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### The acceptability of black bean burger in school-aged children

With the recent rise in obesity, I had interest in using a UROF to research methods on increasing consumption of healthier foods in school lunch. Foods such as fruits, vegetables, legumes, and whole grains were all options as I began the planning process. As I was researching possible projects, I learned about recent research on legume products done by CFANS faculty. I began to research benefits of legumes and decided to use a legume product to observe how acceptability changes over time in elementary-aged students. My undergraduate research project used a series of three of taste-tests and waste collections to observe their effects on the acceptability of black bean burgers in 4<sup>th</sup> and 5<sup>th</sup> graders at one elementary school.

The purpose of school lunch was first to ensure that children in poverty were getting at least one hot meal per day, because they were not always fed well at home. School lunch was a way of combating hunger and making sure that students have the energy to grow properly and concentrate in school. As time has gone on, the goals of school lunch have slightly changed. With the recent emphasis on nutrition in school lunch, it is now a way to set good eating habits for children away from the home. It has been shown in various studies that the eating habits formed in childhood continue to have an impact on habits later in life. For example, in one study done by the Academy of Nutrition and Dietetics on infants, the control group was fed normally sweetened formulas. Another group was fed sweetened formulas. Two years later, a test was done on the toddlers that determined that the infants fed sweeter formulas also preferred sweeter foods at two years of age.

School lunch is important in order to give the brain fuel to learn. In order for this to be effective, the lunch must provide adequate nutrients to keep their brain fueled for the remainder of the school day. There are various benefits of regular legume consumption. The high levels of fiber, zinc, folate, iron, and other nutrients can greatly decrease the risk of cardiovascular disease, breast and colon cancer, and diabetes. Dietary fiber consumption is inversely related to inflammation, meaning that when consumption of beans is high, inflammation should be low. There is about 9 grams of protein per ½ cup, and beans count as a complete protein source when consumed with grains. Beans are also very versatile and can be used in a variety of different

dishes, making them easy to consume each day.

I chose to use black bean burgers because they were already being served at the high school and middle schools in the Wayzata district, meaning the district had easy access to them and would have an easier time purchasing and adding them to a menu at an elementary school. In September 2014, I met with the Wayzata school district dietitian and food service director, Kim Harren and Mary Anderson. They were immediately interested in working with me and were helpful in getting approval from the district and the IRB to perform my research project at Plymouth Creek Elementary. I worked with Kim to make sure we would be serving the black bean burgers as a vegetarian option on a day when hamburgers were also served, and the other lunch options would remain the same for each trial so that they did not impact the reliability of my results.

For my final project, I did three taste trials. One was done in December, the second in January, and the last in February. The taste tests were done on the first Tuesday of each month and the waste collections were done the second Friday. To prepare for the taste test, I first had to get consent from the parents as well as assent from the children participating. Each child with consent was given a survey and asked to fill it out after they had tasted a quarter of a black bean burger, then the surveys were collected without connecting the student to his or her survey. The waste collections consisted of each 4<sup>th</sup> or 5<sup>th</sup> grade student having the option to choose the black bean burger for lunch, and then dispose of their waste in the designated buckets rather than the normal garbage bins. The waste was weighed, and the percentage consumed was calculated.

The expected results were that with each taste test, the rating would increase on a scale of 1-10 and the waste would decrease with each waste collection. I found that with each taste test, ratings were very similar. They did not increase or decrease much at all with each subsequent trial. Although this is not what was expected, the results started high and remained high for each trial, meaning that most of the children enjoyed the samples. At the beginning of the project, the survey asked if any students had consumed a black bean burger previously. Only 11% answered that they had, so although the food was unfamiliar the children still reported that they liked it.

At the beginning of my project, I was able to schedule out when my trials would be completed with Kim Harren. This helped keep me on a schedule and make sure I regularly prepared for each trial. I kept in touch with Kim, my research advisor Marla, and my assistants throughout the whole process in order to keep everyone on the same page. Once the trials were

complete, I began work on analyzing my results in order to begin writing my senior thesis. Each trial went as planned and most of the children enjoyed participating in my study. One thing I wish I had done differently would be to follow individual students through each trial, so I could determine if individual ratings changed or stayed the same throughout the process.

I am very grateful for my UROP experience, as it pushed me out of my comfort zone of completing assignments step by step. When I took on this project I did not know exactly what I wanted the outcome to be or how to achieve it, but with the help of the UROP office, my research advisor; Marla Reicks, and the dietitian and food service director at Wayzata Public Schools, I was able to complete my project and learn more about the research process. I now know that I am capable of so much more than just day-to-day assignments, projects, and exams. I have the ability to use my resources to learn more about something I am truly passionate about.