

TECHNICAL INFORMATION SHEET

PROTAFLOC TABLETS - KETTLE FININGS

Description

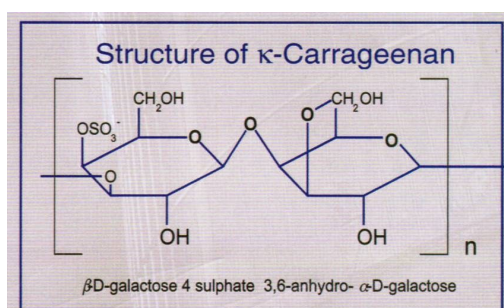
PROTAFLOC TABLETS are a tabletted carrageenan product which is added to the wort in the kettle to enhance protein removal as the wort cools.

Benefits

- Natural product which removes substantial quantities of haze forming material without affecting head retention
- Produces brighter worts, reducing the amount of finings required later
- Increases rate of fermentation and attenuation
- Increases filter runs
- Prolongs shelf life in small pack beers
- Reduces process time
- Is a processing aid not an additive so doesn't require label declaration
- Reduced tank losses
- 5-10% more efficient than competitive products
- Tabletted for easy use

Principle

The active ingredient in PROTAFLOC TABLETS is a polysaccharide called carrageenan which is derived from seaweed. Carrageenan in solution is negatively charged, owing to the sulphate groups along the polysaccharide backbone. It is these charged sites which interact with wort proteins.



In solution at temperatures above 65°C, the carrageenan has a random coil structure. As the wort cools the carrageenan takes a much more compact and ordered helical structure which is thought to drag the protein particles together to form aggregates. The aggregates, having a larger particle radius, settle faster.

Kettle finings are added in the kettle only to allow the carrageenan to dissolve. Wort proteins react with carrageenan as the wort cools and settle as a cold break during fermentation to be removed along with the excess yeast.

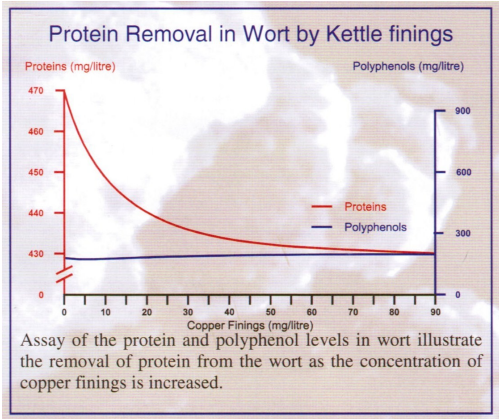
The removal of particles and protein from wort has been demonstrated by microscopic examination of pre-filtered beers and protein assay.

Kettle Fining Rate / ppm	Mean NMP Level (x 10 ⁶)		
	> 10 μ m	2-10 μ m	< 2 μ m
13	0.6	7.6	3.4
25	0.1	0.5	0.5
30	0.02	0.06	0.11

Typical results for all malt wort

As the levels of kettle finings increase, the fine particle counts in each of the size bands decrease. It should be noted that the particles below 2 microns are mostly responsible for blinding filter pores.

Since Kettle Finings remove both particulate and soluble protein, and soluble protein is a component of chill haze, it is unsurprising that the colloidal stability of kettle fined beers is enhanced.



Application

PROTAFLOC TABLETS should be added to the kettle 15 minutes prior to the end of the boil. The addition time reflects the length of time required to dissolve and disperse the carrageenan into the wort. Should PROTAFLOC TABLETS be added early in the boil, then degradation of the polymer may occur and product efficiency is lost.

The reaction between wort proteins and carrageenan is pH dependant and occurs at an optimum pH of 5.3. Below pH 4.4, the reaction does not occur and little benefit is gained from using Kettle finings.

