

A Discussion on Industrial Hemp

Written by Jenny Schaben

Lincoln University (LU) takes initiative when it comes to new opportunities and discoveries, especially with industrial hemp. Although, hemp is not new to our world. It has a deep history within our natural planet, providing communities with resources essential for growth and progress. Fabrics, insulation, food, fuel, paint, paneling, paper, concrete, compost. These are just a handful of items out of thousands of products that can be created with industrial hemp. However, the industry for this substantial plant declined in 1937 with the Marihuana Tax Act, which eventually led to the ban on the product over 50 years ago. Since then, America has become consumed with using products like plastics that cause more pollution and take hundreds of years to decompose. Hemp is sustainable though, leaving a smaller ecological footprint on our environment—one of the most critical factors in today's society.

In recent years, the US has acknowledged the potential for industrial hemp, allowing Missourians to legally grow with a permit in 2020. Lincoln University launched cooperative research and extension projects that very same year to study industrial hemp under Missouri's growing conditions through dedicated LU research farms and laboratories. Before that, there was limited knowledge and testing on industrial hemp. Now, Lincoln University is changing that by becoming the forerunners on this initiative through their nationally recognized program—LU Hemp Institute.

LU Hemp Institute is composed of a team of professionals who screen industrial hemp varieties for agronomic characteristics and provide economic analysis of crop production. They also work with stakeholders to support the hemp industry and hold workshops for potential farmers based on their conducted research and collected data. In spring of 2022, LU Hemp Institute held an event, Missouri Industrial Hemp Farmer Forum, which involved various speakers from the program itself, along with other Missouri hemp farmers. Topics included farmers' challenges, growing practices, pest management, and recent statistics surrounding hemp, with an open panel at the end for participants to discuss further and ask questions.

Dr. Eleazar Gonzalez, who is an active member of LU Hemp Institute, hosted the event. He is currently an assistant professor and state extension specialist in Agricultural Economics and Marketing at Lincoln University, Cooperative Extension. He spoke to the public about demographic statistics and data he analyzed to foresee Missouri hemp producers' challenges and perspectives in 2022. The information he collected came from a survey, which was sent to 150 hemp producers registered in Missouri. Twenty-five of these surveys served as a sample size, providing information to LU Hemp Institute and farmers in an effort to respond accordingly.



Dr. Gonzalez at Sikeston, MO in industrial hemp field.

From the survey, economic indicators projected that most growers do not have a business plan to operate (88%) or a market contract (84%). It can be deduced that many farmers are struggling to connect to a market and create business plans. Through this gathered information, LU Hemp Institute can then recognize issues and create solutions, aiding local farmers and producers economically. Seeing where others are succeeding is also beneficial, setting a narrative for the hemp industry. For instance, many people from the survey who had a marketing strategy did so through their own farm website, social media, email marketing, online marketing websites, wholesaling or on-site sale. Knowing this, research can be conducted to know the further context of this to see how one could be successful through these practices.

Dr. Gonzalez also evaluated growers' understanding of hemp production through the reporting of hemp pests and diseases. Corn earworms, cannabis aphids, russet mites, grasshoppers, stink bugs, and beetles were the most common pests; however, a quarter of the sample size did not know the name of the pests invading their crop. The main diseases reported were pythium root rot, mold, powdery mildew, and stunted plants. 36% of growers did not know the name of the disease(s) damaging their hemp. This is very telling because it shows that a large portion of hemp producers do not understand or recognize pests and diseases, which interfere with successful crop yields. In response to this, more training and workshops can be aimed at identifying pests and diseases, as well as management techniques.

Alan Freeman, with USDA Industrial Hemp program, also presented afterwards with information on regulations, reporting, and annual data. He stated that industrial hemp producers need to maintain all records for three years, and a minimum of one inspection within that time period must be completed. Each specific strain of crop must also be sampled within 30 days prior to harvest for compliance testing factors like .3% THC. As of December 31st, 2021 there has been 178 producer registrations, 48 seed permits, and 51 hemp sampler certificates issued. From that same date, it has been recorded that 21,826 acres have been registered from hemp producers. In 2021, 48% of industrial hemp was intended for floral purposes of CBD, which is widely used for medicinal purposes, and 46% was used for fiber.

To gain perspective from a Missouri farmer, Jeff Limbaugh spoke of his experiences of hemp to fiber. Jeff is the co-founder of Midwest Natural Fiber Company, located in Sikeston, MO. He has been growing industrial hemp for two years now commercially and through research collaboration with Lincoln University. In 2021, he coordinated 600 acres of commercial products with four other farmers. Different sections were treated using various methods when it came to irrigation, as well as fertility and chemical testing. Jeff stated that most of his 600 acres was under center-pivot irrigation. However, one of the tests performed was on an isolated field that was not irrigated, with much less fertilizer. Issues arrived from that, when trying to create ground cover and canopies. Some of the seeds did not work well in these growing conditions. Jeff also reported that when a plant gets to 18 inches tall it is at a critical growing stage, and at that point needs more nitrogen. That method reaped many benefits, along with planting the seed as shallow as possible. Jeff has had much success with his business by producing multiple raw materials, positioning his company to create some of the markets out there.

Midwest Natural Fiber manages an “agri-park” in Sikeston, Missouri, where Lincoln University actively partners with the company. This area consists of 20 acres, with dozens of different varieties of hemp—from fiber strains to dual purpose. “LU and our company are really wanting to focus on trying to create an atmosphere with the proper seeds, in the proper fields, with the proper growing conditions,” Jeff said. They are currently creating a playbook for how to grow industrial hemp. The collaboration with Lincoln University leads them to research different strains, targeting 20 different varieties around the world in an effort to gather data to give to the public as they move forward.



