

Biodegradable Chelant

Natrquest E30

INCI Name: Trisodium Ethylenediamine Disuccinate

CAS No.: 178949-82-1 EINECS No.: 416-530-4

Chelating agents, such as EDDS and EDTA play a crucial role in the stability and efficacy of personal care formulations.

- Anti-oxidants
- Peroxide stabilisation
- Biocide potentiator
- Reducing water hardness

Anti-Oxidant

Metal ions can react with oxygen in the air to form radicals and other reactive species that can lead to discolouration and odours.

Even in trace amounts metal ions can cause side reactions and so it is vital for the formulator to bind these up with a chelating agent.

Metal ions such as Fe and Cu can be introduced into formulations through raw materials, particularly water, from the air or from plant equipment.

Peroxide Stabilisation

In peroxide formulations, metal ions react with the peroxide causing the peroxide to decompose and for radicals to be generated.

Chelants work by binding to metal ions in formulations and so prevent these ions causing these side reactions. This gives formulations greater stability and longer shelf life.

Biocide Potentiation

Biocides and preservatives are potent additives that are designed to kill unwanted bacteria in formulations.

Bacteria can be introduced at low levels during manufacture of formulations or at higher levels when opened or touched by the consumer.

Chelating agents have been found to enhance the activity of biocides and so allows significantly lower levels of biocides to be used.

This is good for the consumer as it reduces the levels of active chemicals that can cause irritation or sensitization and also reduces the amount of biocide released into waste water. This is also good for the manufacturer as it reduces their cost.



TYPICAL PROPERTIES

Not intended for use in preparing specifications

Appearance	Pale, clear liquid, free of foreign matter
Concentration (as free acid)	27-33
(as tri-sodium salt)	33-41
Optical purity of [S,S] form	99 minimum
Species purity of [S,S]-isomer of total amino acid species	95 minimum
pH	9.0-10.0

Reducing Water Hardness

Water hardness ions such as Ca and Mg reduce the effectiveness of surfactants in cleansing products leading to poor foam quality and poor cleaning. Chelants bind up these ions from tap water and help enhance the performance of surfactants.

Performance Benefits

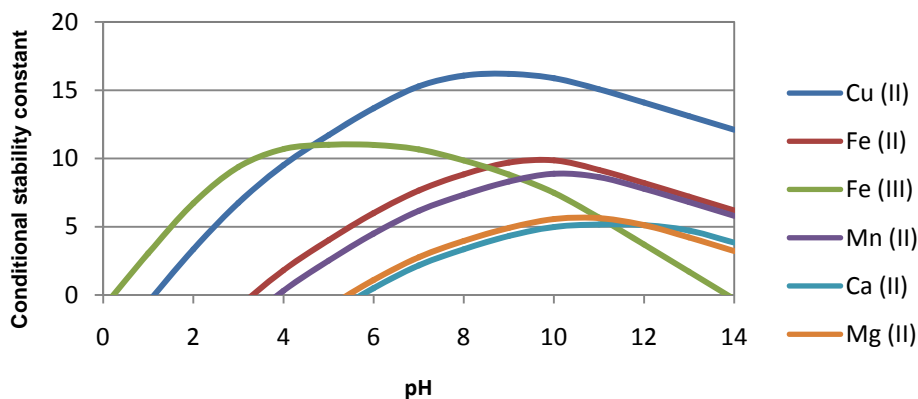
- Effective anti-oxidant
- Effective water hardness control
- Reduce radical generation
- Preservative potentiator improving biocide efficacy
- Environmentally friendly alternative to EDTA
- Green Award Winner – UK Green Chemical Technology Award 2003
- Excellent transition metal chelation
- Effective peroxide stabiliser
- Readily biodegradable
- Fully compliant with all future legislation
- Eco-Label Approved – EU Flower, Nordic Swan, Bra Miljöval
- Natrlquest contains [S,S] – Ethylenediaminedisuccinic acid [EDDS]

Natrlquest performance in personal care formulations

Metal Chelation

Natrlquest E30 can complex a range of metal ions over a broad pH as shown below. The maximum chelation occurs approximately in the centre of the pH range at around pH7 – that of water.

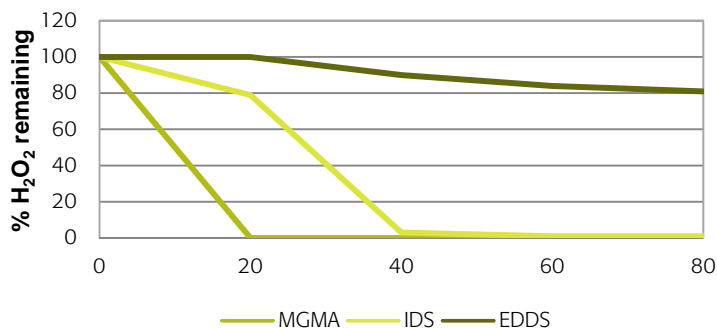
Natrlquest E30 is special in the fact that it is very selective towards problematic transition metals such as Cu and Fe compared to Ca and Mg. This makes it ideal in personal care formulations as it is tackling these problematic transition metals first while in the formulation, but still giving hard water control when released into water. This gives Natrlquest the benefit of excellent anti-oxidant properties and foam preservation in shampoos and conditioners.