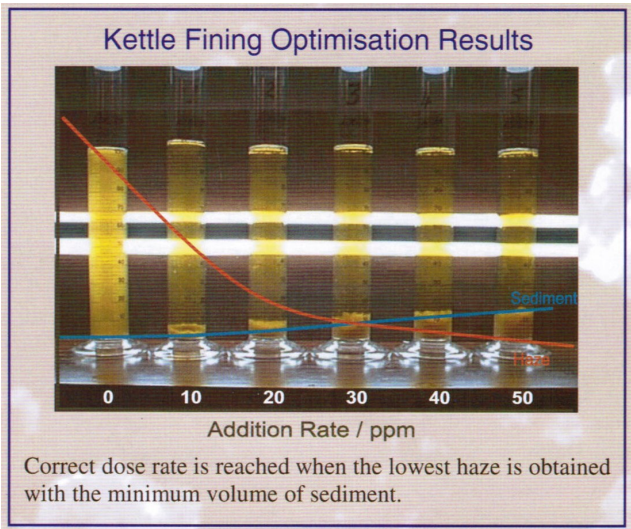
Wort pH	Optimum Rate / ppm	Clarity at Optimum Rate	Sediment Vol. at Optimum Rate / %
4.4	>40	E	0
4.7	40	B	12
5.0	30	A	10
5.3	20	A	10

Clarity is recorded on a visual scale with A being bright and E cloudy.

Rates of Use

The exact rate for a given wort will vary according to the brewery, the recipe and the types of malt and adjuncts used. Typical rates vary from a range of 0.75g to 4.8g per hl , but a kettle finings optimisation should be carried out to determine this more accurately. Rates of use should be checked when you change supplier or move to new seasons malt. Kettle Optimisation Kits can be purchased from Murphy and Son Ltd

As illustrated below, when the dose rate increases, the clarity improves, but the level of sediment increases. Over-fining will give rise to beer losses in fermentation vessel.



Guidelines for use

- Check that the product is within its shelf life before use
- Ensure that the product is dispersed into the wort and does not stick to the walls of the kettle or be drawn up the stack with the steam
- Carry out optimisation trials to determine the correct rate of use
- Read the Material Safety Data sheet prior to use
- DO NOT open the kettle to make the addition unless the boil has been temporarily turned off
- DO NOT add the product significantly earlier or later than the recommended time

Specification

COMPOSITION	Food grade Semi refined carrageenan, produced by alkali treatment of <i>Euchema cottonii</i> , specifically for use in brewing; and dispersants
APPEARANCE	Pale brown tablets
<u>Analysis</u>	
Tablet weight (g)	2.4
<u>Maximum Limits of Impurities</u>	
As (ppm)	3
Pb (ppm)	40
<u>Microbiology</u>	
Total plate count	<5000 colonies per g
Yeasts & Moulds	<300 colonies per g
<i>E.coli</i>	Negative in 5 g
<i>Salmonella spp.</i>	Negative in 25 g

Regulations

The carrageenan (E407) and PES (E407a) in this product meet the definitions and requirements of carrageenan as set forth by the FAO/WHO and EU standards.

Storage & Shelf life

- Store in cool conditions away from direct sunlight
- Keep in original container
- Maximum storage temperature is 30°C
- Keep containers sealed when not in use
- Recommended storage temperature is 10°C - 15°C
- The shelf life at the recommended storage temperature is at least 2 years from the date of manufacture

Technical Support

For Health & Safety information on this product, please see the Safety Data Sheet (SDS)

For support and advice on the use of this product, please call or e-mail our Technical Support:-

Telephone:- + 44 (0)115 978 5494

techsupport@murphyandson.co.uk

For up to date information regarding, Kosher, Halal, Vegetarian, GMO status, or anything not mentioned on this tech sheet please email:-

compliance@murphyandson.co.uk or call +44 (0)115 978 5494

Reference

PRODUCT	PROTAFLOC TABLETS	PRODUCT CODE	PFT
ISSUE No.	1.0	DATE	21/03/2017
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