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Development and Implementation of Biobased Packaging Solutions in West African Food Supply Chains to Increase Food Security

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Abstract

Food security and food losses are of major concern in sub-Saharan Africa. Active packaging solutions can prolong shelf life and increase food safety by inhibiting the growth of spoilage microorganisms and pathogens. The reduction of food losses can help to prevent malnutrition. In addition, the environmental pollution, e.g. by plastic bags etc., is a severe issue in many African countries nowadays. Therefore, the implementation of locally produced, biobased and biodegradable packaging solutions is of great interest, especially in developing countries like Benin.

The aim of the WALF-Pack project was the development of simple and locally producible packaging solutions for food products from Benin, namely the green leafy vegetable Gboman (*Solanum macrocarpon*), smoked chicken and the soft cheese Waragashi. Therefore, a holistic interdisciplinary approach was chosen. First, the supply chains of all products were investigated and characterised in order to identify the hot spots of food loss. A coordination framework of local farmers, suppliers, wholesalers etc. was established for regular exchanges upon actual developments. One main focus of the research addressed the identification of the antimicrobial potential of local plants for the incorporation into food packaging in order to prolong the shelf life. Afterwards, packaging solutions were designed and local materials were chosen to create prototypes. The suitability of the packaging was investigated in product and pilot studies. The consumer acceptance was taken into account and finally all results were made accessible in an online toolkit.

The packaging solutions include papers from different grasses, bioplastic based on PLA, local oils and fibers with an antimicrobial active additive and a biogenic active coating that can be applied on different matrixes like cloth, paper or banana leaves. The active coating and packaging can reduce microbial growth and therefore prolong the shelf life of the product.

Therefore, these packaging solutions can reduce food loss and increase food security and safety when implemented at the food loss hot spots. In addition, the sustainable biobased packages can be produced locally and are biodegradable or easy to dispose. Therefore, they will also have an environmental impact in Benin and contribute to a sustainable packaging and waste management.

Keywords: Active packaging, antimicrobial activity, Benin, biobased, biodegradable, food loss, food security, packaging, sustainability, Western Africa

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