



Bi-Energy Crops

Fuels Rural Economy

Sweet Sorghum



7800 Ltrs Ethanol
ha/year (2 cuts)

Total Feed Stock Solutions for Bio-Fuels

Growth through genetics, prosperity through innovation

At Advanta, we use genetics to leapfrog into the future and innovation to usher in prosperity. The first Indian multinational seed company with a global footprint, we have an active presence in Asia, Australia and Latin America & United States of America. We spearhead with Molecular marker technology in some crops, while building up value added biotech traits through seeds. Across the globe, we enjoy leadership position in Hybrid Rice, Corn, Sorghum and Sunflower. In India, we are one of the leading Sorghum, Pearl Millet and GM Cotton Research Companies. We are the first in the world to launch a Mustard (Juncea) Hybrid. With our leading Vegetable brands Golden Seeds and Unicorn we are also one of the leading players in Sweet Corn, Cole Crops, Tomato and Hot Pepper.

Our strong research and development capabilities in genetics provide us with a critical edge in the market to develop innovative products. We have a dedicated research and development team of over 100 employees worldwide who are focused on the development of new or improved proprietary hybrids based on their research. Advanta's global vision is to drive sustained growth with world class genetics and innovative technology. Our aim is to become a global hub for creating products that are used worldwide. We are committed to offer full crop solutions to the Indian farmer. Because in his growth lies our country's growth.

Advanta Group of Companies



----- Advanta Developments **Bio –Energy** -----

With the global biofuel industry ramping up, and new ethanol plants coming online, the demand for suitable feedstock is growing rapidly. In particular, high sugar and high biomass producing crops such as sweet and forage sorghum fit very well with the current and new technology being used in the plants to produce ethanol. With a multi-million dollar investment in research and development underpinning our efforts, Advanta plant breeders and field staff are dedicating substantial resources to keeping pace with the fast moving biofuels industry. Research is currently in the following:

- . New and improved varieties
- . Developing existing crops such as sweet and forage sorghum
- . Developing agronomic packages

As well as India, Advanta has affiliated sorghum breeding programs in Australia, The United States of America and Argentina which have produced a number of high yielding, high sugar and high juice extraction hybrids. These are highly suitable as an ethanol feedstock and also for livestock production as well. As new technology for ethanol production develops to utilize cellulose, sweet and forage sorghums with very high biomass production combined with high sugar and low lignin (bmr types) are ideal for this purpose. There are a lot of opportunities for agriculture and bioenergy and Advanta and its associated companies are spending a lot of time and effort researching hybrids and farming systems to develop the industry further

Sweet sorghum Vs Sugarcane Vs Corn

Parameter	Sweet Sorghum ²	Sugarcane ²	Maize ³
Crop duration	4 months	12 months	4 months
Water requirement	4000 m ³	36000 m ³	8000 m ³
Grain yield (t ha ⁻¹)	2.0		3.5
Ethanol from grain (l ha ⁻¹)	760		1400
Green stalk cane yield (t ha ⁻¹)	120/2 cuts	75	45
Ethanol from stalk cane juice (l ha ⁻¹)	7800	8800	3200
Stillage/stover (t ha ⁻¹)	4	13.3	8
Ethanol from residue (l/ha)-cellulosic	3325	3325	1816
Total ethanol (l/ha)	9560	12125	6400

Courtesy of ICRISAT

Sweet Sorghum 5 F Crop



Food
Feed
Fodder
Fiber and
Fuel

Sweet sorghum (*sorghum bicolor* (L) Moench) which is similar to grain sorghum with sugar-rich stalks and a water-use efficient crop. Sweet Sorghum has a very good potential as an alternative Feed stock for ethanol production.

Potential uses: Juice from stalks is used primarily for fuel alcohol production. Juice can also be used for the production of syrup. Stillage, the leftover stalks after juice extraction, can be used for cogeneration of power and/or animal feed and/or organic manure.

Comparative advantages of sweet sorghum

Highly suitable for the tougher dryland growing areas produces very high yields with irrigation and high rainfall range of different types for ethanol production.

Short duration crop (4 months), Seed propagation.

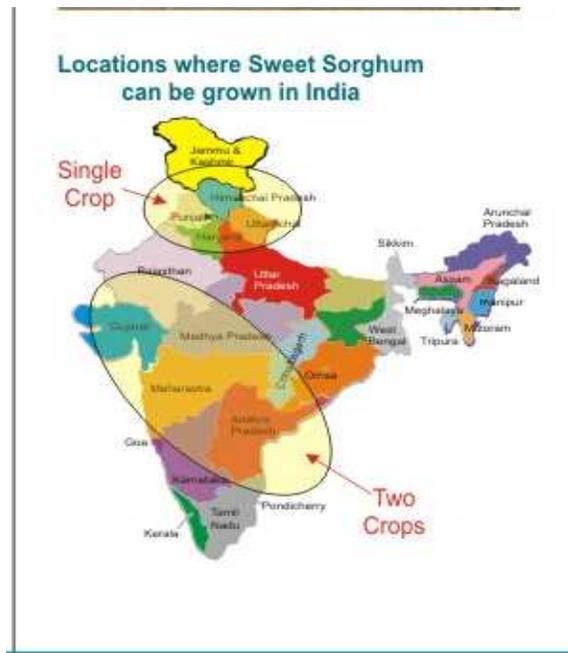
Grain for starch fermentation.

Sweet stalk sorghum for juice and sugar fermentation.

Suitable for mechanized crop production.

BMR sweet and forage sorghums with low lignin for the ultimate ethanol

Production combination sorghum will be one of the key growth areas to meet demand for feedstock for ethanol production.
Eco friendly ethanol processing



Advanta Potential Varieties

PAC 593(Sweet Sorghum)



- High biomass production Potential up to 80-100mt/ha
- High leaf disease resistance - Anthracnose
- High juice recovery - 55% - 60%
- Very high sugar levels Potential up to 18%-20% Brix
- Early Crop - 100-110 Days

BMR Technologies



- Low lignin
- Combine with high juice and sugar production
- Ideal for direct juice fermentation and future ligno-cellulose ethanol production

PIPELINE PRODUCTS:

- [PAC 8381](#)
- [PAC 8329](#)
- [PAC 8328](#)
- [PAC 8357 \(BMR\)](#)

Agronomy

1. Select soil with good Drainage and follow one deep plough.
2. Avoid acidic, saline soil (Optimum P -5.5 - 7.5)
3. Apply 5kg Umet (Phorate 10G) per 1 Acre before sowing.
4. Spacing: 60cm row to row, 20cm Plant to Plant. Sowing depth: 5 to 6 cm.
5. Fertilisers per acre: Basal - 30 kg N, 30kg P, 20kg K.
Foliar - 20kg N after 30 days of sowing.

Land preparation

6. Seed rate: 3kg per acre (35000-40000 plants/acre)
7. Soil moisture: Ensure proper soil moisture for uniform germination.
8. Avoid sowing in low soil temperature (Less than 16 C)
9. Weed control : Pre emergence application of Atrazine @ 0.5 kg / acre.
10. Thinning: Thin out excess plants leaving two plants per hill.

Fertilization

11. Shoot fly management
 - A. Avoid late sowings during kharif.
 - B. Thinning.
 - C. Apply Umet - 10G 2-3 granules per plant whorl, or Phoskill - 2ml/1lt (10-12 days after sowing).

Harvester

13. Yield: 60-80 MT in first cut and 40-70 MT in second cut under good management.

Sweet Sorghum A Mechanised Crop



Land preparation



Fertilization



Harvester

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