



The Golden Grain: From Farm to Glass

Hitesh^{1,2}

Ph.D. Scholar
1- CCS Haryana Agricultural
University, Hisar, Haryana
2- ICAR- IIWBR Karnal
Haryana



*Corresponding Author

Hitesh*

Article History

Received: 10.07.2026

Revised: 15.07.2026

Accepted: 20.07.2026

This article is published under the
terms of the [Creative Commons
Attribution License 4.0.](#)

INTRODUCTION

The creation of an exceptional beer begins deep within the soil. While barley (*Hordeum vulgare* L.) has been cultivated for over 10,000 years to survive harsh climates, the modern brewing industry demands a highly specific type: two-row malt barley.

Unlike six-row barley, which is primarily used for animal feed, two-row barley produces a single row of grains on each side of the stem, allowing the kernels to grow larger, plumper, and more uniform. For brewers, two-row barley is the holy grail because it possesses a lower grain protein content (ideally 9.0% to 11.0%) and a much higher starch content. High starch translates into more fermentable sugars, while low protein prevents the final beer from becoming cloudy or hazy.

India's Two-Row Champions

Historically, India grew six-row barley for cattle feed. However, with the brewing industry booming, top agricultural institutes pivoted to develop indigenous two-row varieties to meet global standards.

- **ICAR-IIWBR (Karnal):** The Indian Institute of Wheat and Barley Research is the vanguard of malt barley. They revolutionized the sector with **DWRUB 52**, a two-row variety that matched six-row yields and became a standard for contract farming. Recently, they released **DWBR 219**, an absolute powerhouse yielding 54.49 quintals per hectare (q/ha) in just 132 days, boasting optimal 11.4% protein and excellent rust resistance. They also developed **DWRB 160** (Karan Maltsona), prized for its superior enzymatic power.
- **CCSHAU (Hisar):** Chaudhary Charan Singh Haryana Agricultural University developed **BH 885**. Highly suitable for Haryana's irrigated plains, it produces bold, plump grains with a thin husk and yields up to 44.1 q/ha.

- **IARI (New Delhi & Regional Stations):**
 The Indian Agricultural Research Institute provided the foundational genetics for India's malt barley. They introduced **BCU 73** from exotic germplasm, which offered incredible kernel plumpness and became a parent for future breeding. They also developed **BHS 169** to bring two-row resilience and cold tolerance to the Northern Hills.

Engineering the Harvest

Growing malt barley is a delicate balancing act. The crop thrives in well-drained, sandy loam soils sown between late October and November.

Farmers face the "nitrogen paradox": while adding nitrogen fertilizer increases yield, it also raises the grain's protein content beyond the 11.0% brewing limit, which ruins the malt. Therefore, agronomists recommend a strictly controlled dose of 90:40:20 kg/ha (N: P: K) for irrigated malt varieties, split carefully to avoid late-season protein spikes. The crop requires three perfectly timed irrigations especially during grain filling to ensure the kernels are plump and uniform rather than shriveled.

The Malting Matrix: Awakening the Seed

Raw barley is full of starch, but brewers can't use it yet. It must be "malted" through a controlled three-step biological process:

1. **Steeping:** The raw barley is soaked in water to raise its moisture to 45%, tricking the seed into waking up from dormancy.
2. **Germination:** Over 4-5 days, the seed begins to sprout. This natural growth releases vital enzymes (like alpha and beta-amylase) and breaks down the tough cell

walls surrounding the starch.

3. **Kilning:** Before the growing sprout eats all the starch, the grain is blasted with hot air in a kiln. This halts growth, drops moisture back to 4%, and toasts the grain to develop flavors ranging from pale biscuit to dark chocolate.

The Brewing Sequence

With the malt ready, the brewer takes over to craft the beer:

- **Milling & Mashing:** The malt is gently crushed and mixed with hot water (62°C–68°C) in a mash tun. Here, the enzymes created during malting reactivate, rapidly converting the complex starches into sweet, fermentable maltose sugar.
- **Lautering & Boiling:** The sugary liquid (sweet wort) is filtered away from the grain husks. It is then boiled vigorously to sterilize it. During the boil, hops are added to provide the beer's signature bitterness and floral aromas.
- **Fermentation:** The cooled wort is transferred to a tank, and brewing yeast is pitched in. The yeast feasts on the sweet maltose, converting it into alcohol and carbon dioxide.
- **Conditioning:** The beer rests to mature, allowing flavors to smooth out and the liquid to clarify before it is carbonated and packaged.

From the precise genetics bred by Indian scientists to the careful temperature control of the brewery, every step of this journey relies on the perfect balance of starch and protein found only in two-row malt barley.