

# Brewtan® C

## >>> Beer stabilisation at maturation Application fact-sheet

### >>> INTRODUCTION

Flavour and colloidal stability are important quality benchmarks for worldwide brewers and consumers. Beer should be an agreeable drink of pleasing flavour, attractive colour and clarity, containing sufficient gas to carry aroma and foam even after transport to the other side of the world or after storage for months in supermarkets.

Brewtan® C is a high quality tannic acid grade. It reacts with the more acid proteins in the green beer. It is an easy and economical solution for a complete background stabilisation and an ideal improvement for a shorter maturation.

Reacts instantly with haze sensitive proteins by adsorption and precipitation  
Doesn't interact with foam active proteins

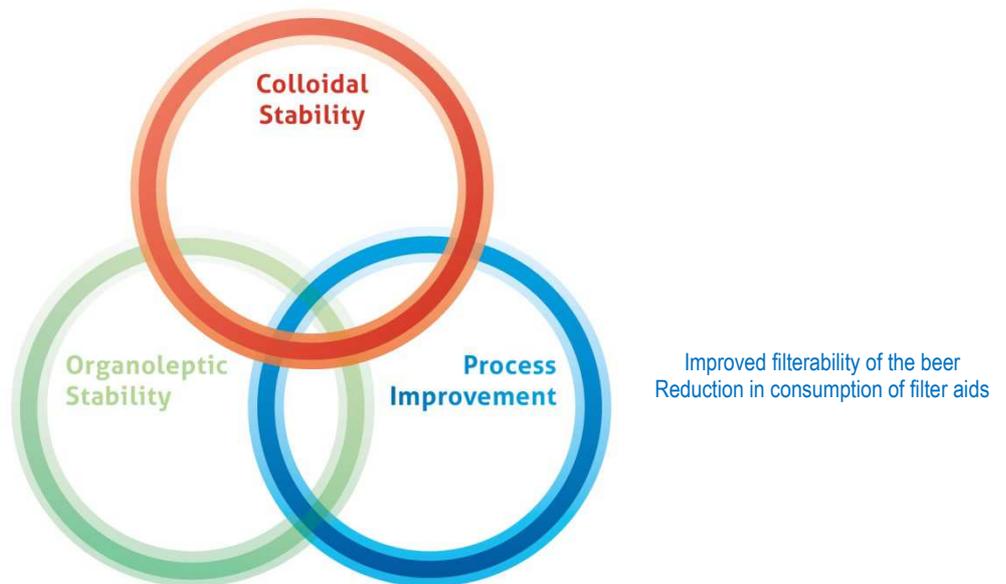


Figure 1.: Properties of Brewtan® C

## >>> BREWTAN® C AT MATURATION

### >> Practical implementation

#### Required equipment

Stainless steel equipment is recommended because dissolved iron from ordinary steel equipment forms a dark blue complex with gallotannins.

The use of Brewtan® C in maturation requires specific equipment, as Brewtan® C is dosed proportionally during transfer from fermentation to maturation. The use of Brewtan® C in a uni-tank system is not recommended.

#### Preparation, dosage & sequence of additon

Typical dosage levels of Brewtan® C in maturation range between 1,5 - 6 g/hl (1,5 – 4 g/hl in combination with a yeast separation system and 2 – 6 g/hl in the classical two tank system). The quantity of Brewtan® C used is expressed relative to the amount of final 100% malt 12°P beer. The amount of added adjuncts, gravity of the beer, yeast count, lagering time, lagering temperature and O<sub>2</sub>-levels has to be taken into account.

Clear solutions are obtained by slowly adding Brewtan® C to soft water at room temperature while stirring to prevent lumps. We recommend a concentration of 25% which afterwards is further diluted to 1 – 5% at cellar temperature. The water used must be O<sub>2</sub> free and covered with CO<sub>2</sub>-gas to avoid O<sub>2</sub> injection in the beer.

The diluted Brewtan® C solution is dosed proportionally during transfer from fermentation to maturation. Injection of Brewtan® C is also possible directly after fermentation, before removal of the main yeast fraction by centrifugation.

The sedimentation time in lagering or settling tanks depends on temperature and yeast count.

- When Brewtan® C is added to beer at an initial temperature of 5°C, gradually reducing to 0°C over a period of one week, settling takes approx. 5 days
- in a settling tank at a temperature of – 1.5°C with high yeast counts (e.g. 5 MIO cells/ml), settling takes 24 to 36 h;

After using Brewtan® C, the filterability of the beer is improved and an increase in the lifetime of the filter by up to 25% is achievable.

