# Product Information

Jungbunzlauer

## Trisodium Citrate Anhydrous

### General Information

Trisodium citrate is a tribasic salt of citric acid. It is produced by complete neutralisation of citric acid with high purity sodium hydroxide or carbonate and subsequent crystallisation and dehydration.
The common hydrate form, trisodium citrate dihydrate, is widely used in foods, beverages and various technical applications mainly as buffering, sequestering or emulsifying agent, whereas the anhydrous form finds its uses in particular applications such as water sensitive dry blends and instant beverages, surfactants, fragrances as well as in tablets and OTC products.
Jungbunzlauer trisodium citrate anhydrous is manufactured from trisodium citrate dihydrate. Water molecules of the dihydrate crystals are removed by a patented process without destroying the original crystal matrix. The resulting crystals have a porous matrix that can be used as a carrier for inorganic and/or organic substances, especially after being impregnated with liquids. Further, due to the absence of water, the product is not prone to caking. Trisodium citrate anhydrous is also used in applications where excess water is not desired.

### Chemical Data

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| Chem. nomenclature | Trisodium 2-hydroxypropane-1,2,3-tricarboxylate |
| Chemical formula | $C_6H_5O_7Na_3$ |
| Molecular weight | 258.07 |
| Sodium content | 27 % |
| Solubility | 425 g/l |
| EC No. | 200-675-3 |
| CAS No. | 68-04-2 |
| E-No. | E 331 |

### Specification

Jungbunzlauer offers trisodium citrate anhydrous as a chem. pure grade for technical applications and as a food and pharmaceutical grade which meets the requirements of the latest edition of the US Pharmacopoeia (USP), the Food Chemicals Codex (FCC) and the Commission Directive 2008/84/EC.

| | |
|---|---|
| Characteristics | conforms |
| Identification | conforms |
| Appearance of solution | conforms |
| Acidity or alkalinity | conforms |
| pH-value (5 % solution) | 7.5 - 9.0 |
| Readily carbonisable substances | conforms |
| Oxalic acid / oxalate | max. 100 mg/kg |
| Sulphate | max. 100 mg/kg |
| Tartrate | conforms |
| Heavy metals (as lead) | max. 5 mg/kg |
| Arsenic | max. 1 mg/kg |
| Lead | max. 1 mg/kg |
| Mercury | max. 1 mg/kg |
| Water (Loss on drying) | max. 1.0 % |
| Assay | 99.0 – 100.5 % |

### Characteristics

Trisodium citrate anhydrous occurs as white, granular crystals or a white, crystalline powder. It is freely soluble in water and practically insoluble in ethanol (96%).

The advantages compared to trisodium citrate dihydrate are as follows:

- Solubility
  A comparison of the solubility between trisodium citrate dihydrate and trisodium citrate anhydrous clearly shows that trisodium citrate anhydrous is much better and easier soluble.
- Efficiency
  The maximum water content of trisodium citrate anhydrous is 1 % whereas it is between 11.0 and 13.0 % for the dihydrate form. Therefore, trisodium citrate anhydrous has a 11 to 14 % higher product content than dihydrate and is thus more efficient in the formulation.
- Mixtures with other acids
  Trisodium citrate anhydrous can be mixed in any ratio with other acids without lump forming. Where mixtures of citric acid and trisodium citrate dihydrate are prone to caking, the use of trisodium citrate anhydrous will not have such problems.
- Free flowing powder with surfactants
  Trisodium citrate anhydrous can be mixed with surfactants and still maintains a free flowing powder.
- Free flowing powder with perfumes
  Trisodium citrate anhydrous will remain a free-flowing powder even when perfume content reaches 6 %. The perfumes may be solvent or oil based.
- Free flowing powder with peroxides
  Trisodium citrate anhydrous will remain a free-flowing powder even when peroxide content reaches 6 to 7 %.

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### Granulation

| Type | Particle size | Limits |
|---|---|---|
| Granular | >1.60 mm | max. 5 % |
| | <0.10 mm | max. 10% |

Particle size distribution is controlled via in-process control and is not listed on the certificates of analysis.

### Legal Aspects

In Europe, trisodium citrate is listed as generally permitted food additive (E 331) and may be added to all foodstuffs, following the "quantum satis" principle, as long as no special regulation restricts the use.

The US Food and Drug Administration (FDA) affirmed trisodium citrate as GRAS (generally recognized as safe) and permitted the use in food according to current GMP (CFR § 184.1751), without setting an upper limit.

### Packaging and Storage

Jungbunzlauer Trisodium citrate is supplied in 25 kg net polyethylene lined paper bags.
Tripotassium citrate is very hygroscopic. Therefore, adverse storage conditions should be strictly avoided to prevent caking.
Jungbunzlauer guarantees optimum quality for at least 3 years if stored in originally closed bags under the following storage conditions:

| | |
|---|---|
| Temperature | < 30 °C |
| Relative humidity | < 70 % |