



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Samika Swamy</b>	<b>Project Number</b> <b>J1130</b>
<b>Project Title</b> <b>BioFresh Food Smarts: An Eco-friendly, Smart Solution to Reduce Wastage of Climacteric Produce</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Food wastage is a massive problem globally, with one-third of all the food produced getting wasted. Roughly one trillion dollars worth of food ends up in landfills every year. Food wastage's carbon footprint is estimated at 3.3 billion metric tons of greenhouse gases emitted yearly. The goal of this project is to deliver an eco-friendly, smart solution for extending the life of climacteric produce and helping households manage their produce consumption</p> <p><b>Methods/Materials</b> Key materials included climacteric produce, containers, potassium permanganate, zeolite, rice paper, Raspberry Pi, camera, and Software toolkit. BioFresh liner was built to absorb ethylene generated by produce using potassium permanganate infused zeolite pellets encased in rice paper covering. BioFresh was integrated with Smart Container for use in pantries and refrigerators. Container system included Raspberry-Pi and Camera for produce monitoring. AWS based hosted control system was built as the hub, to track stored produce. Python code with MQTT client/server mechanism was developed for information exchange between smart container and AWS. Email server in AWS generated reminders on aging produce with associated pictures to aid timely consumption</p> <p><b>Results</b> Efficacy of BioFresh liner was tested using 5 climacteric produce items. Results were conclusive that BioFresh was able to extend shelf-life of produce by over two times. Testing of Smart Container proved the ability to track age of produce in container. Emails generated by AWS were deterministic about produce aging and healthy recipe information</p> <p><b>Conclusions/Discussion</b> BioFresh liner with smart container can be used in households for storing climacteric produce. Produce will stay fresh for at least twice their regular lifespan. Produce aging alerts and healthy recipe recommendations can be received through email. This is a great tool to avoid wastage of food in consumption cycle, thereby helping reduce overall food losses globally</p>	
<b>Summary Statement</b> Project delivers an eco-friendly, smart solution to reduce food wastage by extending life of climacteric produce with an integrated smart monitoring system	
<b>Help Received</b> My science teacher offered guidance and support through review and feedback	