Louis Stokes Alliances for Minority Participation (LSAMP)

Building Pathways through Connection and Direction for Underrepresented Students in Science, Technology, Engineering, and Mathematics

VALENCIA COLLEGE

The Central Florida STEM Alliance operates under a grant from The National Science Foundation, HRD-1304966.

The Central Florida STEM Alliance (CFSA)

Lake Sumter State College

SEMINOLE STATE COLLEGE OF FLORIDA

VALENCIA COLLEGE

Supporting Your Path to a Bachelor's Degree and Career in STEM

SCIENCE · TECHNOLOGY · ENGINEERING · MATH

Goal

To double the number of underrepresented minority students (URM) transferring into STEM baccalaureate degree majors

Focus

Use successful practices to integrate students' academic and social environments and to expand students' professional opportunities

Structure of CFSA

- Valencia College – Lead institution with Principal Investigator, Project Director, and 3 STEM Advisors
- Lake-Sumter State College – Partner institution with Co-Principal Investigator and one STEM Advisor
- Seminole State College – Partner institution with Co-Principal Investigator and 2 STEM Advisors

Strategic Indicators

- # URM students declaring STEM majors
- Persistence rate of URM students
- Graduation rate for URM students
- URM students' grade point average $\geq$ 2.75
- Faculty and student participation in project activities
- # of URM associate's degree students enrolling in STEM majors at baccalaureate level

