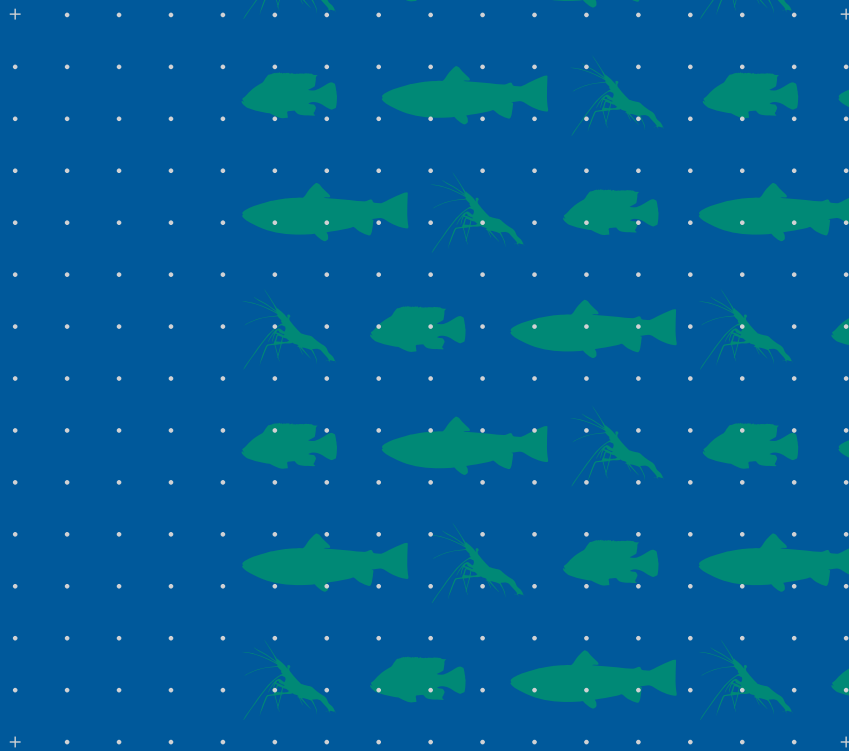


ROVIMIX[®] STAY-C[®] 35

The vitamin C form for fish and shrimp

a **DSM** Product



ROVIMIX® STAY-C® 35

- ROVIMIX® STAY-C® 35 designed for maximum stability in aggressively produced extruded diets.
- Fully bioavailable in salmon and trout.



- ROVIMIX® STAY-C® 35 ideal for shrimp diets – superior stability ensures optimum vitamin C levels in feeds submerged in water.

- ROVIMIX® STAY-C® 35 is the superior, cost effective vitamin C source.
- It is THE proven industry standard.



Problems

- Vitamin C is necessary for all fish and shrimp
- Vitamin C is very unstable and must be protected
- Free vitamin C or coated vitamin C is unstable
- Many vitamin C products have variable handling properties
- Many vitamin C products have variable ascorbic acid content

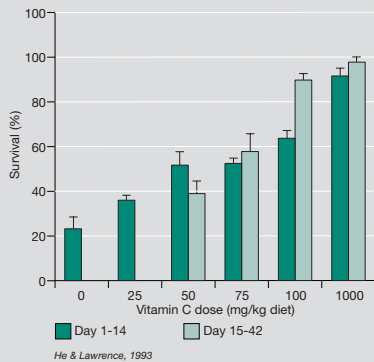
Product Benefits

- STAY-C® 35 is a fully bioavailable
- STAY-C® 35 is THE stable
- STAY-C® 35 is proven to be more effective than competing vitamin C forms
- STAY-C® 35 is fully optimized
- STAY-C® 35 has a guaranteed 35% ascorbic acid content
- STAY-C® 35 is THE original for aquaculture

ROVIMIX® STAY-C® 35

Vitamin C Requirement

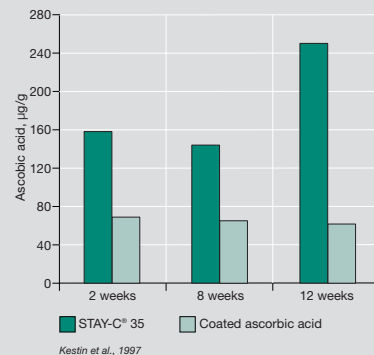
Survival (%) of *Penaeus vannamei* fed graded levels of vitamin C



Vitamin C is a requirement for the survival of shrimp and fish and must be included in the diet at a sufficient level to ensure good growth & survival.

