Use of unmalted buckwheat for innovative beer production

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1. BACKGROUND

Consumers are drinking less beer, and when they do, they increasingly want special and high-quality beers. As a result, there is a growing interest in innovative beers based on alternative cereals and pseudocereals as these give the final beer a more unique, authentic or even sustainable character. The partial replacement of barley malt by an (unmalted) alternative pseudocereal, such as buckwheat, will result in novel features of the final beer (odour, aroma, taste, mouthfeel, etc.), but will also influence the brewing and fermentation process.

2. EXPERIMENTAL

A buckwheat beer was made on 20 L-scale in duplicate, with a mash consisting of:

i) 40% unmalted buckwheat and 60% malted barley

Two reference beers were made on 20 L-scale in duplicate, with mashes consisting of:

ii) 100% malted barley

iii) 40% unmalted barley and 60% malted barley

3. RESULTS AND DISCUSSION

Observations of brewing with 40% buckwheat and subsequent fermentation

- Mashes were more viscous - stirring advisable
- Mash filtration times >3h = 100% barley malt (1th) and 40% barley (3th-45 min)
- More foamy, sticky and viscous hot trub, which stuck to the inside of the boiling kettle
- Overfoaming of the fermenter

40% buckwheat wort properties

- Lowest amount of fermentable sugars
- Significantly more glucose than both references → α-glucosidase

40% buckwheat beer properties

- Real degree of fermentation
- Significant higher foam stability compared to 100% barley malt
- No significant differences compared to the references

Beer sensory evaluation

- Colour: straw yellow to greenish
- Odour & aroma: banana, rose
- Taste: sweet
- Mouthfeel: round and thick body with a creamy texture

4. CONCLUSION

The implementation of buckwheat in the brewery still poses challenges. Long mash filtration times and excessive foam production during fermentation are obviously major drawbacks and need further research. Despite these issues, a 40% buckwheat beer was produced on a 20 L-scale with, except for the fermentable sugar profile, similar wort and beer quality as the reference beers. The final buckwheat beer was straw yellow to greenish, with an odour and aroma of banana and rose. The beer had novel features like a round and thick body, a highly creamy texture and it had the best beer foam stability. Together with its pleasant flavour, these features can appeal to existing or new beer drinkers, making buckwheat promising for innovative beer production.

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