Industrial hemp, dual purpose variety, in Sikeston, MO.

Although, not everyone farms hemp in the same way or for the same purpose. There are many options with industrial hemp—from fiber to CBD. Heather DeRose, another guest speaker during the forum, shed light on her experiences with hemp regenerative agricultural practices and her journey that led her there. She first started her journey as a medical marijuana patient when she moved to Colorado from Missouri in 2015, so she could treat her reoccurring epileptic seizures. In Colorado, she was able to have access to the medicine she needed that was not available in Missouri at that time. Finding treatment to manage her illness drove her to become a true advocate for the industry.



Heather DeRose poses with her industrial hemp plants.

While in Colorado, she worked on an organic cannabis farm, which taught her many techniques on how to care for this all-purposeful plant. She became incredibly passionate about this cause and then founded Green House Healthy—a media and consulting business that includes all things hemp. Heather DeRose also acts as a certified trainer and nutrition coach for Green House Healthy, hosting numerous fitness events and utilizing other hemp products for workouts. She discovered the many health benefits of introducing hemp into her diet and wanted to share those experiences with her clients, especially for patients with joint pain or inflammation. She said it boosted her passion when she could see all the people who found pain relief from these practices. She even began hosting dinner parties where everything was made from hemp—from tea and coffee to the food they were eating—and ran dozens of marathons, dressed in hemp clothes and hemp shoes, to advocate for this purpose.

In 2019, Heather DeRose moved back to Missouri, since the state legalized medical marijuana to treat her epileptic seizures, which she has been free of for five years now without the use of prescriptions. She is now the co-founder of Kind Living Farm, a regenerative farm growing hemp in Missouri. Last year, Heather began producing industrial hemp for the first time, as an all organic, outdoor grow operation. No equipment is used, and everything is hand planted, harvested, and trimmed. As a regenerative farm, the food and medicine she produces is created without the use of harmful chemicals, which she sees as better for people and animal life. She stated, "Farms following soil-friendly practices grow healthier food." Regenerative farming helps reduce erosion, reverses the effects of chemical pollution and decarbonization to improve topsoil health and fertility. Heather also discussed her other methods for farming hemp, like growing companion plants to deter bugs away—chamomile, clover, dill, lavender, marigolds, and sunflowers. She also uses kombucha as a natural pesticide and fertilizer, which helps repel Japanese beetles, aphids, and spider mites.



Dr. Akotsen-Mensah poses with industrial hemp.

Dr. Clement Akotsen-Mensah, member of LU Hemp Institute, Assistant Professor, and State Extension Specialist for integrated pest management (IPM), spoke on his research of unwanted intruders in hemp plants. He uses different approaches to identify and evaluate traps for pest monitoring. The research he presented shows that many pests, especially harlequin and stink bugs, prefer hemp over other plants like tomatoes, elderberries, and nightshades. These insects can cause much damage, so it is important to understand them for management purposes. All insects and other arthropods associated with hemp are cataloged. Dr. Akotsen-Mensah analyzes the potential harm from key pests in traps, in terms of seed, grain, flower, and fiber damage. He also evaluates some of the EPA approved pesticides and other potential products, like essential oils, against pests in Missouri. His research and findings are shared with farmers throughout the state. Another member of LU Hemp institute spoke during the forum, David Middleton, who acts as the Hemp Outreach Coordinator for Lincoln University. He works closely with research for variety trials on how to find the best genetics for Missouri farmers. David announced that he holds a virtual seminar every three weeks to present updates on hemp, giving details to participants for them to join.

At the end of the forum, participants asked questions and made comments. Much of the conversation was on hemp markets. As a new product intended for fiber, floral, and seed use, industrial hemp can create a market for many commodities. For instance, hemp seed oil promotes healthy skin, hair, and nails,

while also reducing inflammation. Hemp fabric has proved itself to be superior to other materials for clothes by being more porous, breathable, and durable. Hemp fiber is the most durable of any plant—even more so than cotton, which is not as eco-friendly and sustainable. Hemp plastic can also do anything conventional plastic can do, without being harmful to the planet in the process. The biggest issue using hemp plastic commercially is that hemp is still in short supply, especially since it is heavily regulated and new in the market.

Still, many farmers are struggling to connect to a hemp market and have a business plan. There is much potential though, and soon more people will begin buying eco-safe and climate-smart commodities over unsustainable products. America, and across the world, many are following this practice, becoming more aware and conscious of what they are consuming and utilizing in everyday life. The market is there—farmers, producers, businesses, and customers just need to find a way to come together. Industrial hemp has only been legal in Missouri for two years, which is moderately new in terms of consumer development. Over time, we will see an extreme profitable increase in the industrial hemp market as more connections are created. As Jeff Limbaugh, co-founder of Midwest Natural Fiber, said, "We have a long way to go and a short time to get there. That's why it is going to take so many good people in the field working together, all the way from Lincoln University to the state of Missouri to local businesses and farmers—being able to collaborate and put it together to make something positive...as I say, 'hemp' broken down stands for Helping Employ Missouri People."

Currently, Lincoln's Hemp Institute is one of the leading hemp research facilities in the country. For more information on LU Hemp Institute, please contact Dr. Babu Valliyodan (valliyodanb@lincolnu.edu), Chair of LU Hemp Institute and Assistant Professor of Molecular Biology and Genomics at Lincoln University, Missouri. Partnerships are needed to help farmers and industries in the state.



Dr. Babu Valliyodan (left) speaks on LU Hemp Institute initiatives.