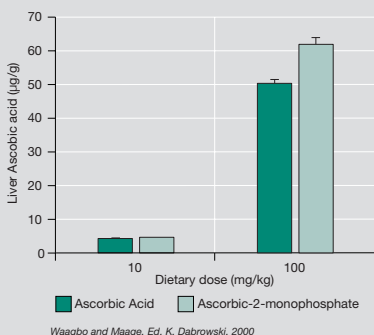
Bioavailability

Ascorbic acid concentration in the liver of Atlantic salmon fed on diets with different ascorbate sources



Bioavailability

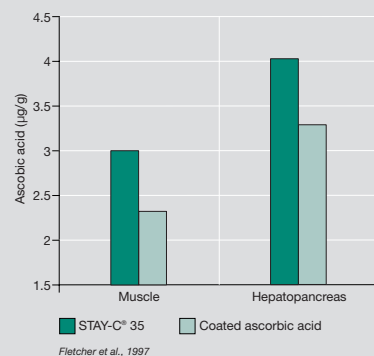
Comparison of the bioavailability of free ascorbic acid versus ascorbyl monophosphate in Atlantic salmon



Studies have demonstrated that ascorbyl monophosphate (e.g. STAY-C® 35) is as bioavailable as free ascorbic acid.

Bioavailability

Ascorbic acid deposition in the tissues of shrimp fed diets with various ascorbate sources (250 mg/kg) for 8 weeks



available vitamin C form

source of vitamin C in aquafeeds

is more stable and cost effective than
ascorbic acid

is preferred for superior handling properties

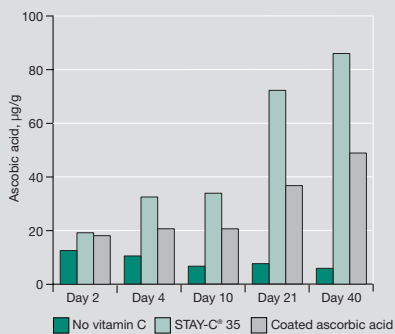
meets minimum level of 35% vitamin C

is the industry standard vitamin C source



Bioavailability

Ascorbic acid concentration in the liver of sea bream fed on diets with different ascorbate sources



Numerous studies have demonstrated that STAY-C® 35 is more bioavailable than coated ascorbic acid in salmonids, shrimp and marine species.

Bioavailability of vitamin C in fish is indicated by the levels of free ascorbic acid in liver, kidney and plasma. In shrimp, the concentration of free ascorbic acid in the whole body and hepatopancreas is a measure of bioavailability.

