



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Sumit Mitra</b>	<b>Project Number</b> <b>S1715</b>
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**Project Title**  
**The Effect of Water Quantity on Methane Emissions from Constructed Wetlands**

**Abstract**

**Objectives/Goals**

My objective was to find out if varying water quantity in constructed wetlands will affect the methane emissions from them.

**Methods/Materials**

6 plastic containers, 36 L of sphagnum peat moss, 15 L of water, 1 L measuring cup, 3 plant lights, 3 light holders, 12 seedlings of *Scirpus americanus* (Three-square Bulrush), 6- 50 cm X 35 cm of clear plastic sheeting, Duct tape, 7 syringes- 10 cc., Gloves, Scissors, Labels, Table, Measuring tape, Gas chromatograph

Measure 6L of sphagnum peat moss soil and place it in each plastic container. Label them as Models A, B, C, D, E and F. Pour 3.5L of water in models A and B, 5L of water in models C and D, 6.5 L of water in model E and F. Plant 2 seedlings of *Scirpus americanus* (Three-square Bulrush) in each container and let the plants grow under grow lights for 6 weeks. Then cover the plants with plastic sheeting to form airtight chamber and after 8 hours make a hole and take a sample of gas with the help of a syringe. Collect all the samples and take them to a lab for analysis in a gas chromatograph.

**Results**

Gas Chromatograph Bin # Model Peak Height

19	A	4188
23	B	4200
18	C	4259
22	D	4205
17	E	4295
20	F	4291
21	Garage	4019

**Conclusions/Discussion**

The results supported the hypothesis, that Models E and F would release the greatest quantity of methane gas and models A and B with smallest water volume would release the smallest quantity of methane. Although the hypothesis was proved to be correct, the results of all the models were not very different from each other. There could have been various sources of error which would mean that the gas concentration would be more or less similar in all models. The garage had water heater in it and that emits methane and this was not taken into consideration while evaluating the results. As compared to Model C, Model D's growth was stunted and this could have affected the results. The difference in methane data of

**Summary Statement**

This project is about finding out if water quantity affects the methane emissions in constructed wetland so that greenhouse effect from wetlands can be minimized

**Help Received**

Prof Blake of UCI helped with the use of chromatograph; The staff of Tree of Life nursery in San Juan Capistrano helped in selecting the wetland plants and explained in detail on how to plant them; parents helped with the supplies; Irvine Ranch and Water District provided with the valuable reference of EPA