VIKING MALT

DISCOVERING THE WORLD OF MALT.

VIKING MALT

MALT ANALYSIS

#5 WEBINAR

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WHY ANALYSIS ARE DONE?

- To guarantee raw material…
- To check that malting process has gone as expected
- To give **brewer** a good estimation of the delivered malt
- For R&D and troubleshooting…

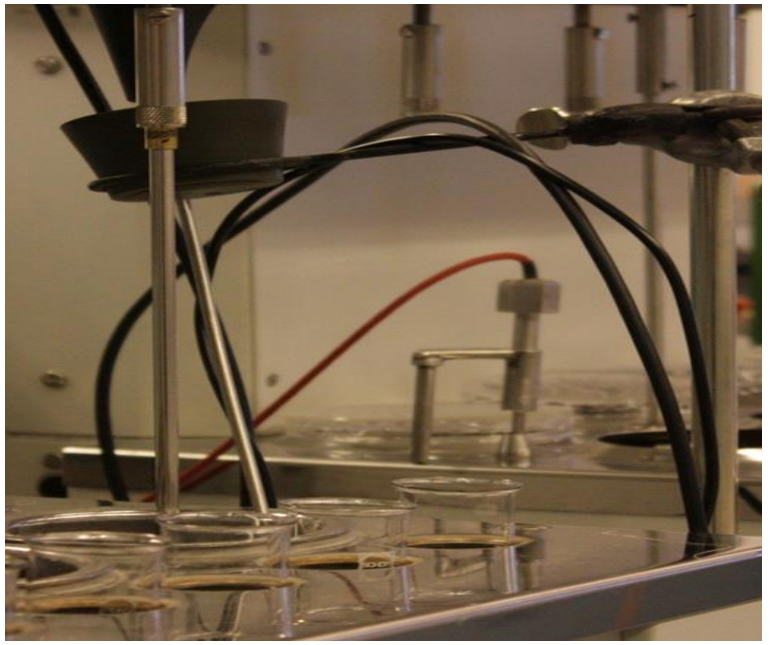
TYPICAL WAY TO CONTROL MALT QUALITY

- Presample of barley lot, quality before take in a barley lot
- Actual intake sample of barley lot→ even sample from the whole incoming lot
- Steeping sample before steeping→ control that we really are sure what are we processing
- Malt batch sample after kilning and deculming→ quality of ready product that is transported into a malt silo
- Malt blend → blend is done from the analysed malt batces by calculation
- Delivery sample→ taken evenly from the delivery batch

CONGRESS WORT, WHAT IS IT?

Std. wort made according to EBC-Analytica

- 50 g milled malt
- 200 ml distilled water
- Continuous stirring 100 rpm
- 45°C/30min – ramp 1°C/min to 70°C (55 min from start 100ml of 70°C water dosed in) – 70°C 60 min – cooling 10-15 min down to 20°C
- With distilled water weight of wort to exactly 450g
- Wort filtrated through Schleicher&Schuell No 597 ½ filtration paper
- Inactive malts are mashed 50/50 basis with known Pilsner malt



ABOUT MALT ANALYSIS

- Malt analysis are based measurements made directly on malt kernel but also Congress mashing and wort from it.
- Not all analysis can be done from special malts
- Congress mashing results needs to be **understood like a measuring stick**→ an estimation tool into brewing process.
- A brewer needs to have a **clear vision how Congress wort response to** the wort made with brewer's **own brewing process.**
- A good sampling is a basic demand for reliable analysis result

EXAMPLE OF ANALYSIS RESULTS MADE FROM PILSNER MALT PRODUCTION BATCH

Analysis	Result	Analysed from
Moisture (%)	4,2	Kernel
Extract fine (%d.m.)	81,2	Congress wort
Extract coarce (% d.m.)	80,2	Congress wort
Extract difference (% d.m.)	81,2 – 80,2 =1	calculative
Colour, visual (°EBC)	3,8	Congress wort
Betaglucan (mg/l)	155	Congress wort
Protein (%)	10,5	Kernel
Soluble N (mg/l)	767	Congress wort
Soluble N (mg/100g)	683	Congress wort
Kolbach index (%)	683/10,5 x 0,625 = 41	calculative
Free Amino Nitrogen (mg/l)	156	Congress wort
Diastatic power (WK d.m.)	310	wort
Alpha amylase (DU d.m.)	60	wort
Friability (%)	90	Kernel
Partly unmodified grains (%)	2,0	Kernel
Glassy corns (%)	1,0	Kernel
DMSP (ppm)	4,0	Congress wort or Kernel

