

Introduction

Industrial hemp has multiple application opportunities. Besides being used as food, fiber & personal care, hemp is now used in biofuel and hemp production and has the potential to enhance the quality of soil and environment. Industrial hemp refers to those strains of *Cannabis sativa* L. which contains less than 0.3 % tetrahydrocannabinol (THC). The United States is the only industrialized nation that doesn't allow commercial hemp production. Current industry estimates that U.S. retail sales of all hemp based products may exceed \$300 million per year. The 2014 Agricultural Act ("farm bill", P.L. 113-79, Sec. 7606) provides unique opportunities to 1890 land grant institutions such as a Tennessee State University.

Project Outline

This project coordinates efforts and implements research activities at Tennessee State University in advancing industrial hemp as a new crop in Tennessee. The project has developed 4 main objectives:

1. Identify hemp varieties for sustainably produced and processed seed and fiber
2. Create and test sustainability assessment tools and sustainability metrics for commercial hemp growers in Tennessee
3. Validate and improve practice-based sustainability assessments as well as environmental and economic outcomes for farm applications in Tennessee
4. Build critical educational and mass support for growing hemp for seed and fiber production. Provide outreach and extension education program. Host conferences for growers and other stockholder's. These objectives will be accomplished through the combined efforts of several specialists identified below.

What is Industrial Hemp

Industrial hemp is a new crop for the United States after many years of Federal legislation outlawing the genus, *Cannabis* L. Industrial hemp refers to those strains of *Cannabis sativa* L. which contain less than 0.3% tetrahydrocannabinol (THC), a psychoactive compound found in *Cannabis sativa* L.

Morphology of Industrial Hemp

- *Cannabis* is a rapidly growing dioecious (male and female reproductive organs on different plants), wind pollinated, annual herb
- Naturally, it's dioecious but Monoecious cultivars have been selected to reduce the agronomic problems
- Tap root system but lateral root uptakes nutrients
- For fiber - long stalks and little branching
- For seed – shorter stalks and more branching

Expected Outcomes

- Cultivar recommendations for Tennessee
- Best agronomic management practices for hemp production
- Innovative food and hemp additives
- Unique hemp products
- Economic analysis of hemp production in Tennessee
- Cost effective approaches to enhance the farmer's income
- Advancement of hemp cultivation in Tennessee

Things to consider:

- Define your purpose before you grow
- Hemp can be grown in field and greenhouse
- Research your market

For more info:

- www.tnstate.edu/extension
- Tennessee Department of Agriculture
- Hemp Industries Association

Dr. FitzRoy Bullock, Weed Scientist, and Project Director for the industrial hemp project.

Project Objectives:

- Determine best practices for fiber varieties management to maximize yields and profits.
- Determine best practices for seed varieties management to maximize yields and profits
- Provide data on yield expectations for each variety to determine best cultivars for TN

Dr. Emmanuel Dzantor, Soil Scientist.

Project Objectives:

- To evaluate the agronomic feasibility & Environmental desirability.
- To identify & quantify the environmental impacts associated with the making of bioplastics from hemp fibers.

Dr. Roger J. Sauve, Plant pathologist.

Project Objectives:

- To determine the optimum indoor environment for maximizing nutritional value of different hemp varieties.

Dr. Matthew Blair, Plant breeder/Molecular Geneticist.

Project Objectives:

- To use the molecular markers to identify the suitable hemp germplasm for TN.
- Fingerprint the varieties grown at the TSU with molecular markers and sequence-based assays

Dr. Ying Wu, Food scientist.

Project Objectives:

- To investigate chemical, physical, & physicochemical properties of phytochemical and structural components in hemp seed.

Dr. Aditya R. Khanal, Agricultural & Applied economist.

Project Objectives:

- To analyze economic feasibility of growing hemp in TN



Other Team Members:-

Anand Kumar, *Research Assistant/production*
Sharath, *Ph.D candidate*
Will Tarleton, *M.S. candidate*

Alan Otey, *Research Assistant*
Eddie Williams, *Farm Manager*

Licensing and Legalities

Who can get License

- An individual residing in TN or an Institution of higher education(Section 101)
- Sole Proprietorship, partnership, association, corporation, limited-liability corporation, limited partnership, or any other business entity
- having place permanently located within this state
- Employees permanently assigned to work in TN
- Tangible assets permanently located in TN

How to get License

- Applicant need to submit a complete, accurate & legible application provided by Commissioner by **APRIL 1 each year**
- Name of the variety, No. of acres, GPS coordinates,
- If applicant is not the land owner, need to submit the signed copy of owner
- Address where the produces will be stored
- Annual license fee shall be **\$250 plus \$2.0/acre**

Reports

- 7 days prior to harvest,
- Licensee shall include a statement of intended disposition of produces
- Purchase agreement or disposition statement within 10 days of change
- Shall include the location & mode of transportation

Inspection

- All licensee subject to sampling of hemp crop to verify THC content on dry mass basis
- Over 0.3 % THC will result suspension of license
- Test result from higher institution may, at the commissioner's discretion
- Licensee pay the charge of \$35 per hours per inspector
- Licensee shall reimburse the department for all lab analysis costs incurred

Violation

- Violation shall lead to immediate suspension of license
- \$ 500 penalties & disciplinary sanctions including revocation of registration

Facts

- Industrial hemp is a form of *Cannabis sativa* and is of the same plant species as marijuana. However, hemp is genetically different and distinguished by its use and chemical makeup
- Industrial hemp and Marijuana (Medical/ recreational) can only be identified by lab test of THC content
- Any parts of hemp plant at any time shouldn't have THC content more than 0.3%
- Genetics and agricultural practices may alter the THC content (<0.3%) in Industrial hemp cultivars



Figure 1 & 2: Photo credits: Paige Thompson