TETRA ISO EXTRACT (TETRA)

OVERVIEW

- **Tetra Iso-Extract (Tetra)** is a pure, aqueous solution of the potassium salts of tetrahydro iso-alpha acids derived exclusively from CO_2 hop extract.
- **Tetra** greatly enhances beer foam when used as a post-fermentation replacement for a portion of conventional bittering products.
- **Tetra** provides protection against lightsrcuk flavour when used as the sole source of bitterness or in combination with other light stable hop products.

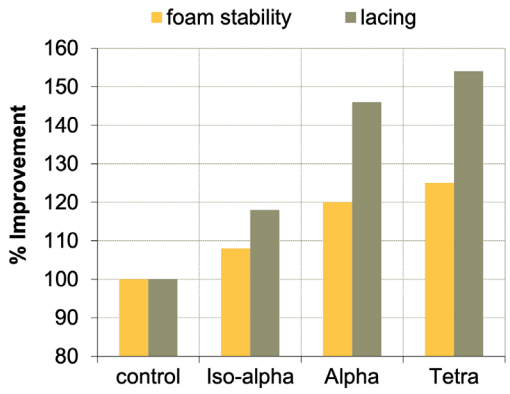
PROPERTIES

APPEARANCE	**Tetra** is a homogenous, clear aqueous solution that is amber in colour. It is free-flowing at the recommended storage and application temperatures. **Tetra** is miscible in demineralised water and alcohol.
UTILISATION	Based on HPLC analysis of the finished beer, utilisation of **Tetra** is 60-80% depending on the timing and efficiency of the addition. Actual utilisation will vary from brewery to brewery due to differences in equipment and process conditions.
LIGHT STABILITY	**Tetra** only provides protection from lightstruck flavour in the complete absence of alpha acids and iso-alpha acids. **Tetra** can be used in conjunction with any Ellerslie Australia light stable product to achieve light stability.
FOAM ENHANCEMENT	**Tetra** enhances both foam retention and cling. An improvement in beer foam is already noticeable at 2-3 mg/l of tetrahydro iso-alpha acids in the finished beer.
FLAVOUR	**Tetra** provides 1.0 to 1.3 times the sensory bitterness to that achieved with iso-alpha acids. The actual intensity of bitterness depends primarily on the quantity of bittering units and thte type of beer. Therefore, the target number of bittering units must be determined in preliminary tests to achieve the correct level of sensory bitterness.
QUALITY	All Ellerslie Australia products are processed in facilities which fulfill internationally recognised quality standards.
PACKAGING	**Tetra** is normally packaged into 20 kg pails. 10kg jugs are also available.

QUICK SPECS

DESCRIPTION	An amber aqueous solution of the potassium salts of tetrahydro iso-alpha acids
CONCENTRATION	9.0 ± 0.5% (w/w) of tetrahydro iso-alpha acids by HPLC or 10.0 ± 0.5% (w/w) by UV spectrophotometric analysis)
ISO-ALPHA ACIDS	Below detection limit
ALPHA ACIDS	Below detection limit
PH	9.5 (± 1.0)
VISCOSITY	2 – 6 mPas (at 20 °C / 68 °F)
DENSITY	1.017 (± 0.005) g/ml at 20˚C (68˚F)

THE EFFECTS OF 3MG/L OF PURE HOP ACIDS ON FOAM AND LACING - A PRODUCT COMPARISON



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PRODUCT USE

Tetra is typically used as a post-fermentation addition and prior to the final step in filtration.

DOSAGE	Dosage is based on the product concentration, an estimated or known utilisation and the desired intensity of bitterness in the beer. The fact that the perceived bitterness of **Tetra** is about 1.0 to 1.3 times the bitterness of iso-alpha acids derived from conventional hop products must taken in to consideration. The correct dosage of **Tetra** must be determined through trials at the brewery.
ADDITION	We recommend adding **Tetra** at full strength (undiluted) into the centre of the beer stream for at least 70% of the total vollume being transferred. An accurate, high pressure dosing pump is required to add the product into the beer stream at a point where vigourous mixing is assured. **Tetra** can be added at ambient temperatures. If dilution is necessary, always add **Tetra** to demineralised water first and adjust the pH to 8.5 - 9.5 using either potassium hydroxide (KOH) or potassium carbonate (K_2CO_3). Laboratory scale testing is recommended prior to commercial use. If containers are used over several days, it is recommended that the headspace be fllushed with nitrogen (CO_2 is not suitable).
FOR LIGHT STABLE BEER	For maximum protection against lightstruck flavour, it is essential that no other sources of non-reduced iso-alpha acids are inadvertently introduced into the wort or beer. Therefore, the following must be carefully implemented: • Exclusive use of light stable hop products throughout the entire process. • Avoid contamination through equipment surfaces previously in contact with regular iso-alpha acids. • Never pitch wort with yeast that has been in contact with regular alpha and iso-alpha acids.
STORAGE	**Tetra** should be stored in sealed containers at 5 – 25°C (41 – 77°F). Opened containers should be used within a few days. For long-term storage, the ideal temperature is between 10-20˚C (50-68˚F).

PRODUCT USE

CLEANING RECOMMENDATION	**Tetra** should not be left in dosing lines at low temperatures. Lines and dosing pumps should be flushed with warm, slightly alkaline, demineralised water or ethanol for purposes of cleaning.
BEST BEFORE DATE	**Tetra** is stable two years from the date it was produced/packaged if stored under the recommended conditions.
SAFETY	**Tetra** is a slightly alkaline, intensely bitter product and may be safely handled using routine precautions to avoid contact with skin and, in particular, the eyes. Any product coming into contact with the skin should be washed off immediately with soap and water or an approprate hand cleanser. If **Tetra** gets into the eyes, flush with copious amounts of water until clear and seek medical attention. For full safety information, please refer to the relevant Ellerslie Australia safety data sheet.

ANALYTICAL METHODS

CONCENTRATION OF BITTER SUBSTANCES	The concentration of tetrahydro iso-alpha acids can be measured using the following methods: • HPLC according to Analytica-EBC 7.9 with the current ICS standards • UV spectrophotometric analysis
CONCENTRATIONS OF REDUCED ISO-ALPHA ACIDS IN BEER	The concentration of reduced iso-alpha acids in beer can be measured by HPLC according to Analytica-EBC 9.47. Note: Is is possible that anlysis results for the corresponding value for bitterness must be adjusted. The factor used in this anlysis will result in lower values if reduced hop products were used as the exclusive source for bitterness or in higher amounts.
FOAM STABILITY AND CLING TEST	Foam stability can be measured using the following methods listed in MEBAK, ASBC or Analytica-EBC: • NIBEM-T Meter • NIBEM Cling • Steinfurth Foam Stability Tester • Ross & Clark • Pour Test

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TECHNICAL SUPPORT

We are pleased to offer assistance and advice on the full range of Ellerslie Australia products:

- Copies of all relevant analytical procedures
- Safety Data Sheets (SDS)
- Assistance with pilot or full-scale brewing trials
- Special analytical services

Disclaimer: The information provided in this document is believed to be correct and valid. However, Ellerslie Australia does not guarantee that the information provided here is complete or accurate and thus assumes no liability for any consequences resulting from its application.

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