



Premium Alcohol Free Malt Extract – A New Method for Producing Alcohol Free Beverages

What is it?

A specialised malt extract intended for producing 0.0% alcohol free beer. The sugar profile is modified to replicate the familiar body, mouthfeel and flavour of a finished beer when diluted. This creates an extremely convincing alcohol-free beverage to which brewers can add hops, botanicals, and other ingredients for the effect of a complex brew.



Why use the extract for non-alcoholic beer production?

The Premium Alcohol-Free Malt Extract method solves a few problems encountered by Brewers who wish to produce non-alcoholic beverages. The most common solutions include:

1. **Thin mouthfeel** – The extract can be used when a brewer is dissatisfied with the thin texture of their alcohol-free beer range, which is typical of beer produced by diluting high gravity beer to 0.5% abv using just water.
2. **Overly sweet** – Usually caused by the presence of maltose sugar, which remains when limited fermentations are utilised to keep the ABV low. Maltose is more intensely sweet than other sugars so is kept to only trace amounts in the extract.
3. **Expensive equipment needed** – No reverse osmosis or vacuum distillation is required to make an alcohol-free beverage using this extract, all that is required is a brewhouse and a closed fermentation vessel.

In addition to this, the mashing/fermentation process can be cut out entirely from production. This means an alcohol-free beverage is brewed and packaged within as little as 2-3 days, saving time, tank space and cost for the brewery with 100% extract efficiency.

How is it made?

Premium Alcohol-Free Extract is made from brewing quality malt that is processed through Muntions brewhouse. The wort made at Muntions is not fermented but concentrated using vacuum evaporation to remove water without imparting colour. The resulting concentrated brewer's wort (malt extract) is then treated with unique enzymatic processes to modify the sugar and flavour profile. The final extract is additionally hopped using two hop extracts that add a mild bitterness and inhibit the growth of microbes such as *Lactobacillus* species.

How to use it

Premium Alcohol-Free Extract is designed to be used seamlessly within commercial Brewhouse equipment and processes. The diagram below summarises the method for its use in a typical brewery.

Using Alcohol Free Malt Extract

Mix in Kettle



- Fill with liquor. Adjust water chemistry to style.
- Dilute Alcohol Free Malt Extract into kettle (5kg/hL as a typical dosage).
- Mix extra ingredients if desired e.g. Maltodextrin.
- Boil for just 10 minutes at 95°C to kill microbes and retain optimal flavour.

Whirlpool & Cool



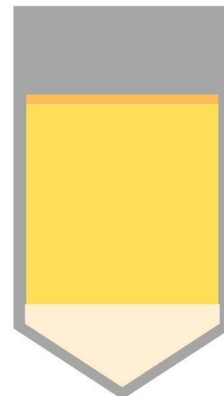
- Transfer to Whirlpool
- Go crazy with ingredients (Hops and Botanicals!) for complexity
- Remove large protein/ polyphenol complexes
- Cool to CO2 purged fermentation vessel

Package



- Add preservatives and/or pasteurise
- Treat the same as a soft drink - keep packaging process very clean and limit Oxygen exposure.

Condition & Clarify



- Dry Hop and add flavour extracts if desired
- Add finings/use gravity to produce bright beer with cold crashing
- Remove small protein/polyphenol complexes
- Clarification takes 1-2 days
- Transfer for carbonation

Specifications and dosage

Parameter	Unit	Alcohol Free Extract
Colour (10% w/v solution)	EBC	≤ 25
pH (10% w/v solution)		≤ 5.5
Bitterness (10% w/v)	IBU	< 15
Refractometric Solids	%	≥ 60
Typical extract (calculated from refractometric solids)	L°/KG	≥ 250

Premium Alcohol Free Malt Extract is intended to be used so that, when diluted, it replicates the residual sugar levels found in ordinary alcoholic beer. Only small quantities are needed compared to using normal malt extract.

A good standard dose is 5kg/hL of water, which would create a balanced drink of roughly 3.3°P or 1.013 SG:

$$\frac{5\text{kg (Alcohol-Free extract)} \times 66 \text{ (% Solids)}}{100 \text{ (Litres)}} = 3.3 \text{ °Plato}$$

$$\frac{5\text{kg (Alcohol-Free extract)} \times 250 \text{ (L°/KG)}}{100 \text{ (Litres)}} = 1.013 \text{ SG}$$

Recommended whirlpool/cellaring ingredients

There are many ingredients that can be used in conjunction with Premium Alcohol Free Malt Extract to imitate the flavour of a fermented beer. The most common include:

- **Chilli** – used in very small amounts, chilli can replicate the slight ethanol burn that most consumers expect when drinking alcoholic beer. This gives the drink complexity as well as providing familiar textural sensations.
- **Hop Varieties** – particularly those of intense aroma, such as Citra and Mosaic. High quality extracts are very good for masking Wort Aldehyde aroma due to their pungency, but pellets/cones can also be used.
- **Yeast metabolite flavourings** – these include natural flavour extracts such as isoamyl acetate or esters. Without fermentation, many of these flavour compounds that are not present in non-alcoholic beer can still be added later to create the impression of a fermented brew. This technique is used by many global beer brands.

There are countless more ingredients that a brewer can utilise for this, including fruit, zest, spices and specialty malts to get as close as possible to true fermented beer flavour.

Limitations

All methods of commercial alcohol-free production have benefits and drawbacks, being limited in how closely they can replicate authentic beer flavour. Wort aldehydes are responsible for the “grainy” flavour very common to alcohol free beers, particularly those produced using the high temperature mash method for 0.0 % beer. These will be at a notably lower intensity when using Premium Alcohol Free Malt Extract than when using high temperature mashing, though may still be present in subtle amounts. This aroma is most

easily removed by masking with a highly aromatic ingredient such as Citra hops or a botanical.