Project Activities

Student Impact

- Academic support
- Social connections
- Professionalization opportunities

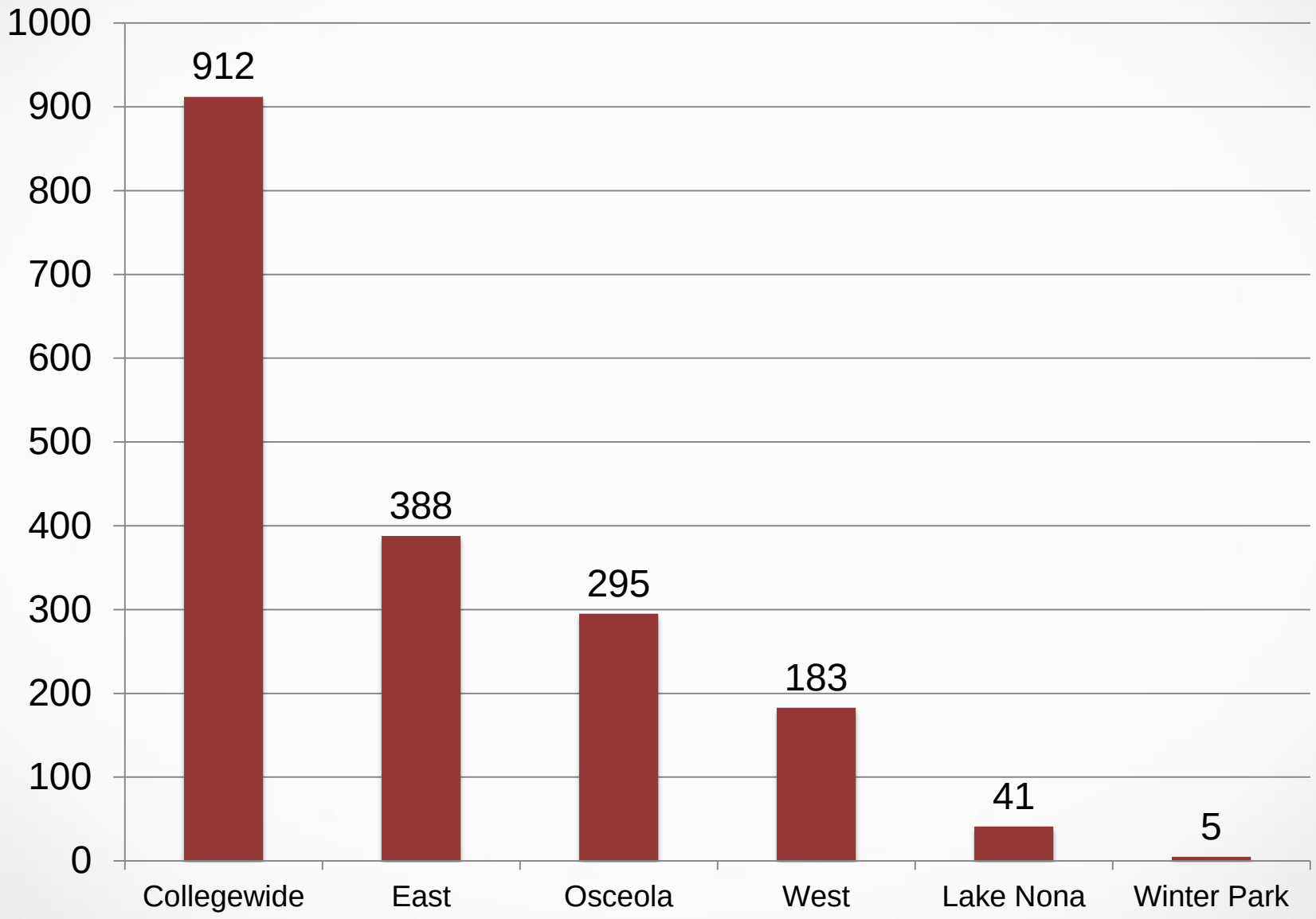
Faculty Impact

- Faculty development
- Engagement with/ support for students
- STEM career connections

