

# Beer body

## Simplified version

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### Introduction

This document is a simple introduction to the process of controlling beer/ale body when brewing with all grain. This document is aimed for small batches from 10L up to a couple of hundred Litres.

### Simplification

The beer body is a relative complex mix of primarily; protein, starch, and simple sugar. There are some “discussions” about the impact of proteins. However the focus of this document is on the mashing and the mashing has little to no impact on the amount of proteins. There are some talks about the thickness of the mash, yet another area I’m not going in to.

### Mashing

The focus on this document / class is what you can do to control the body during the mashing of the malt.

I have based the process on “The Single Infusion Mash” (where we are maintaining a constant temperature during mashing). Multi stage infusion mashing can produce a higher yield and better control of various sugars. However, when brewing in small scale, just add a little more malt if you want more wort. In reality, multi-stage infusions are more of interest when working with whole bags (25Kg or more) of malt.

### What does the mashing do?

First, lets have a look at what actually happens during mashing.

Mashing is the process where we are converting complex sugar molecules/starch to fermentable sugar molecules. A typical mashing process is done by soaking the malt in hot water (most of the time, between 63 and 69C) for an hour. The hot water triggers enzymes to convert complex sugars into simple sugars (maltose) that the yeast can “consume”.

### Enzymes

There are two main groups of enzymes that are involved in the mashing process. These are alpha and beta amylase. Alpha amylase are creating longer sugar molecules than Beta. These longer

molecules are less fermentable and will create a “fuller” body. The beta amylase enzymes are creating shorter sugar molecules that are easily fermentable.

## **Control the Enzymes, control the body**

By controlling what enzymes that are active during the mashing, we are in fact controlling the body of the brew.

You always need short molecules if you want to ferment the brew. However, if you are after a light/thin beer, you want to keep the longer sugar molecules to a minimum.

The process of controlling them is relatively simple. You control the temperature.

Hot mashing (69-75C) will favour Alpha amylase, producing more “unfermentable sugars”, producing a fuller body.

Medium mashing (65-67), will activate a balanced mix of both alpha and beta amylase, producing a typical medium body.

Colder mashing (63-65), will primarily activate beta amylase that will produces mostly fermentable sugars yielding a light/thin brew.

The alfa amylase will “smash” the complex sugars molecules to smaller chains, but still bigger than what the beta does. The Beta is in fact able to smash the molecules the Alfa is creating.

The beta amylase is only able to work on complex sugars from each end of the molecules. As a result of this, the beta needs more time than the alfa to do its job.

## **Alcohol**

Naturally, the more unfermentable sugars you have, the less alcohol you will get in the brew. There is a really easy method to compensate for this, add more malt...

I personally prefer a higher alcohol level the “fuller” body I’m after. As a result, the fuller body I’m after, the more malt I use and stop sparging earlier than if I’m after a thin, less alcoholic brew.

## **Malt types**

Different type of malt (crystal, pilsner, ale) have small variations to how temperature will control the enzymes. For the majority of brewers, you can ignore these variations. There is a “golden” rule that a beer should be based on a minimum of 80% of either ale or pilsner malt. I know professional brewers that are using Pilsner malt for ale, however, then never have more than 20% of other grains in the brew. Based on this, simply see the crystal, chock, wheat and other grains as flavour add-ons and ignore the sugar types.

## Generic brew styles

Naturally, there are no rules for what body you can have for a particular brew. This section is just an indication of what you typically find on the “shelf”.

### Heavy/full body

The classic typical brews of these are Stout, barley wine, heavy dark ales.

### Medium body

The classic brew styles for this type of body are various ale types medium to dark amber ales.

### Light/Thin body

In this category we often find lager and pilsner. Danish pilsner has a really light body (and is very light on the hops).

## Class tasting

The 3 beers that was presented for testing/tasting during the class at Canterbury Fair 2017 were made as follows.

All 3 beer batches were made exactly identical, down to the gram and minute, with the exception of the temperature.

- 2Kg plain ale malt
- 50gr (old New Zealand Pacific Hallertau, low acid) bittering agent
- 10gr Citra hops towards the end of the boil, to make the beer a little more interesting.
- Water
- Baking yeast

Each batch yielded between 9 and 10L of fermented beer.

Light: Mashing temp starting at 65, main time between 63-64, end temp 60C. Gravity of the wort 1048.

Medium: Mashing temp starting at 69, main mashing around 68, end 67C. A little higher than I wanted. Gravity of the wort 1050.

Full: Starting 77, main mashing around 73, end 70C. Gravity of the wort 1056.

The reason for this variation was that I did not have a small insulated vessel to mash in so I used a small fermentation bucket with a draining hose connected to the tap at the bottom. I then wrapped the bin with blankets. I did not want to stir it too much so I started a little high and within a few minutes the temperature evened out in the bin. And over time, the temp dropped a bit. The medium

was a couple of degrees higher than I ideally wanted but I did not want to deviate from the volumes I used for mashing so I only had the temperature as the difference.

## Medieval authenticity

As far as I know, temperature control during the medieval era were quite simplified and quite rough. Working on the detailed beer body in this document is down to a degree or two accuracy. However I'm quite sure it is (was?) possible to do a quite rough control for a light or heavy body. To date, I've yet to see primary sources that shows the deliberate intention to control the body. I would love for someone to show me a primary source in this area! However, while working on recreating medieval beer/ale, I see no problem with controlling the body to enhance the enjoyment during consumption.

## Good online brewing sources

A really good site regarding brewing is [beersmith.com](http://beersmith.com). Apart from a good forum frequently used by professional brewers and brewing geeks from all over the world, they are also making and selling a beer smith software that will help you design beers and step by step guides for how to make your brew.

There are many more sites out there and best is to google to find a style that works best for you.

## Who am I

In the SCA I'm known as Sir Asbjorn Pedersen Marsvin. I've been brewing on and off for about 30 years. Over the last 10 years, I have been focusing on beer brewing with the odd batch of mead. Apart from the fact I like beer, I do enjoy the speed of beer brewing where you typically are able to start drinking the brew 3-4 weeks after you make it. This also provide the opportunity for relatively fast learning. My brewing kit is a large chilly bin (esky for the aussies) and a 180L boiler. I'm currently in the process of converting a 300L stainless wetback hot water cylinder to a conical water cooled/heated fermenter. Experimental batches (minimum I can do with my main boiler) is about 50L and a typical batch 120L. For small tests and mead I tend to use a 20 L pot.

I'm doing a lot of research in medieval ale/beer brewing.

I also have a brewing blog <http://purebrew.blogspot.com>