

What is malt? In brewing it specifically refers to cereal grains that have been “malted”. Malting is the process of germinating barley and other cereal grains to release enzymes necessary for starch conversion. This process is halted by kilning the grain (122-158f) so that it is dried, locking in the enzymes at their most usable point. The final water content is reduced from 40-50% by weight to 3-8%, which is important to long term storage.

Further kilning and even roasting produces grains typically associated with darker colors, and bready, roasty and coffee like flavors via maillard reactions. However, that process denatures those enzymes thus lowering their diastatic power.

The most common cereal grain we see malted for use in beer is barley. Barley comes in a few varieties, namely 2 row, 4 row and six row. 4 row is not used in brewing. 2 row is considered to be of the highest quality and is the most common used in brewing. 6 row is also occasionally used because of its higher diastatic power and has gradually become much higher quality due to selective breeding.

A few other non-barley relatives are also malted, including wheat and rye. While all relatives in the poideae subfamily, they are completely different species.

Both wheat and rye, as well as barley can be found unmalted (green). Other unmalted adjuncts include oats, corn and rice. All of these may be found as “rolled” (already gelatinized and are more soluble). Some adjuncts (such as corn, rice and unmalted grain) do not contain the ability to self-convert and will rely on the diastatic power of the mash for conversion. It’s the enzymes that determine the sugar and not the original starch, thus the sugar will be mostly maltose.

In the end, the length, temperature and moisture content of the kilning/roasting process is the single greatest aspect affecting the flavor and color of the malt. It is also responsible for the many nutrients that yeast require for healthy fermentation. All of the info pertaining to the color and nutrient content of a malt can be found in the manufacture malt analysis.

#### Base Malts:

Lager/Pilsner 2L (most common). Dried at 90f. Withered and cured at over 2 days by gradually increasing temp to 140. Very light and crisp in color and taste.

Pale 3L (most common in ales) kilned just slightly higher than pilsner, thus giving it a slightly more amber/golden color and toastier flavor.

Wheat 3L (used nearly as long as barley and has equal diastatic power) Used anywhere from 5 to 70% of grist depending on style. Smaller and no outer husk, so less tannins. Contains higher protein content than barley.

Rye 3L (just now gaining popularity) Small and hard. Used as 5-10% of grain bill it can add spiciness and a crisp dry finish.

“Kilned Malts”: Higher curing temp

Vienna 4L (typically 10-40% but can fully self-convert) A darker toastier version of Pale malt. Similar to Munich but sweeter.

Munich 10L-20L (10-60%) Amber in color, very malty in flavor. Can still self-convert but much lower diastatic power. (Oktoberfest, bocks, pale ales)

Aromatic/Melanoidin 20L (5-10%) Similar to dark Munich. Deep amber/walnut color and rich malty flavor.

Amber/biscuit/victory 25L (5-10%) Slightly roasty malt flavor. Bread and biscuit like characteristics. Deep amber color.

Brown 60L (5-10%) Very dry roasted flavor similar to bread crust. Deep amber to milk chocolate color. No sweetness. (Brown ale, porter, stout)

Caramel/Crystal/ Malts: (5-15%) Stewed to partially convert sugar (similar to a mash) for about 45 minutes, then quickly heated to crystalize the sugar. Must reach at least 300 f to crystalize. Since kilns max out around 240f with the highly wet grains, they must be roasted in roaster. Depending on roast temp, can produce honey, toffee and dark caramel flavors and colors. Depending on maltster, similar L ratings can be quite different depending on technique.

Carapils/Dextrin 3L (1-5%) Enhances, body, mouthfeel and head retention without an impact on color or flavor. Small and hard to crush, so may be difficult to get good efficiency in extraction.

10L Light honey sweetness and some body.

40L Slightly more caramel than 10L. (pale ales/lagers)

60L (most common) Full caramel taste and color. Adds body. (Used in everything from pales to stouts)

80L Lightly bittersweet. Lends a reddish tone to beer.

120L Toasted/bittersweet flavor. Rich medium dark color. Hints of burnt sugar and raisin. (Old ales, barley wines, doppelbocks)

Special B 150L (1-5%) Belgian crystal malt with roasty dark caramel flavor. Can be very nutty when used in light amounts but tends to get more raisiny and plumb like in larger amounts.

Roasted Malts: Can be added at end of mash to reduce acrid tannic flavors and ground finer to achieve more color with less grain and flavor impact. Can also be found dehusked for less flavor impact. A more acid grain that can lower mash ph. A higher PH (and chloride to sulfate ratio) water profile can help offset this (if needed) and reduce acrid flavors.

Rostmalz 300-500L German form of roasted malt that is typically smother than American roasted malts.

Chocolate Malt 300-400L (1/2lb-1lb per 5 gal) Bittersweet chocolate, soft roast character. Deep ruby to black color. (Brown ales, porter, stout)

Roasted Barley 500L (not actually malted) Distinct rich coffee flavor and color typical in stouts and porters.

Black Patent 500-600L Ultra dark roasted barley that should be used sparingly to avoid astringent flavors.

Debittered/carafo (I, II, III) special 350-500L Flavor can depend on color. Up to 60% dehusked before malting to produce smoother flavor while retaining rich color.

#### Adjuncts:

Oats- Add smooth creaminess to beer. Should be rolled or flaked (gelatinized) to get full extraction of compounds responsible for flavor and mouthfeel. Otherwise a cereal mash is recommended. (porter, stout)

Flaked Barley- Adds protein for head retention and body in stouts and porters.

Flaked Wheat- Adds a slightly sharp wheat flavor. Adds considerable amount of haze forming protein common in witbier and Lambic styles.

Flaked Rice- Drier than corn. Common in Japanese and American lite lagers. Must be mashed with base malt to convert. Like un-flaked oats, whole rice must be cooked before mashing. (Coors)

Flaked Corn- Most common adjunct used in beer worldwide. Common in several lagers including Budweiser, Bud Light and Miller brands.

Hulls- Made from oats or rice. These have no flavor or color impact. Used in mashes with high protein to husk ratio where lautering can be an issue.

#### References:

"How To Brew" – John Palmer

Oklahoma University online beer chemistry course

Brew Strong episode 11/24/08

[www.weyermannmalt.com](http://www.weyermannmalt.com)