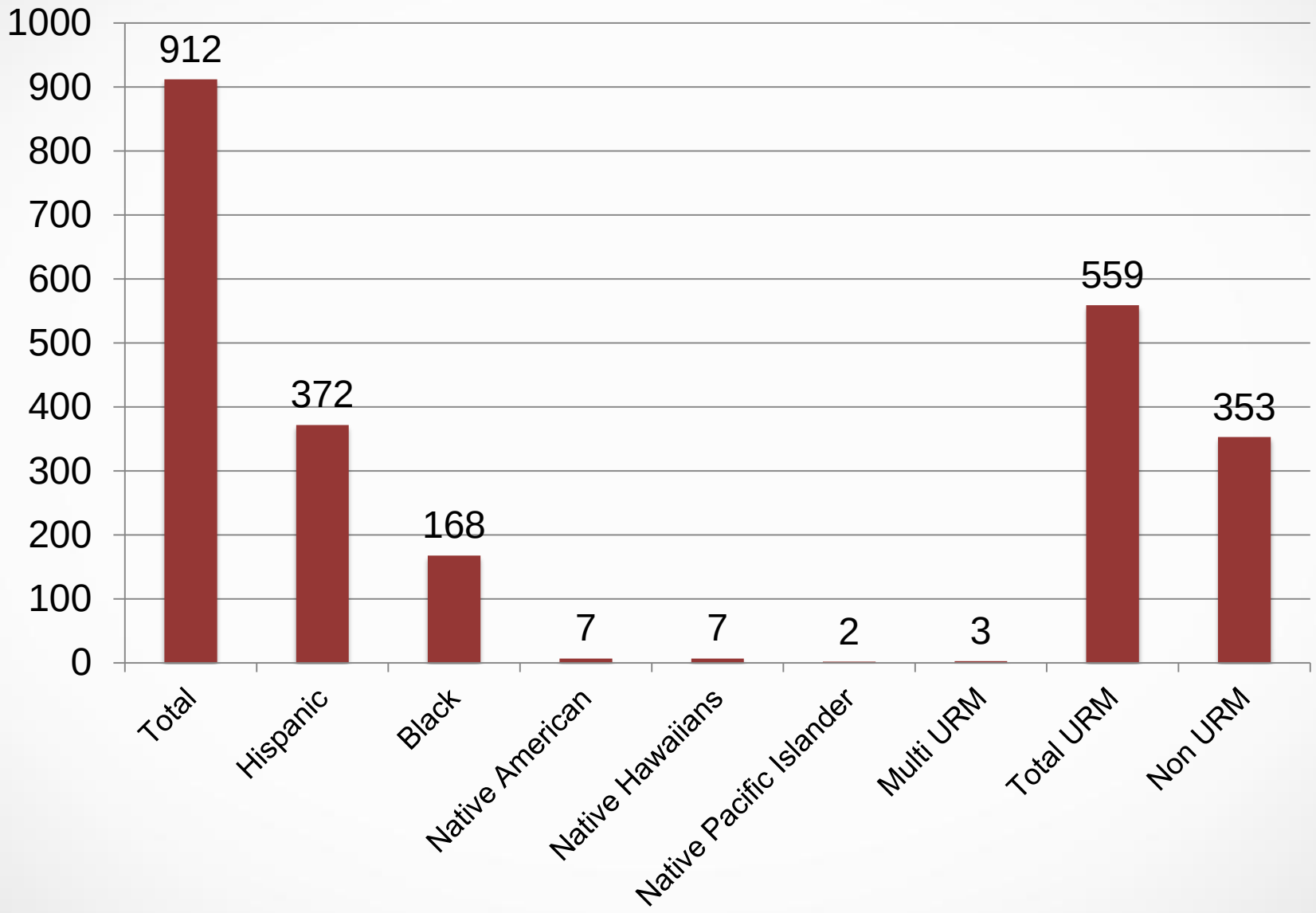
Department/ Institution Impact

- New pathways
- New articulation agreements
- Sustained support/ opportunities

Valencia College – LSAMP Enrollment by Campus



Valencia College – LSAMP Enrollment by Ethnicity



Significant Results at Valencia

- Participation of 585 students and 106 faculty in 36 project activities
- STEM advising for 469 students
- More than 5900 hours of tutoring for 304 students
- Host for 2015 STEM Summit with 20 Valencia students in attendance
- 2014 and 2015 Summer STEM Institutes on three campuses
- Internship experiences for 13 students

The Effects of Pair Planting on Tomato Plants

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Valencia College

Introduction: Companion planting is supposed to help enhance the plants growth , flavor and protection from unwanted organisms. Marigold flowers are one of the most common plant protectors as they are know for producing a substance called alpha-terthienyl. This substance helps in the reduction of root –knot nematodes and other harmful organisms(R.Krueger 2007). Marigold flowers are used as an alternative pesticide instead of using traditional toxic pesticides. After marigold flowers are planted next to the tomatoes plants they should enhance the growth and protection of the other plant. This publication focuses on the impact marigolds protection of the tomatoes plants growth and yield.

Figure 1.1: week 2 development of tomatoes plants at 20cm

Aim: The objective for this experiment was to determine if the marigold flowers would impact the growth of the tomatoes plants in anyway. A total number 16 tomatoes plants were divided into two sets of 2 rows. 13 young marigold flowers were use in this experiment. The marigold flowers had a significant effect on the tomatoes because they decreased the growth rate. Marigold flowers can be used as a alternative pesticides which was observed for certain pests in this experiment. However it will effect the growth rate at which the tomatoes will grow.

Method : To test the effects of paired planting 16 tomato plants were divided into two sets of 8 (Set A and Set B) and planted (outside of Building 4 on the Osceola Campus of Valencia College) in bed number 4 as shown (Figure 1). Set A acted as the control group with young tomato plants planted in two rows 6 inches apart. Set B acted as the experimental group with 8 young tomato plants planted in two rows 6 inches apart and surrounded by 13 young marigold plants (Figure 2).

Set A :*figure 1* Set B : *figure 2*

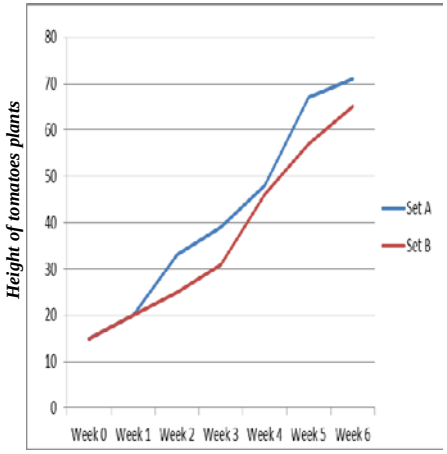
Figure 1: Show the control group with young tomato plants planted in two rows 6 inches apart.

