Bioplastics packaging for enhanced sustainability of the food supply system

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Introduction

It is contended that significant market potential exists in the food industry for the adoption of bioplastics packaging that is either compostable or suitable for anaerobic digestion (AD) and which optimises shelf life thereby reducing waste to landfill and deriving environmental value.

The Problem

It is often inconvenient for UK householders and costly for industry to separate spoilt food from packaging for the green bin. A third of food purchased by the average household is thrown away often still in its original packaging, either opened or unopened (WRAP, 2008). Also, food contaminated plastics can be environmentally costly to recycle - raising issues such as hygiene, transport emissions, use of energy and water – and difficult to process particularly those constructed using co-extruded or laminated materials. Disposal of used plastics, food waste, paper and other organic wastes to landfill results in the generation of the potent greenhouse gas, methane, and represents a waste of potentially valuable resource.

Sustainability Context

Anaerobic Digestion (AD) technology is expected to be quickly adopted over the next 5 years spurred on by a number of drivers including the rising cost of energy from non-renewable fossil fuels, legislation (e.g. EU Landfill Directive), the UK government's Climate Change Act's 80% carbon reduction target by 2050 and the coalition's commitment to renewable energy.

The Benefits

In addition to diverting waste from landfill, the biogas and digestate generated by the AD process are valuable products which could, for example, serve to fuel food delivery or waste collection trucks and amend agricultural soil. With fast-rising food prices, increasing fertiliser costs and concerns over global reserves of phosphorus, there should be sound incentive in the future for retailers and food manufacturers to specify AD compatible or compostable packaging for certain product categories such as fresh produce. Consequently, innovative bioplastics could become a mainstream alternative to many synthetic materials commonly used for existing pack formats.

The Challenge

The challenge is to develop cost effective bioplastics packaging solutions which deliver the required functionality for optimal product shelf life and are designed for waste management options which maximise environmental benefit from these materials.

With increased stress on the global food supply system likely in the future, due to issues such as declining freshwater availability and climate change, greater value will be placed on technologies, including packaging, which can help reduce food waste and derive value from what waste is generated. Also, given that much food, such as produce, is imported to the UK on a just-in-time delivery basis from overseas, including regions like Africa, it is likely that retail supply chains will become increasingly "rattled" in the future. For example, according to the UN, most countries in Africa will see their water availability reduce by 50% or more by 2025 with food production falling dramatically in certain cases. Coupled to rising population trends this scenario presents a particularly serious challenge as most countries in this region are predicted to suffer from either water scarcity, water stress or water vulnerability. Thus, locally or regionally sourced packaging, using natural resources or bio-based materials, could play an important role in helping to protect and preserve food, particularly in developing countries where little infrastructure or expertise is currently available.