

Impact of gel beta-glucans & HMW arabinoxylans on mash and beer filtration.

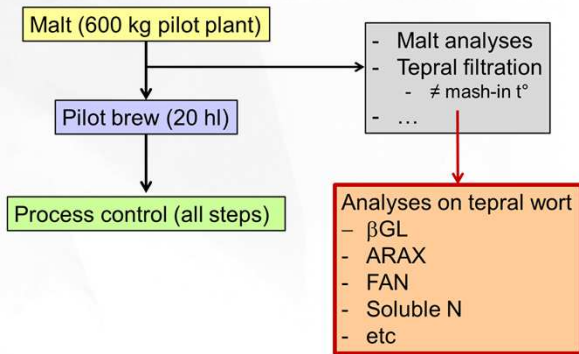
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INTRODUCTION

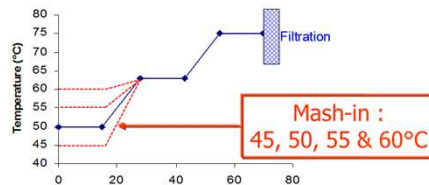
Mash & beer filtration problems are of importance for the barley to beer chain. Regarding functional properties of malt, we were looking for relevant tools to improve knowledge and provide more specific definitions of required specifications for barley breeders. The purpose of this work is to identify molecules linked with filtration problems observed at pilot plant level and to detect them at a previous step.

SAMPLES PRODUCTION & ANALYSES



Teparl system

- Computerized mashing system
 - 57 g fine gring & 200 ml water
 - Mash-in temperature : 50°C (15 min)
 - Rests temperatures : 63 & 75°C (15 min)
 - Mash filtration speed (1 bar pressure)
 - Sparging with 200 ml water at 75°C
 - Sparging filtration speed (1.5 bar pressure)



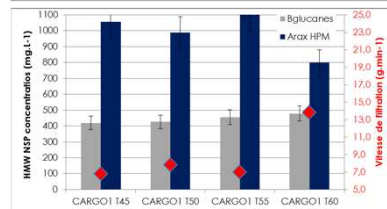
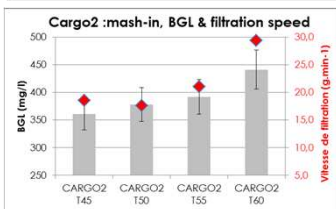
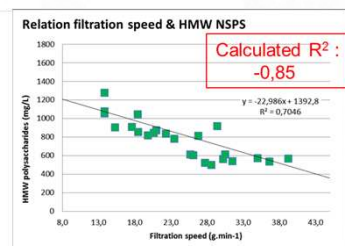
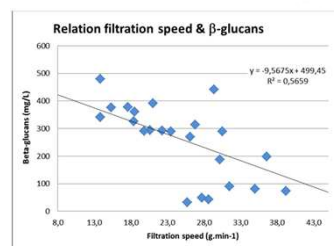
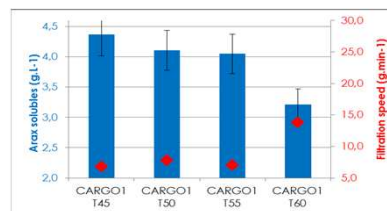
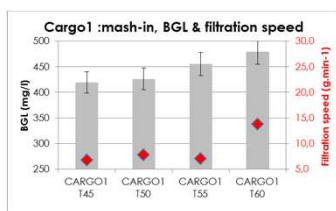
Interesting CBMO malts batches (with & without filtration problems)

	Batches	Mash filtration	Beer filtration
CARGO	Cargo 1	☹☹	☹
	Cargo 2	☹	☹
	Cargo 3	☹☹	☹
ATLANTICK	Atlantick 2	☹	☹☹
SY TEPEE	SY Tepee 2	☺	☹
EXPLORER	Explorer 3	☺	☹

HMW non starchy polysaccharides (HMW NSP) analyses :

- gel β -glucans according MEBAK 2.5.5
- HMW ARAX adapted from Novozymes, J. Obrecht, 2009 & INRA Nantes, L. Saulnier, 2012

RESULTS



- β -glucans content \nearrow with mash-in T° \nearrow
- β -GG content \searrow with mash-in T° \nearrow

- Solubles arax are of interest but HMW give more relevant information

- Filtration speed is not only impacted by β -glucans.
- Correlation is more better with HMW NSPs (= β -glucans + HMW arax)
- Very good relation with filtration duration & wort viscosity (data not shown)
- Mash filtration impacted by gel β -glucans, HMW arax & HMW NSPs
- Beer filtration problems (increase of delta-pressure) linked with HMW arax (data not shown)

CONCLUSIONS

Several barley varieties (2RW, 6RW & 2RS) were malted and brewed at pilot scale (600 kg malt & 20 hl beer). Process control was made on all steps, with particular attention on mash & beer filtration. In the same way, malt batches were brewed with different mash-in temperatures with teparl filtration sytem. Worts were analysed with current parameters, but also with gel beta-glucans, solubles & high molecular weight soluble arax.

According to different mashing profile, analyses of EBC congress wort of the malts tested were not sufficient to elucidate the filtration problems observed during beer production. More linked with the industrial practices, the teparl filtration system remain a good tool to make a diagnostic on malt quality. Use of gel BGL and development of analyse of HMW arax allow more expertise on raw material.