Figure 2: Shows experimental group with 8 young tomato plants planted in two rows 6 inches apart and surrounded by 13 young marigold plants

Data (height measurements and plant damage) was collected every Wednesday afternoon for a 6 week period beginning on February 25th ending April 8th. The height of tomato plants from both Set A and B were measured in centimeters and averaged to determine an average plant height for each set (+/- standard error). Observations of any plant damage were also collected at the time of measurement. Marigold flowers were used around the tomatoes boarders and were 6cm apart from the marigold flower to the tomatoes. *(figure2).* The plants were watered

Results : The effect of the marigold flowers on the tomatoes plants can be shown in (*figure 3).* The height of the experimental tomatoes plants were significantly ($p < 0.05$) then the control group. Over a 6 week period , both Set A and Set B where measured in centimetres. The highest height was achieved by set A, where by the end of week 2 it have reached 33cm. Set B had only reached 25cm in week 2. There was a 8 cm difference between both set A and Set B. Set B decreased because of the marigold flowers sharing of the same soil. Therefore, absorbing the nutrients from the soil caused a delay in the growth of the tomato plants. In week 5, set A increased growth by 10cm in height. By observation, Set A had more eaten leaves but less snail activity. Set B had less eaten leaves but more snail activity (fig. 4)

Figure 3: The Average Height of Tomatoes Plants



Conclusions: Over all this experiment showed that the marigold flowers take nutrients from the tomatoes plants which decreased the growth rate of the tomatoes plants. However some protection was shown as seen in (*figure 4).* Set B had less leaf damage, but attracted other organisms. Unfortunately time in this experiment was very limited . However, even though marigold flowers do slow down the growth rate of the tomatoes, it still protects them from most small organisms. More research should be done for more actuate results.

(*Figure 4)* tomatoes plants on week 6

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Purity vs. Yield, what solvent does the deal?

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Introduction

Organic Chemistry is one of the few realms of chemistry that gives birth to some of the most dangerous reactions and also some of the most common reactions that happen on a day to day basis. This internship involved research in conjunction with Dr. Timothy Barnett with Valencia College. Also, it involved the use of basic laboratory technique/preparation and mentorship from Dr. Barnett. The purpose of this research project was to perform a reaction with the use of two different solvents that could replace the hazardous and dangerous solvent of carbon tetrachloride that has been previously used. These solvents were dichloromethane and chlorobenzene. The theory behind the reaction was that possibly one solvent would produce a more pure product than the other while still being environmentally friendly. The main concept behind this specific reaction was to place a bromine on the benzylic position of 4-methylbenzoic acid by the use of *N*-bromosuccinimide (NBS).

benozyl
peroxide

solvent

Aim

The objective of this research was to find if it was possible to successfully brominate the benzylic position of 4-methyl benzoic acid via a radical reaction by employing the use of N-bromosuccinimide without the use of the solvent carbon tetrachloride. Carbon tetrachloride is an excellent solvent but, it has many negative effects on the environment. One of the major effects of carbon tetrachloride is commonly known as ozone depletion. According to the EPA, studies have shown that one single chlorine atom can destroy 100,000 ozone molecules! Thus, in hopes to prevent this phenomenon our research tested the reaction with dichloromethane and chlorobenzene. The use of these chemicals would greatly reduce the risks and would be considered green chemistry. The photo below demonstrates an ozone hole on Earth where a large portion of ozone layer has been depleted!

Method

Results

After performing the reaction with dicholoromethane and chlorobenzene separately it was found that dichloromethane produced about 12% more product than chlorobenzene. However, the product produced via chlorobenzene was slightly more pure than the product produced with dichloromethane according to the melting point analysis. This was particularly interesting because appearance wise the product from the dichloromethane solvent seemed far more white/pure. The following table shows the respective yields of product for each solvent and the results of purity assessment via melting point analysis.

Solvent:	Dichloromethane	Chlorobenzene
Actual Yield of 4-(bromomethyl)benzoic acid:	1.6608g	1.4693g
Theoretical Yield of 4-(bromomethyl)benzoic acid:	2.1764g	2.2606g
Percent Yield of 4-(bromomethyl)benzoic acid:	76.310%	64.996%
Theoretical Melting Point Range of 4-(bromomethyl)benzoic acid:	223-227°C	223-227°C
Experimental Melting Point Range of 4-(bromomethlyl)benzoic acid:	217.0-218.6°C	218.9-220.7°C

s

Conclusions

From our results it was concluded that both solvents were very close in the percent yield of product. However, it is apparent that chlorobenzene was more successful in producing a product that was more pure. Although initially from the apparent observations it seemed that the product from the chlorobenzene solvent would be less pure. This was inferred because the product had noticeable tints of yellow in the product which signified that some of the side product of succinimide had not been fully removed.

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Questions?

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