#### Impact of raw materials

- Malt  
Malt with a protein content of 9-12% is good brewery malt, lower than 9% gives foam problems, more than 12% gives very unstable beers. Malt with high nitrogen content gives a lower brewhouse yield, will result in more soluble proteins and thus also more haze formation in the final beer. Brewtan® C can help to correct fluctuations in malt quality by eliminating these excessive amounts of proteins.
- Hops  
Unoxidized, high  $\alpha$ -content hops give the best stable beers. Very easy tools which help to improve the overall stability are hopextracts and pellets. Vacuum packed pellets under N<sub>2</sub>, even pre-isomerized, are stable for a few years at temperatures below 15°C; polyphenolfree hopextract is stable for over 10 years and greatly enhances the colloidal stability.

### >> Compatibility with other stabilisers

Injection of finings is possible but not together with Brewtan® C. A solution of Brewtan® C is first injected in line, and the fining can be added a few meters further downstream. The optimum ratio Brewtan® C/Fining can be determined in the lab, at 0°C, in an Imhoff-vessel.

### >> Residues in final beer

g/hl addition	Polyphenol residue (as gallic acid)
0 g	0,50 ppm
5 g	0,45 ppm
6 g	0,42 ppm
7 g	0,50 ppm
8 g	0,50 ppm

To determine the impact on the polyphenol residue of Brewtan® C five similar brews were made using the same raw materials and brewing method.

The polyphenol residue of this untreated beer is 0,50 ppm. When the polyphenol residue is determined in the Brewtan® C treated beers (5, 6, 7 and 8 g/hl) the polyphenol residues found are equal to that of the untreated beer. It thus can be concluded that there are no residues of Brewtan® C left in the beer.

Table 1.: Residues of Brewtan® C in final beer

## >>> IMPACT OF BREWTAN® C USE

### >> Impact on colloidal stability

In order to study the impact of Brewtan® C on the final beer quality as well as the brewing process one brew was split in two just before maturation; the first half was treated with 1,25 g/hl of Brewtan® C and the second half with 70 g/hl of Silica Hydrogel. After inline dosing the beer was matured for 48 hours at -1,5°C. In a first trial the beer was filtered using membrane filtration technology. Afterwards results were crosschecked using normal DE filtration.

The beer quality was assessed by initial turbidity (once after maturation and once after filtration) and a forcing test to determine the colloidal stability. During this forcing test the beer was kept at 40°C for 2 weeks. The increase in EBC is a measure for the colloidal stability. Table 2. provides an overview of the positive results.

	Brewtan® C	Silica Hydrogel
Turbidity after maturation (EBC)	3,43	4,68
Turbidity filtered beer (EBC)	0,45	0,51
Forcing test ( $\Delta$ EBC)	1,41	3,16

Table 2.: Influence on turbidity and colloidal stability

>> **Impact on organoleptic stability**

**Impact on beer colouration**

The addition of Brewtan® C helps to prevent beer colouration as a result of exposure to daylight.

	Brown bottles 45 days normal day light 20°C	Colourless bottles 20 days full daylight 20°C
Blank	Yellow normal	Brown
2 g/hl Brewtan® C	Yellow normal	Yellow normal

Table 3.: Influence of the light on beer colouration

The colour of the beer can be 0,5 to 0,75 EBC units lower by addition of Brewtan® C due to co-precipitation of some melanoidins.

**Impact on metal removal**

Brewtan® C is a well-known chelating agent for bi- and tri-valent ions. Due to this ability to complex metals it helps to prevent Fenton’s reaction which can lead to unpleasant flavours in the final beer.

	ppm Fe		ppm Al		ppb Pb	
	before	after	before	after	before	after
Trial	0,35	0,05	0,20	0,03	9	1

Table 4.: Metal removal with 7 g/hl Brewtan® C

**Impact on foam**

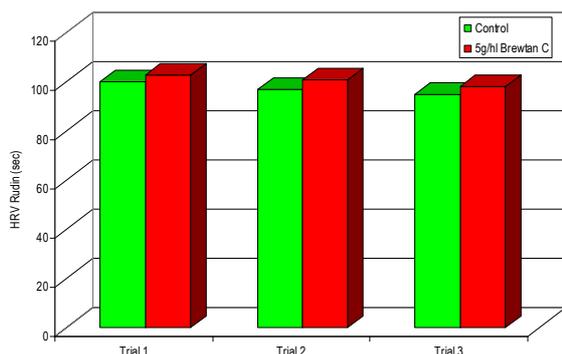


Figure 2.: Impact of Brewtan® C on foam

Three trial brews were split in two just before maturation; one half was the control the other half was treated with Brewtan® C.