Traits of Commercial Alcohol Free Production methods

Physical Dealcoholisation

	Thermal	Membrane
Technology	<ul style="list-style-type: none"> • Steam Distillation • Vacuum Distillation 	<ul style="list-style-type: none"> • Reverse Osmosis
Traits	<ul style="list-style-type: none"> • Heat Damage - cooked flavour • Loss of complexity from higher alcohol/ester removal • Expensive Equipment 	<ul style="list-style-type: none"> • Very thin texture • Loss of complexity from higher alcohol/ester removal • Expensive Equipment

Biological methods

	Limited Fermentation	High Temperature Mashing
Technology	<ul style="list-style-type: none"> • Maltose negative yeast • Arrested/restricted Fermentation 	<ul style="list-style-type: none"> • Low Strength wort mashed 72-80°C • Ferment to 0.5% ABV or package as 0.0% ABV malt beverage
Traits	<ul style="list-style-type: none"> • Doesn't lose higher alcohols/esters • Overly sweet - yeast leave maltose which is intensely sweet compared to other sugars • Slight wort aldehyde characters 	<ul style="list-style-type: none"> • Lacks complexity from higher alcohols/esters • Cost effective with normal brewing process • Intense wort aldehyde character plus strong sweetness

Dilution

	De-aerated Liquor
Technology	<ul style="list-style-type: none"> • High Gravity Fermented beer diluted with water until 0.5% ABV
Traits	<ul style="list-style-type: none"> • Very thin texture • Cost effective with normal brewing process • Can lose a lot of colour and head retention

Premium Alcohol-Free Extract method

	Kettle Addition
Technology	<ul style="list-style-type: none"> • Specialised malt extract diluted in Kettle with hops/botanicals • Packaged at 0.0% ABV as a non-alcoholic drink
Traits	<ul style="list-style-type: none"> • Familiar body, flavour and head retention of alcoholic beer • Decent complexity if ingredients used well • Cost effective with normal brewing process • Slight wort aldehyde character • No intense sweetness/thin texture

Final product stability

It is important the final product is treated the same as a soft drink for preservation, with the presence of sugars potentially causing spoilage. This is easily fixed with preventive steps.

Notably, the lack of alcohol means the product must be pasteurised OR have preservatives added for food safety. Potassium Sorbate is therefore usually used to inhibit microbe cell replication, with 20g/hL being an effective amount.

Due to a lack of yeast for oxygen scavenging, Ascorbic Acid is also typically added at rate of 15-45g/hL. This prevents off flavours and product deterioration. The darker the beer, the less is needed as darker malts have more antioxidant compounds present.

Other preservatives used for soft drinks may be utilised if they are declared and within legal limits.

Non-Alcoholic labelling

A product is not considered “beer” if it is alcohol free or non-alcoholic. Therefore, it would not be compliant to call the finished product manufactured with this base in the manner described as “beer”. The class designation “malt beverage,” or “cereal beverage,” or “near beer” should be provided instead to be more appropriate and compliant with UK or EU harmonised law.

‘Alcohol free’ may also only be used if the alcohol has been extracted from the beer, therefore a 0.0% product made with the extract method described (where no alcohol is ever made) may be referred to as a “non-alcoholic beverage/drink” instead.

For example, instead of using the term “beer” or “alcohol free” to describe the finished product, one could simply state “0.0% abv West Coast IPA” as a product description. Legally, the 0.0% abv product created using the method described is classed as a carbonated soft drink or malt beverage. It is for this reason that preservatives may be added if they are declared on the label and within legal quantities.

Food labelling and QUID declaration

Alcohol-Free beverages are classed as foods and therefore require an ingredient declaration in order to meet the food information regulations. Premium Alcohol Free Malt Extract, should be declared as *Hopped Malt Extract (Barley Malt, Water, Hop Extracts)* on the ingredients label. Note that allergens must be displayed in a **bold** typeface.

The label must also comply with Quantitative Ingredients Declaration (QUID), which details the percentage of specific ingredients if they are mentioned in the product name/emphasized by words and graphics. For example, a malt beverage made with alcohol free extract (5kg/hL) would be declared as follows:

Ingredients: *Hopped Malt Extract (5%) (Barley Malt, Water, Hop Extracts), Hops, Acid (Lactic Acid), Natural Flavourings (hops, chilli), Preservatives (potassium sorbate, ascorbic acid)*

Food products also require a nutritional table, listed allergens and a ‘best before’ or ‘use by’ date. Check the UK Government website for further details.

The finished product will be exempt from sugar tax duty provided the gravity is below 5.0 °Plato (which is well above the typical usage described in this paper).



For more information, visit:

<https://www.gov.uk/government/publications/low-alcohol-descriptors>

<https://www.gov.uk/guidance/chemicals-in-food-safety-controls>

<https://www.gov.uk/guidance/food-labelling-giving-food-information-to-consumers>

<https://www.gov.uk/guidance/check-if-your-drink-is-liable-for-the-soft-drinks-industry-levy>

Safety

Adding extracts to hot liquids is always a potential health and safety hazard. It is important to wear gloves and eye protection when adding to the kettle. The extract pours more easily than regular malt extract, but warming the container beforehand decreases the viscosity for easier handling.

Storage

Keep the extract sealed and in a cool dry place. Once opened, keep refrigerated. Bring the container to room temperature before using so that the extract pours more readily.

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Muntons technical brewing team are always on hand to assist with recipe development in our nano brewery, blending, preparation and fermentation facility. If you have any further questions about introducing Premium Alcohol Free Malt Extract in your brewing, please contact our technical team.

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