



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Saloni R. Patel</b>	<b>Project Number</b> <b>J1322</b>
<b>Project Title</b> <b>Solving the Puzzle of Rooftop Garden Planting Substrate</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project was to find the optimal light weight rooftop farm substrate with the lowest organic to inorganic matter ratio that will still support the growth of produce, so as to avoid potential problems of organic material breaking down and causing drainage and replacement problems.</p> <p><b>Methods/Materials</b> Procedure for Plant Growth Experiment: Create 7 different substrate mixtures with varying percentages of organic material (20%, 30%, 40%,..., 80%). The inorganic matter would be pumice and the organic matter would consist of equal parts coir and worm castings. Pot and plant these substrates with 2 different types of plants (3 sets per plant type per substrate), a fast growing mustard and romaine lettuce. Place the pots under 24 hours growing light system. Water with 75 ml water every other day. For mustard, record height and number of seed pods. For lettuce, record leaf count and appearance. Take pictures to record appearance.</p> <p>Procedure for Water Retention Experiment: Create 7 different substrate mixtures as described in the above procedure. Make sure all materials are dry. Put funnels on top of graduated cylinders and line them with filter paper. Fill 1 cup of each type of substrate into funnels. Pour 50 ml of water over all funnels slowly. After 5 minutes, record the amount of water that collects in the graduated cylinders.</p> <p><b>Results</b> Lettuce plants grew best with at least 60% organic matter. This shows that a certain percentage of organic matter is important as it provides the nutrients necessary for optimal plant growth. Same results were obtained for the mustard, where optimal growth and better seed production was observed in plants with at least sixty percent organic material. The water retention experiment showed that the higher the organic content, the better the substrate was at retaining water.</p> <p><b>Conclusions/Discussion</b> In conclusion, the sixty percent organic material soil type was the optimal soil type for a rooftop farm because the data clearly shows that the sixty percent soil mixture has the best balance between keeping a relatively low amount of organic material, while still providing enough nutrients and water retention so that the plants can grow well.</p>	
<b>Summary Statement</b> Finding the optimal percentage of organic matter in rooftop garden substrate to grow produce.	
<b>Help Received</b> My mom helped me build the light system and buy materials necessary to perform the experiments.	