Thus foam half-life of the untreated control and beer stabilised with 5 g/hl Brewtan® C during maturation could be compared.

Use of Brewtan® C during maturation has no negative influence on foam. In some cases the foam is even better with Brewtan® C due to absorption of fatty substances on the Brewtan® flocks.

**>> Impact on process improvements**

Brewtan® C has an impact on the filterability of the beer. The filterability indicator during membrane filtration is the amount of beer that is filtered before an intermediate back flush rinse is performed. The result is shown in Figure 3.

Afterwards these results were confirmed on the DE filtration system:

- Filtration cycle increased with 45%
- DE consumption reduced by 25%

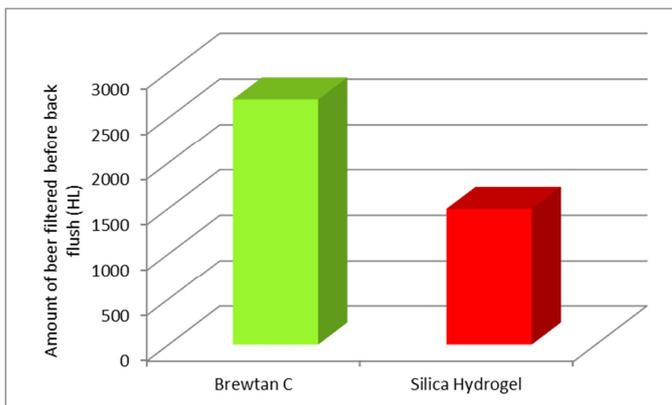


Figure 3.: Impact of Brewtan® C on filtration cycle

>>> REVIEW

Figure 4. shows the different ways of incorporating gallotannins into the brewing process. This allows brewers to choose the most appropriate product for their requirements; it is also possible to combine two or more of these methods to give a combination of process and stability benefits.

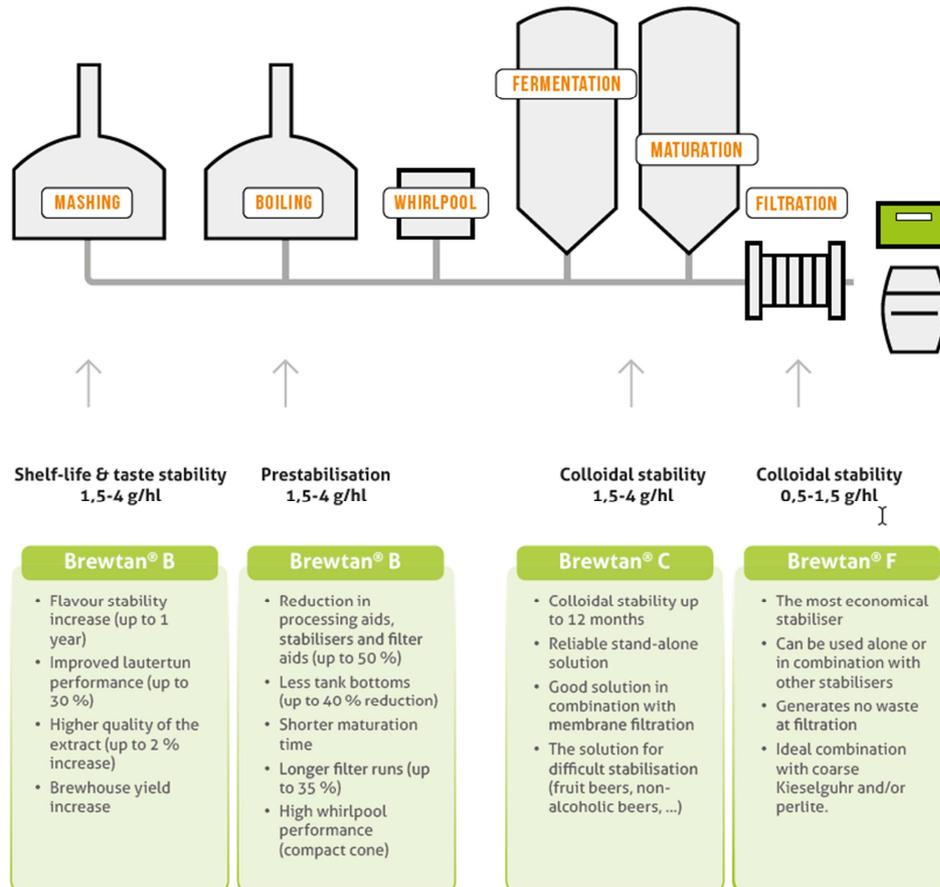


Figure 4.: Brewtan®, your natural beer stabiliser

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