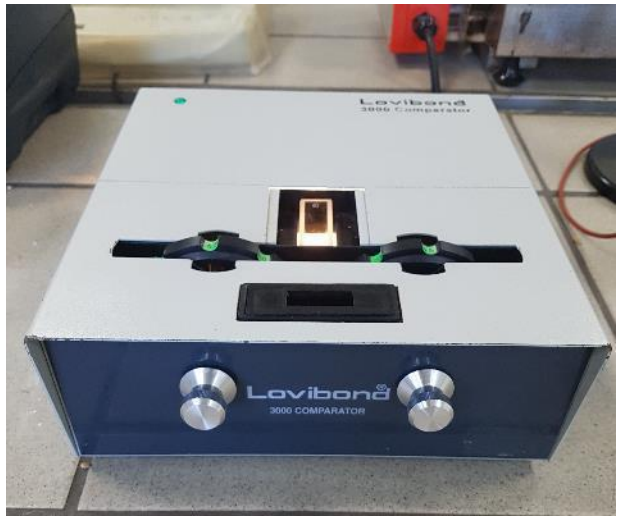
FRIABILITY

- A mechanical stress test for malted kernel.

COLOR

- Wort sample is put in a standardized cuvette and color is measured by comparing it to the color of discs.

- Color can also be measured with spectrophotometer.



HOW TO MAKE SURE…

Malt laboratory

- Uses standardized methods
- Calibrates laboratory equipments daily according to quality instructions
- Takes part into ring tests to evaluate it's own results against other malt laboratories.
- Uses reference malt's and analyses them systematically to follow own analysis results.
- Keeps statistics over all results
- All analysis results and "middle" results are stored for later check if needed →transparency

SOME EXAMPLES OF TOLERANCE WHEN MALT ANALYSIS IS DONE AGAIN

- Betaglucan mg/l: Result may vary by ~15%. As an example values inside 170 – 230 are all ok.

- Soluble N mg/100g: tolerance is ~5% meaning soluble N results may even vary easily ±40 units

- Color EBC, comparator: 4,0 – 4,3 are both ok

ACCURACY

According guidelines given in EBC Analytica the accuracy of analysis may be following:

	Standard	average/range	r 95 (same sample again)	R 95 (new sample)	Unit	note
Betaglucan	4.16.2	0,60	0,05	0,18	%(m/m)	for malt
		289	11	41	mg/l	for wort
Soluble N	4.9.2.	600-850	30	104	mg/l	for wort
FAN	8.10.2	0,11-0,16	0,023-0,093	0,047-0,171	mg/l	for malt
		110-180	28-0,105	16-27	% dm	for wort
(Protein) Tot N	4.3.2.	1,23-1,86	0,063	0,116	% m/m	for malt
Extract	4.5.1.	79,3-81,4	0,58	1,2	% d.m.	for wort
Color	4.7.2.	2,5-6,5	0,3	1		for wort
Friablity	4.15.	96	1,1	3,6	%	for malt
Diastatic pow	4.12.	220-600	6,6	21	WK/d.m.	for wort
Alpha amylase	4.13.	30-100	0,067x result range	10	DU	for wort

Many malt laboratories operate with more narrow r95 and R95 range

HOW TO READ MALT ANALYSIS

- Certificate of analysis may have results from 2-15+ different analysis
- **CoA should always be read as a whole**, not concentrating on one single parameter.
- There are parameters, features in malt that many analysis describes from different angle.
- Keep in mind, all analysis have their tolerance in accuracy. Variation in a result does not mean error in a lab.

Betaglucan
Friability-PUG-WG-homogeneity
Protein –Soluble N –Kolbach

Strongly related to each other

Example values, should you be worried? Red numbers should be put under consideration, are they correct?

Malt	Betag mg/l	Homoge neity %	Friab %	PUG %	WG %	Prot %	Sol N mg/100g	Kolbach %
1	150	90	90	1	0	10,5	700	42
2	295	90	90	1	0	10,5	700	42
3	295	65	68	8	3	10,5	520	31
4	150	90	90	1	0	10,5	520	31

HIGH GRAVITY MASHING

- Viking Malt laboratories uses also HG-mashing method.
- Mashing program more close to real brewery process
  - pH is adjusted
  - wort plato is ~16

- Wort filtration speed is measured and so called filtration area can be calculated.
- Method is used widely in studies for example before crop changes and also in our many ongoing R&D projects.

Mashing
48°C/30 min, 63°C/30 min, 72°C/30 min, 80°C/10 min

Hot wort when filtrated

That’s all folks…

Thank’s a lot!

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