NOVEL MATERIALS AND METHODS FOR EXTENDING SHELF-LIFE OF FOODS

The annual global food waste is about 25% (worth ~$4 trillions). JP Labs has demonstrated that the shelf-life of a large number of foods can be extended significantly by treating foods with non-toxic or GRAS (**G**enerally **R**egarded **A**s **S**afe) additives referred herein as shelf-life extenders. For a summary video on the technology visit: https://youtu.be/I57DQDctp4I .

Liquid foods (milk and juices): Out of nearly one trillion dollars' worth of milk and milk products produced annually in the world, about 20% (worth ~$200 billion) are wasted. We have been able to extend the shelf-life of milk from a few days to a few weeks at room temperature simply by adding a low concentration of a GRAS shelf-life extender. Such an addition prevents milk from curdling and emitting a bad odor at room temperature for a few weeks. Similarly, we have been able to extend the shelf-life of cold pressed fresh fruit juices, such as that of apple, carrot, grapes, orange, cabbage, and tomato a few folds by adding a small quantity of the shelf-life extender.

Delayed ripening: Sometimes farmers discard their produce due to over-production, lack of demand during the peak production season and the high cost of cold storage. We have been able to delay the ripening and keep a number of fruits and vegetables, such as tomato, avocado, papaya, pepper, and parsley fresh longer more than two folds by exposing the produce to the vapor of the shelf-life extenders which leave no residue.

Fungus: Fungus is one of the major causes of food waste. By treating foods with shelf-life extenders, we have prevented the growth of fungus on a large number of produce, such as avocado, orange, berries, onion, carrot, sprouted beans and processed foods such as cheeses, and breads. The shelf-life extenders can also be used as fumigants. Food is exposed to the vapor of the shelf-life extenders and hence they leave no residue on the foods.

Prevent germination: By exposing tubers such as potato, onion and garlic to the vapor of the shelf-life extenders, we have been able to prevent sprouting. Unseasonal rain and flood do significant damage to ready-to- harvest crops and warehoused grains and legumes. We have also been able to prevent germination of flooded grains and legumes by adding a small quantity of the shelf-life extenders in water.

We have demonstrated the feasibility of concepts that exposing foods to the vapor the shelf-life extenders, the shelf-life of foods can be extended significantly with a small number of GRAS or low/acceptable toxicity preservatives. Analytical work to determine (i) any chemical and biological changes in the treated food and (ii) is the treated food "SAFE TO EAT?" is required.

Patents: Five US patents have been issued, an application is pending in USA and the patent application is also filed in about ten industrialized countries.

Market: The potential global market for extending the shelf-life of foods could be tens to hundreds of billions of dollars per year. JP Labs develops new products/technologies, patents and licenses. The technology is available for worldwide exclusive license.