

## Potential Plants for Biofuel in Texas

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## Plant Materials Technical Note

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'Alamo' Switchgrass  
(*Panicum virgatum*)  
Photo by Brandon Carr



Hulled Peanuts (*Arachis L.*)  
Photo by Brandon Carr



'Tropic Sun' Sunn Hemp  
(*Crotalaria juncea*)  
Photo by Brandon Carr

### Background

The production of biofuel may be difficult in theory however, the concept is rather simple. Biofuel is essentially any fuel derived from a recently-living organism. Often, plants are the first organism that comes to mind. Biomass produced from plants may be processed into liquid fuel such as ethanol or biodiesel. Biomass may be burned to generate heat and/or electricity, fermented to generate methane or chemically converted to synthesis gas.

### Purpose

The purpose of this technical note is to provide basic background and general biofuel terminology information as well as a list of potential biofuels plants that are adapted to Texas.

### Basic Biofuel Terminology

**Solid biofuel** – the conversion of raw biomass into heat or steam via direct combustion. Examples of solid biofuel include wood, sawdust, non-food energy crops, and general plant material.

**Bioethanol** – alcohol made by fermenting the sugar, starch or cellulose components of plant materials.

**Ethanol** - the most common biofuel worldwide and is produced by the fermentation of sugars derived from plants such as wheat, corn, sugar beets, sugar cane, molasses, etc.

**Cellulosic ethanol** – alcohol production made by fermenting non-food crops or inedible waste products such as native plant material, citrus peels, sawdust, etc.

**Biodiesel** – diesel made from vegetable oils, animal fats or recycled plant material which can be used in its pure form as fuel for vehicles or used as a diesel additive. Biodiesel can be produced from vegetable oils derived from soybeans, sunflowers, mustard, flax, etc.

**Biogas** – methane gas produced from the anaerobic digestion of organic material. Commonly biogas is produced using animal waste or high yielding crop species such as sorghums, millet, switchgrass, etc.

**Synthesis gas (Syngas)** – produced by partial combustion of biomass. Syngas may be used to produce methanol and hydrogen or converted into a fuel substitute.

### Potential Biofuel Plants for Texas

Currently, biofuel technologies and markets are undetermined and experiencing a phase of uncertain development. There is no single plant material that agriculture producers can use to meet future biofuel demands. It is likely that a combination of plant materials will be required to meet future biofuel needs. Following is a list of plants that have proven productivity, adaptability and potential biofuel benefits for Texas. Conservationist should contact their Zone Specialist for information about seeding plants not listed below.

#### **Lignocelulosic Plants**

<b>Plant Species</b>	<b>Plant Variety</b>	<b>Season</b>	<b>Origin</b>	<b>Life Span</b>	<b>Average Annual Production</b>
Switchgrass	Alamo	Warm	Native	Perennial	5-10 tons/ac/yr
Indiangrass	Lometa	Warm	Native	Perennial	2 tons /ac/yr
big bluestem	Earl	Warm	Native	Perennial	1.5 tons/ac/yr
big sacaton	Falfurrias Germplasm	Warm	Native	Perennial	3-4 tons/ac/yr
sun hemp	Tropic	Warm	Introduced	Annual	4-6 tons/ac/yr
High-tonnage sugar cane		Warm	Introduced	Perennial	20 + tons/ac/yr
High-tonnage sorghum		Warm	Introduced	Annual	15 - 20 tons/ac/yr
Sweet sorghum		Warm	Introduced	Annual	5 - 10 tons/ac/yr

#### **Oilseed Plants**

<b>Plant Species</b>	<b>Oil Percentage</b>	<b>Season</b>	<b>Origin</b>	<b>Life Span</b>	<b>Average Annual Production</b>
cotton	17	Warm	Introduced	Annual	1.5 tons/ac/yr
soybean	18	Warm	Introduced	Annual	30 bu/ac/yr
peanut	45	Warm	Introduced	Annual	1.5 tons/ac/yr
safflower	42	Warm/ Cool	Introduced	Annual	1-2 tons/ac/yr
rapeseed (Canola)	40	Cool	Introduced	Annual	1500 lbs/ac/yr
mustard	40	Cool	Introduced	Annual	6-7 tons/ac/yr
flax	35	Cool	Introduced	Annual	32-39 bu/ac/yr
sunflower	42	Warm	Introduced	Annual	0.5-1 ton/ac/yr
sesame	50	Warm	Introduced	Annual	300-1500 lbs/ac/yr

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