quality losses during the entire food supply chain (from smallholder farmer to consumer) and to improve product quality, food safety and storability by adopting affordable production, harvest techniques, postharvest treatments and processing technologies, as well as implementing emerging technologies for optimising transport and storage conditions under unfavourable conditions.

Moreover, it is largely unknown in which quantities compounds relevant for a healthy human nutrition (e.g. vitamins, minerals, secondary plant metabolites) are present in ALVs. In order to link potentially beneficial effects to secondary plant metabolites, extracts as well as isolated and chemically characterised substances are subjected to biochemical *in vitro* assays. Additionally, the impact of agronomical practices and harvesting stages on the chemical composition of ALV will be studied. All these aspects contribute to the understanding how significant improvements in the nutritional status of the sub-saharan population can be obtained by the optimisation of processing and postharvest treatments of indigenous ALVs in Kenya.

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