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COMMENTARY

REDUCING WORLD FOOD LOSSES: FRESH DEMO PROJECT INTRODUCES 'CONTRONICS HUMIDIFIERS' SOLUTION TO AGRI-FOOD LOSSES

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The International Union of Food Scientists (IUFoST) World Congress, a massive global event bringing together over 3,000 delegates, over 80 scientific sessions, over 1000 scientific papers from all over the world and from the most prestigious institutions teaching food science and related disciplines, recently took place in the bustling city of Dublin, Ireland. The event was held at the iconic Royal Dublin Society from the 21st to the 26th of August 2016.

Unlike lawyers, doctors, or pilots, food science as a discipline is not as famous. Nevertheless, food scientists save more lives than all these renowned professionals combined. This, they do quietly and subtly by making sure that processed foods all over the world are safe and of decent quality. Many of us enjoy great meals, enabled through different mixes and innovations. But do we bother to realize that there is someone at the other end of the supply chain, making sure that the food is of consistent quality and just at the right taste? For example; many people enjoy ice-cream without being concerned about how many ingredients it contains and how these ingredients are combined to form such a delicacy: whoever came up with the mix of ingredients or the knowledge that adding air to a dairy product can result in such a great refreshment?

Let us consider a bottle of *coke,* a worldwide, well-known and highly appreciated soft drink. Have you ever wondered who came up with the idea of the gas and why they use the gas? Or do you think it is just inappropriate to induce belching? Of course not, and there is more to it than that. The people working often behind the scenes, making sure that you enjoy these delicacies and refreshments with consistent quality and safety, are usually food scientists.

So the 18th congress of the IUFosT brought together individual food technology organizations from countries all over the world. In Kenya, there are two food science and technology bodies that represent and take care of the interest of food science and technology and related disciplines. These are the Food Science and Technology Platform of Kenya (FoSTEP-K) which is an adhering body of the IUFoST, and the Kenya Institute of Food Science and Technology (KIFTS) which is an adhering body of the Association of Professional Societies in East Africa (APSEA).

As you can imagine, the latest innovations and cutting edge research in the area of food science and technology were displayed at the IUFoST world congress in Dublin. One of the most important concerns for food technologists all over the world is how to keep food fresh for longer, whilst guaranteeing food safety. Fruits and vegetables are especially vulnerable as they lose their freshness quickly during the long process from harvest to point of consumption. As a result, the world is experiencing a mega postharvest food loss and wastage. It is estimated that up to 50 % of the total amount of food produced in sub-Saharan Africa is wasted. This is mainly due to poor logistics of food distribution; from lack of good road networks and inadequate market regulation, to lack of refrigerated storage systems due to a shortage of energy.

Fruits and vegetables are the major culprits in these losses as they begin to lose freshness immediately after harvest. Consumers want to enjoy the freshness of their fruits and

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vegetables, which means that the produce not only has to be fresh but should also have a fresh appearance. Preference in good appearance, especially, results in huge losses of fruits and vegetables, even though they may still be perfectly edible. Moreover, when we talk about harvest loss and wasted food, people tend to forget about the energy losses due to transportation, the environmental damage due to the emissions of greenhouse gasses, and the amount of water lost in producing the food. At the IUFoST congress, quite a few food waste reducing innovations were displayed. One such innovation was the '*Contronics innovations'* project, christened as the 'Fresh Demo - project'.

Have you ever seen how fruits and vegetables wither very quickly in supermarkets? This happens because for fruits and vegetables to stay fresh, they need not just the shade to protect them from the sun; they also need a moist environment to stop them from losing their internal water content due to the natural breathing process (evapo-transportation). This is because fruits and vegetables remain alive even after harvesting and hence lose their water by natural breathing. Besides, the supermarkets' arid airstream from air conditioning accelerates this breathing process. As a result, most fruits and vegetables will lose their water content quickly and wither within a few hours.

The *Fresh Demo* innovation is counteracting this phenomenon by giving fruits, vegetables and other fresh food like meat and fish exactly what they need to stay fresh and look appealing. The best part of this innovation is that it is energy efficient and thus cheaper than any other preservation method currently available in the market. This innovation scooped the best price in the food preservation innovations category as voted by the expert panel of IUFoST at the congress in Dublin in August, 2016.

The *Contronics humidifiers* have been developed in order to increase the shelflife of fruits and vegetables, from harvest throughout the value chain to the table. The humidifier produces clean mist of about 1 micron (almost 1 millionth part of a tiny water drop), which evaporates as it comes into contact with the arid stream. In its evaporation, the mist carries energy from the air stream leading to a drop of air temperature by about 5^{o}C. The relative humidity increases to about 95% caused by the overlaying mists. This mist covers the products like a blanket, avoiding loss of weight and deterioration due to evaporation. In fact, in some cases the fruits and vegetables even gain weight as a result of absorbing the surrounding mist.

The fruits remain cool, humid, and fresh, although they do not become wet. This innovation reduces the energy needs by about 70%. It uses an ultrasound technology which almost instantaneously generates the mists. Because it uses a demineralized water system, product safety is guaranteed. This system is extremely versatile, furnished with an accessory of an ozone air purifier that cleans the vessel and kills any bacteria. Because it is made of a special stainless steel, no bacteria can survive or lodge in its pores. The water for use is obtained through a simple ultra-purifier that eliminates all bacteria and even viruses, causing the produce to stay fresh for longer.

In many supermarkets, especially in France, Germany and Great Britain, where the humidifiers have been installed, great successes have already been reported. Firstly, consumers love the idea and the concept of keeping the fruits and vegetables fresh for

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longer in an environment simulating their natural habitat and with very little energy input. Secondly, the fruits and vegetables stay fresh longer, taste better, and definitely look much better than conventionally refrigerated fruits. In addition, this technology does not require any packaging of fruits and vegetables.

This technology not only leads to reduction of losses by about 50%, it saves energy, and reduces the carbon footprint by eliminating greenhouse gas emissions accruing from post-harvest losses, and food wastes dumped in landfills. So far, this technology is being used in only a few daring and pioneering supermarkets in Europe. It is flexible in the sense that it can be applied to more than fruits and vegetables alone. It is used to preserve snacks, baked goods, and even meat products.

We can only hope that many more supermarkets and players in the value chain are going to adopt this technology to enjoy the benefits and reduce the global food wastage, which currently stands at several trillions of US dollars. Furthermore, it will be of great importance to adopt this technology in sub-Saharan Africa, given its huge food losses due to poor roads, inadequate electricity supply and inefficient supply chains. Will this be the ultimate solution to the African agri-based food losses?