Biomedical
Engineering
Society
University of Texas Chapter

BMES CASE COMPETITION

FALL 2024

OBJECTIVE:

Design and present a solution to combat food malnutrition in food-scarce area. Consider the effects of food toxicity and contamination when developing your solution. We encourage you to create your case through a biomedical solution but are not limited to exploring other lenses such as mechanical, chemical, electrical, economical, etc. approaches. Perhaps consider how your solution could incorporate creating food sustainability in impoverished areas, disease-resistant crops, addressing the use of pesticides and their effects on crops and people, current irrigation techniques, better and sustainable farming practices, and/or treatments for malnourished people. Feel free to design your case in any direction you want, as long as you are addressing the topic of malnutrition and/or food toxicity. While your solution should be thinking about and preparing for the future, we ask you to keep in mind the current state of people suffering from malnutrition and how to better their conditions/quality of life. Consider a feasible solution that can be efficiently implemented and be sure to include how it will be financially and ethically sustainable in the region it is in while considering the resources they have access to. Additionally, discuss why your novel idea is more effective than previous solutions to this problem. Be prepared to refute any potential arguments against your solution.

Your solution can include but is not limited to: creating or modifying a biomedical device, technological application, biopharmaceutical solution, medical solution, social change, or policy change, etc. to best address malnutrition and food contamination in in food-scarce areas.

Background

Malnutrition and food contamination are rooted in 20th-century practices with the rise of basic regulations and food safety, revolutionizing the healthcare industry and increasing life expectancy significantly. Despite the increased attention to food standards, malnutrition has become a greater issue across the world, primarily in conflict-stricken and impoverished areas where food scarcity is prevalent. Food scarcity directly perpetuates malnutrition as the lack of available, healthy foods leads to decreased mineral and vitamin content, giving rise to a myriad of health issues. Malnutrition occurs not only from food scarcity but the intake of toxic chemicals through food contamination. Pesticide and chemical usage in farming practices leads to 1 million chronic deaths each year and shows no signs of slowing down as the rapidly growing population and economy force farmers to use more efficient farming methods. Malnutrition becomes a significant obstacle for developing individuals and has long-lasting effects on both children and adults, yet food standards fail to address these core issues in food-scare areas.

Potential Applications

Genetically Modified Foods

The use of Genetically Modified (GM) foods has become extremely prominent in many places around the world, including the United States, Brazil, and India. These GM foods have enhanced properties that make them more desirable to the public, such as better shelf life, higher nutritional value, or better taste. One prime example is golden rice, which addresses vitamin A deficiencies faced by many developing countries with high levels of rice consumption. Ultimately, these genetically modified foods have the potential to aid in combating malnutrition; however, ethical concerns arise around GM foods because of their potential health risks and environmental impacts.

Pesticide Usage

Pesticides are increasingly common in agricultural practice nowadays and their consumption is projected to rise from 4.3 million metric tons in 2023 to 4.41 million metric tons in 2027. However, the improper use and disposal of pesticides is having a negative impact on our environment and several populations' food sources across the globe. For example, a study in Pakistan showed traces of pesticides in vegetables. The study reported that up to 63% of the vegetables were contaminated with pesticide residues and around 46% exceeded the maximum residue level (MRL).

Summary

A successful presentation will include an innovative solution to the problem at hand, thorough research of the solution, a plan to implement the solution that includes a thorough understanding of the risks and rewards, potential pitfalls, opportunities for further development, relevant financial information such as business development, marketing, funding, and expenses, etc., and the long-term impact of the proposed solution in an organized and aesthetically pleasing presentation.

Competition Day

The competition will be held on Saturday, November 16, at 9 am. Teams will be notified of their presentation times beforehand. Each team will have 15 minutes for their presentation, 10 minutes to present their solution, and 5 minutes to answer questions from the judges. Dress code for presenters is business professional.
The 1st place team will be awarded $350. The 2nd place team will be awarded $250. The 3rd place team will be awarded $100.
prizes are subject to change

Criteria

Idea:
- ❑ Novel
- ❑ Creative
- ❑ Practical

Implementation:
- ❑ Net Positive Impact
- ❑ Minimal Ethical and Cultural Effects
- ❑ Economic and Technical Feasibility

Proposal:
- ❑ Business Plan for Implementation
- ❑ Relevant Financial Information
- ❑ Long-term Effects

Quality of Presentation:
- ❑ Neat and Organized
- ❑ Smooth Transitions
- ❑ Contains all necessary information

if you have any questions, please contact:
casecomp.texasbmes@gmail.com