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## **Jack Hoyle wins 2021 Arkansas Soybean Science Challenge Award at Southwest Arkansas Regional Science Fair**

Jack Hoyle, age 17, a junior at Taylor High School in Taylor, won the Soybean Science Challenge at the 2021 Southwest Arkansas Regional Science Fair held at Southern Arkansas University-Magnolia March 12.

Hoyle received a \$300 cash award provided by the Arkansas Soybean Promotion Board at the awards ceremony. His science project titled "Burning Biofuels" also received first place in Engineering, first place overall for Best of Fair and received the Columbia County Conservation District Award.

Christy Hoyle, Jack's teacher, won the \$200 Soybean Science Challenge Teacher-Mentor Award. Hoyle believes the Soybean Science Challenge is a worthy program for her students. "I always encourage my students to take advantage of educational opportunities available to them, and the Soybean Science Challenge is both a great educational opportunity and an opportunity to win some money, which is always motivating to students," she replied.

Jack says it was exciting to win the 2021 Soybean Science Challenge. "I was very excited to be named the 2021 Soybean Challenge Winner. I enjoy research projects, and I am always excited to have an opportunity to share my results with others," he said.

Christy Hoyle, also Jack's mother, was ecstatic to learn of her son's award. "We were very excited that Jack was able to participate in the Soybean Challenge and were even more pleased that he won and will be able to use the prize money to further his education," she replied.

Hoyle believes Jack was an excellent fit for the Soybean Science Challenge. "Jack is an excellent student who has always enjoyed research projects. He has an interest in agriculture and programs that support sustainable agriculture," she said.

Jack admitted he had limited knowledge about soybeans before taking the Soybean Science Challenge online course. "Prior to this year, I had a very limited knowledge about the soybean industry. I was aware that soybeans are a major row crop in Arkansas, but did not know much about the industry," he said.

The part of the Soybean Science Challenge course that appealed most to Jack was learning about the soybean industry and agricultural sustainability. “Learning more about the soybean industry in Arkansas as a whole is very interesting to me. I feel that sustainability in agriculture is an important aspect that we need to focus on in the future as the demand for food and fuel resources continues to increase,” he explained.

“The Soybean Science Challenge provides an opportunity for Arkansas High School students to participate in scientific research that can impact the State of Arkansas as well as the world. Soybean Science Challenge student researchers learn about this important commodity crop and its many uses including feeding the world, development of biofuels and sustainable products. The Soybean Science Challenge helps students develop an understanding of the challenges and complexities of modern farming,” said Dr. Julie Robinson, Associate Professor and director of the program.

“The goal of the Arkansas Soybean Science Challenge is to engage students in “real-world” education to support soybean production and agricultural sustainability,” said Gary Sitzer, a former member of the Arkansas Soybean Promotion Board. “The program also rewards scientific inquiry and discovery that supports the Arkansas Soybean Industry.”

The Arkansas Soybean Science Challenge was launched in January 2014 to 9-12<sup>th</sup> grade science students and in 2021, a Junior level award was added for grades 6-8. Students who successfully completed the online course were eligible to have their original soybean-related research projects judged at the 2021 Arkansas Science and Engineering Fairs.

Information on the 2021-2022 Arkansas Soybean Science Challenge will be available in summer 2020. For more information, contact Dr. Julie Robinson at [jrobinson@uada.edu](mailto:jrobinson@uada.edu) or Diedre Young at [dyoung@uada.edu](mailto:dyoung@uada.edu).

The Cooperative Extension Service is part of the University of Arkansas System Division of Agriculture.

**Jack Hoyle, Taylor High School, Taylor, Arkansas; Teacher, Christy Hoyle**

**Category: Engineering**

**Project Title: Burning Biofuels**

**Abstract:** With unprecedented human population growth comes an increased demand for sustainable agriculture systems and a greater demand for alternative fuel sources. It is important for agriculturalists to consider the wastes produced by production agriculture as energy sources and to continue to explore ways to utilize these resources. The **purpose** of this research was to determine which types of agricultural wastes can produce biogas that can be collected and burned to power a small engine. Two previous years’ research has been conducted to determine which types of agricultural waste products produce the most biogas and to measure the amount of energy, in Calories, in each biofuel. The **procedure** included the

construction of a wood gasifier and modification of a small gas engine to run on biofuel. Common agricultural wastes were processed in the wood gasifier to produce biogas, collected and measured in a plastic chamber by water displacement. The gas was then passed from the collection chamber, through a fuel filter, and was used to power a small gas engine. The tests measured the amount of time the engine would run on each biogas. The results did not support the original hypothesis, which stated that the forestry waste would power the engine the longest. The **results** determined that wheat straw biofuel actually powered the engine for the greatest amount of time. All of the crop wastes tested produced biogas capable of powering the small gas engine. The animal wastes tested did produce flammable biogas when processed in the gasifier, however, none of the animal waste biogas was capable of successfully powering the small gas engine. These results are consistent with previous research of others that indicates animal waste is best suited to processing in a methane digester for collection of biogas. **Conclusions** can be drawn that agricultural wastes can serve as fuel sources and agriculturalists can determine which type of fuel source is best for them depending on the type of production they are in and the availability of the resources.