



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Rachel Eizner; Lisa Leung	Project Number J1112
Project Title Replacing Plastics: Innovating Biodegradable, Bio-based Plastics	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to create a biodegradable, protein-based film that could hold at least 200 grams of weight.</p> <p>Methods/Materials Protein, water, and glycerin were used to make films. Students tested strength using a modulus involving adhesive tape and 100g weights placed in middle with the dip of films being recorded.</p> <p>Information for films was found from online studies, then modified. Information for modulus was also found online, then modified.</p> <p>Results The strength (dip) of the prototypes was compared. The protein film that used casein was able to hold 200 grams and was the strongest of the films, with a dip that was, on average 30% stronger (30% less dip) than the 2nd best prototype. In addition, its transparency made it the most viable alternative.</p> <p>Conclusions/Discussion Casein films were found to be the strongest and most successful film, compared to the other two protein films: pea and brown rice. Their strength was sufficient for actual usage in packaging and as a replacement for today's plastics.</p>	
Summary Statement We created a protein-based, biodegradable polymer film that could potentially replace non-biodegradable plastics.	
Help Received We created and tested the films entirely ourselves after doing research on methods. However, our mentor Ms. Saksena reviewed our work.	