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# Seasonal influence on seed quality traits and industrial potential of guar (*Cyamopsis tetragonoloba* L.) genotypes

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**ABSTRACT :** Field investigations were conducted at the College of Agriculture, Acharya N.G. Ranga Agricultural University, Rajendranagar, Hyderabad, to evaluate twenty-two guar genotypes for seed quality traits and their industrial potential across Kharif, Rabi, and summer seasons. The study focused on the influence of seasonal environments on galactomannan content, seed protein, carbohydrate concentration, endosperm proportion, and viscosity — key traits determining guar's value for food, feed, and industrial applications. Results revealed marked seasonal variation in quality attributes: summer sowing consistently yielded seeds with higher galactomannan content, greater viscosity, and improved endosperm proportion, accompanied by elevated N, P, and K accumulation in reproductive tissues. Kharif sowings recorded moderate values for quality traits despite luxuriant vegetative growth, while Rabi sowings resulted in significant reductions across all measured quality parameters. Genotypes RGM 115, RGM 114, RGC 1033, and RGC 1077 emerged as stable performers, maintaining high galactomannan and protein levels irrespective of season, thereby demonstrating potential for industrial guar gum production in semi-arid tropics.

**KEY WORDS :** Guar, *Cyamopsis tetragonoloba*, Galactomannan, Seed protein, Carbohydrate content, Endosperm percentage, Viscosity, Seasonal variation, Industrial gum quality

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**G**uar (*Cyamopsis tetragonoloba* L. Taub.), a drought-tolerant annual legume, occupies a unique position among arid-land crops due to its dual role as a food/feed source and a raw material for diverse industrial applications. India remains the largest global producer, cultivating over 33.47 lakh hectares with a production of 11.69 lakh tonnes, representing nearly 80% of the world's guar output (Indiastat, 2006–07). Rajasthan alone contributes 70–80% of the national area, with additional production in Gujarat, Haryana, Punjab, and parts of Uttar Pradesh and Madhya Pradesh (Chamola and Hasija, 1984). Expansion into the arid belts of Andhra Pradesh, Tamil Nadu and Maharashtra has

been driven by guar's ability to thrive under low rainfall, high temperatures, and marginal soils, making it an economically viable crop in challenging environments (Chakraborty, 2007). While guar has long been valued for fodder, green manure, and vegetable purposes, its commercial significance surged with the recognition of its seed endosperm as the source of galactomannan gum - a water-soluble polysaccharide that imparts viscosity, stability, and thickening capacity in aqueous solutions. The endosperm, constituting 27-30% of the seed, contains 19–43% galactomannan, which is in high demand in industries such as food processing, paper, textiles, pharmaceuticals, cosmetics, mining, petroleum and explosives