



GUAR — A NEW PROMISING CROP IN THE REPUBLIC OF UZBEKISTAN

Negmatova S.T.

Doctor of Agricultural Sciences, Professor
Cotton Breeding, Seed Production and
Agritechnologies Research Institute

Yandashova M.E.

PhD Student

Navoi Branch of the Academy of Sciences of the Republic of Uzbekistan

<https://doi.org/10.5281/zenodo.18699162>

Abstract: At present, humanity is facing global challenges such as climate change, water scarcity, expansion of degraded lands, and soil salinization. In this regard, one of the most urgent tasks of modern agriculture is the development of agrotechnologies for cultivating non-traditional crops with high nutritional value that are capable of growing under diverse soil and climatic conditions. **As a solution to these challenges**, scientific research is currently being carried out to develop agrotechnologies for cultivating the tropical legume crop guar under the soil and climatic conditions of the Bukhara region of the Republic, which are characterized by water scarcity, varying degrees of soil salinity, and poor meliorative status

Due to the significant attention of the President of the Republic of Uzbekistan, Sh.M. Mirziyoyev, to crop diversification, numerous crop species of foreign breeding, their hybrids, and varieties have been introduced into the country, and research has been initiated to study their adaptation. As a result, many crop species have been found to be well adapted to the natural soil and climatic conditions of Uzbekistan.

Among such crops, non-traditional legumes such as crotalaria, indigofera, and quinoa play an important role, as they improve soil meliorative conditions, restore soil fertility, and can be used as green manure, fodder, medicinal, fiber crops, and sources of natural dyes. In the coming years, the structure of grain legumes may be supplemented by a new non-traditional crop — guar.



Guar (*Cyamopsis tetragonoloba* L.) Taub. — an annual tropical legume plant. Like other legumes, guar contains a large amount of protein in the seeds, its green mass is used fresh and dry, the plant enriches the soil with nitrogen. Of particular value is guar gum [1], which is obtained from the endosperm of seeds and is widely used in the food, cosmetics, textile, paper, and oil industries.

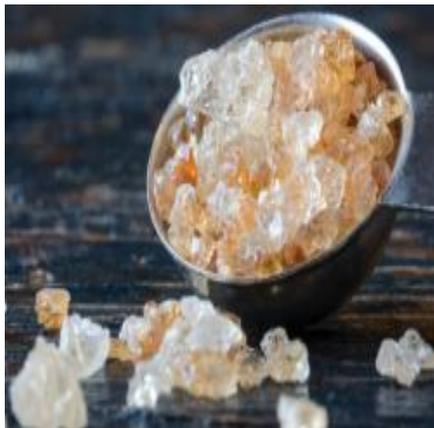
Guar is native to India, Pakistan, and possibly Africa [2], but it is not found in the wild. N.I. Vavilov believed that India was the center of guar's origin and diversity [3]. Although green guar beans are used as a vegetable in India, the Indian name for the plant, gau-aahaar, translates to "cow food" [4], indicating that guar is primarily an ancient forage crop [5].

Initially, guar pods were used as human food, while stems and leaves served as livestock feed. In the early twentieth century, the crop was used in the United States in crop rotations



with cotton. Subsequently, guar spread worldwide after the discovery of its most valuable component — guar gum.

Guar gum is a polysaccharide $(C_6H_{10}O_5)_n$ composed of galactose and mannose in an approximate ratio of 1:2. It is widely used in various sectors of the economy, including the cosmetic industry for the production of shampoos, creams, and lotions, as well as in the oil drilling industry. Currently, global guar gum production exceeds 1.5 million tons, with India being the main producer. Russia imports approximately 20 thousand tons of guar gum annually. Due to its ability to form a viscous gel in cold water, guar gum is extensively used in industry and, in smaller quantities, in the textile, pharmaceutical, and paper industries. In addition, natural fiber obtained from guar seeds is of industrial importance.



Traditionally, guar has been used in India to treat diabetes, asthma, and colds, and its medicinal properties have been confirmed by modern medicine. Guar gum is slowly absorbed in the human body, promotes prolonged satiety, and reduces the glycemic index. In the food industry, it is widely used as food additive E412 in the production of sauces, ice cream, and yogurt.

By-products of guar seed processing contain about 50% protein and represent valuable compound feed for cattle, poultry, and fish. Currently, guar meal and pelleted feeds with an energy value of 2022–2074 kcal/kg are widely used. Thermally treated guar meal containing 40% protein has a digestibility of up to 76% and can replace soybean meal in livestock diets. Feed produced from seed germ contains 48–50% protein, while roasted forms contain up to 56% protein and show improved digestibility; these feeds are recommended for livestock, poultry, and fish. Premium feeds based on roasted guar meal with protein content exceeding 60% are used in aquaculture, including the feeding of salmon species and shrimp, and are widely exported.

The green mass of guar, which is used for feeding cattle and as a green manure, contains 15.56% crude protein and 15.74% crude

fiber [6]. The best time for mowing guar for green fodder is the flowering and milk-ripening phase of the beans. The attractiveness of the green mass

of guar for livestock increases after grinding and pre-drying. The recommended share of hay from plant residues of guar in the diet of adult sheep can be up to 70% [7]. In arid areas

In India, after harvesting guar beans, cattle and camels graze in fields with crop residues [8]. Guar is recommended as

an alternative to the more water-demanding alfalfa in a country with such

arid conditions as the United Arab Emirates [9]. In conclusion, considering the steadily growing global demand for guar products, its tolerance to drought and salinity, and its suitability for cultivation on degraded lands, guar can be regarded as a promising crop for agricultural production in the Republic of Uzbekistan.

List of used literature:

1. Whistler R.L. Guar — a new industrial crop. Chem. Ind., 1948, 62: P. 60-61.



2. Whistler R.L., Hymowitz T. Guar: agronomy, production, industrial use, and nutrition. Purdue University Press, West Lafayette, Indiana, 1979.
3. Vavilov N.I. The origin, variation, immunity and breeding of cultivated plants. *Chronica Botanica*, 1951, 13(1/6): P. 1-366.
4. Chudzikowski R.J. Guar gum and its applications. *Journal of the Society of Cosmetic Chemistry*, 1971, 22: P. 43-60.
5. Thombare N., Jha U., Mishra S., Siddigui M.Z. Guar gum as a promising starting material for diverse applications: A review. *Int. J. Biol. Macromol.*, 2016, 7(88): P. 361-372
6. Мурадов К.М. Опыт интродукции *Cyamopsis tetragonoloba* (L.) Taub. на юге Туркмении. *Растительные ресурсы*, 1973, 9(4): P. 516-523
7. Singh N., Arya R.S., Sharma T., Dhuria R.K., Garg D.D. Effect of feeding of clusterbean (*Cyamopsis tetragonoloba*) straw based complete feed in loose and compressed form on rumen and haemato-biochemical parameters in Marwari sheep. *Vet. Pract.*, 2008, 9 (2): P. 110-115
8. Bhakat C., Saini N., Pathak K.M.L. Comparative study on camel management systems for economic sustainability. *J. Camel Pract. Res.*, 2009, 16(1): P. 77-81.
9. Rao N.K., Shahid M. Potential of cowpea [*Vigna unguiculata* (L.) Walp.] and guar [*Cyamopsis tetragonoloba* (L.) Taub.] as alternative forage legumes for the United Arab Emirates. *Emir. J. Food Agric.*, 2011, 23(2): P. 147-156.