Peroxide Stabilisation

Natrlquest E30 is used commercially in peroxide based products. It is much better, for instance, in stabilising peroxide against decomposition by iron compared with alternative biodegradable chelants.

Stability of 5% peroxide at pH 4 and 25°C with 5 ppm Fe and 0.5% chelant



Biocide Potentiation

Natrqlquest E30 is used to enhance the activity of preservatives in personal care formulations, improving efficacy and allowing the level to be reduced.

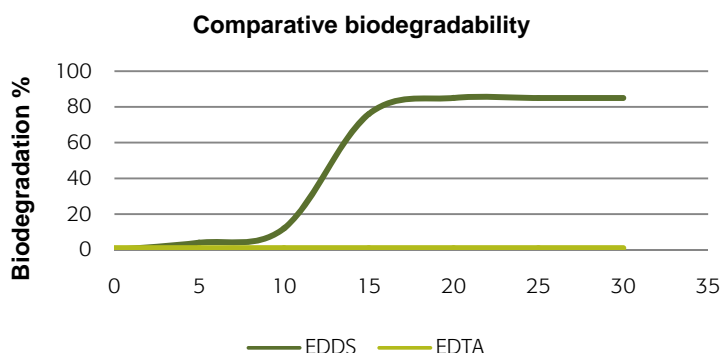
Natrqlquest E30 is not a preservative by itself. Minimum inhibitory concentration (MIC) measurements demonstrate the effect:

Biocide	Organism	MIC Biocide alone (ppm)	MIC _(1:1) with EDDS (ppm)
5-chloro-2-methyl-3-isothiazolone and 2-methyl-3-isothiazolone	A Niger	13.5	1.5 (185)
	C Albicans	0.34	0.27 (27)
	P Putida	0.27	0.21 (21)
	S Aureus	4.5	2.6 (185)
	P Aeruginosa	1.9	0.75 (185)
2-bromo-2-nitro-1,3-propanediol	A Niger	3200	25 (185)
	B Cepacia	3.2	2.7 (270)
	S Aureus	9.9	5.5 (550)
	P Aeruginosa	3.7	1.9 (190)
Benzisothiazolone	A Niger	292	1.06 (106)
	B Cepacia	440	67 (6700)
	E Coli	550	67 (6700)
	S Aureus	1490	104 (10400)
	P Aeruginosa	660	88 (8800)
Imidazolidinyl Urea	A niger	2000	1100 (185)
	C Albicans	10000	4600 (185)
	S Aureus	600	400 (185)
	P Aeruginosa	650	450 (185)
1,3-Dimethylol-5,5-dimethylhydantoin	A niger	1500	500 (185)
	C Albicans	6000	2200 (185)
	S Aureus	525	400 (185)
Phenoxyethanol	A Niger	2000	1600 (185)
	C Albicans	3000	2000 (185)
	S Aureus	6500	6000 (185)
2-methyl-3-isothiazolone	A Niger	300	50 (1800)
	C Albicans	200	75 (2400)
	P Putida	16.9	9.9 (990)
	P Aeruginosa	20	15 (300)
2-n-Octyl-3-isothiazolone	C Albicans	1.5	0.7 (70)
	B Cepacia	149	17.3 (1730)
	E Coli	55	22.4 (2240)
	P Aeruginosa	298	33.5 (3350)

Note [1]: EDDS concentration in brackets

Natrlquest

Natrlquest is classed as “readily biodegradable”. It has passed various biodegradability tests as recognised by the OECD. EDTA is not readily biodegradable as shown in the comparative biodegradability graph with EDDS below:



Test	Result
OECD 301B Sturm CO2 production test (20 & 40ppm) after 28 days.	>80% degraded
OECD 302A Semi continuous activated sludge test SCAS (20ppm)	96% DOC removal
OECD 303A Continuous activated sludge test CAS (20ppm)	96% DOC removal

Green Award Winner

Natrlquest was the Winner of UK Green Chemical Technology Award 2003 for Product Chemistry, awarded by CRYSTAL Faraday Partnership (Institute of Chemical Engineers, Royal Society of Chemistry, Chemical Industry Association)

Eco-Labels

Natrlquest is approved under the EU Flower Nordic Swan and Bra Miljöval eco-labeling schemes for Detergents and Household cleaners.

Packaging

Natrlquest E30 is a 37% aqueous solution of (EDDS) as its tri-sodium salt. It is available in 25kg, 250kg, 1000kg and bulk packages.

For further information, please email your region:

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