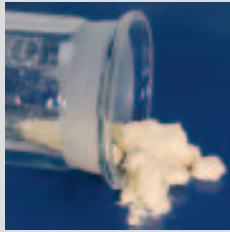
ROVIMIX® STAY-C® 35

The vitamin C form for fish and shrimp

STAY-C® 35 competitor product comparisons



ROVIMIX® STAY-C® 35



competitor A



competitor B

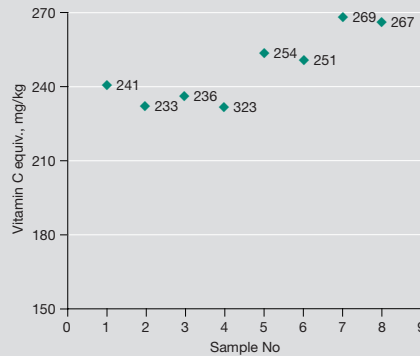


competitor C

Mixability

STAY-C® 35 mixability in aquafeed

Homogeneity of mixing of ROVIMIX® STAY-C® 35 in a pelleted fish feed

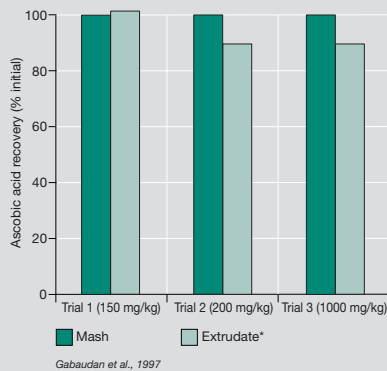


Gadient, 1997

STAY-C® 35 superior product quality ensures good flowability and mixability in aquafeed.

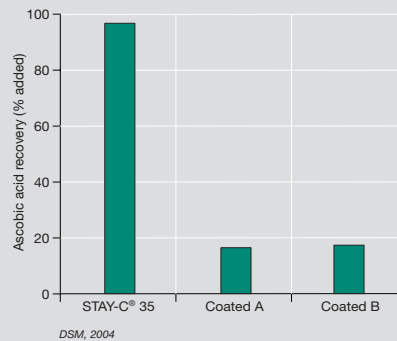
STAY-C® 35 stability in salmon and shrimp feeds

Retention of STAY-C® 35 in extruded (137°C) salmonid feeds (*corrected for added oil and moisture content)



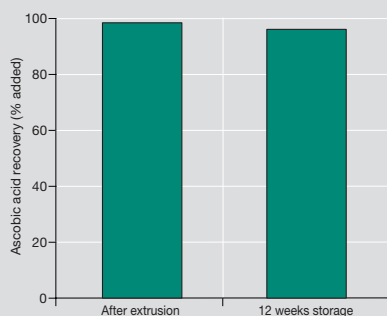
Gabaudan et al., 1997

STAY-C® 35 stability through shrimp feed manufacture (recovery as % added)



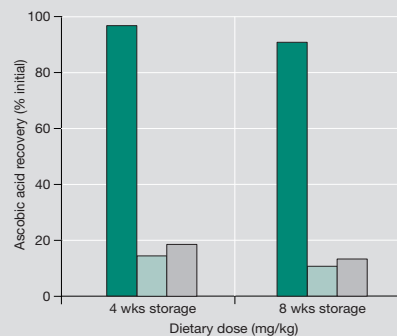
DSM, 2004

STAY-C® 35 stability during storage of extruded salmon feed (recovery as % added)



Gadient et al., 1997

STAY-C® 35 stability during storage of shrimp feed (recovery as % initial)



DSM, 2004

STAY-C® 35 has excellent stability during diet manufacture and storage, compared to other vitamin C forms.

Recommended inclusion rates of ROVIMIX® STAY-C® 35 in feeds for aquaculture species

Species	Recommended vitamin C supplementation* (mg/kg feed)	ROVIMIX® STAY-C® 35 inclusion* (g/tonne feed)
Trout	150 – 250	430 – 715
Salmon	150 – 250	430 – 715
Carp	150 – 250	430 – 715
Catfish	150 – 250	430 – 715
Seabream/Seabass	150 – 250	430 – 715
Eel	150 – 300	430 – 860
Tilapia	150 – 250	430 – 715
Shrimp	250 – 500	715 – 1430
* amounts should be increased by 30 % for fry and broodstock		
For wound healing, stimulation of immune response and winter feeding: 1000 mg vitamin C/kg feed		

ROVIMIX® STAY-C® 35 can also be used in all aggressively produced types of feed, such as:

- high-temperature pelleted feeds
- expanded or extruded feeds for land-based animals and pets.

ROVIMIX® STAY-C® 35 may be added:

- to the feed during mixing or
- incorporated in the premix

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