Practice Abstract #34

TRansition paths to sUstainable legume-based systems in Europe

Update to brewing abstract – Pulses as an adjunct in beer production

In the production of any alcoholic beverage, you must understand the character of the starch present, how to convert this them to fermentable sugars, and separate the sugar-rich liquid from insoluble materials. Both steps occur during the mashing process of beer making and involves a temperature-holding step 63-64°C. This allows starch gelatinisation and enzyme action to occur. For pulses, this temperature is too low, and a cooking step is required to gelatinise and allow enzymatic degradation of its starch to occur prior to adding barley.

While legume starch character varies across species, 80°C was found to allow hydration and disruption of most legume-starch granules tested. In addition, and unlike some cereals, legumes lack the necessary starch degrading enzymes. The use of pulses may also present high levels of undegraded cell wall components such as β-glucans and arabinoxylans which thicken the wort leading to filtration and extract recovery problems, as well as final product quality issues such as haze formation.

The extent of these issues is pulse-species specific, e.g., faba bean. To address these issues, it is necessary to add commercially available proteolytic and starch degrading enzymes.

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All Pratice Abstracts prepared by the TRUE Project in the EIP-Agri common format can be found here: https://ec.europa.eu/eip/agriculture/en/find-connect/projects/transition-paths-sustainable-legume-based-systems

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Recommended milled faba bean kernel processing steps are as follows.

1. Pre-treatment of flour slurry at 40°C in the presence of protease.
2. Precook at a minimum of 80 °C for 1 hour in the presence of alpha-amylase.
3. Mash the malted barley etc as normal using the cooked legume slurry as a portion of the mashing in water.
4. Proceed using normal brewery procedures (mash, boil, cool, and ferment).

Figure 1. Various legumes and pulses . *Photo credits ©: Mariana Duarte*

About TRUE

The EU funded project "TRansition paths to sUstainable legume based systems in Europe" (TRUE) is a balanced practice-research partnership of 24 institutions, which aims to identify the best routes, or "transition paths" to **increase sustainable legume cultivation and consumption across Europe** and includes the entire legume feed and food value chains.

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