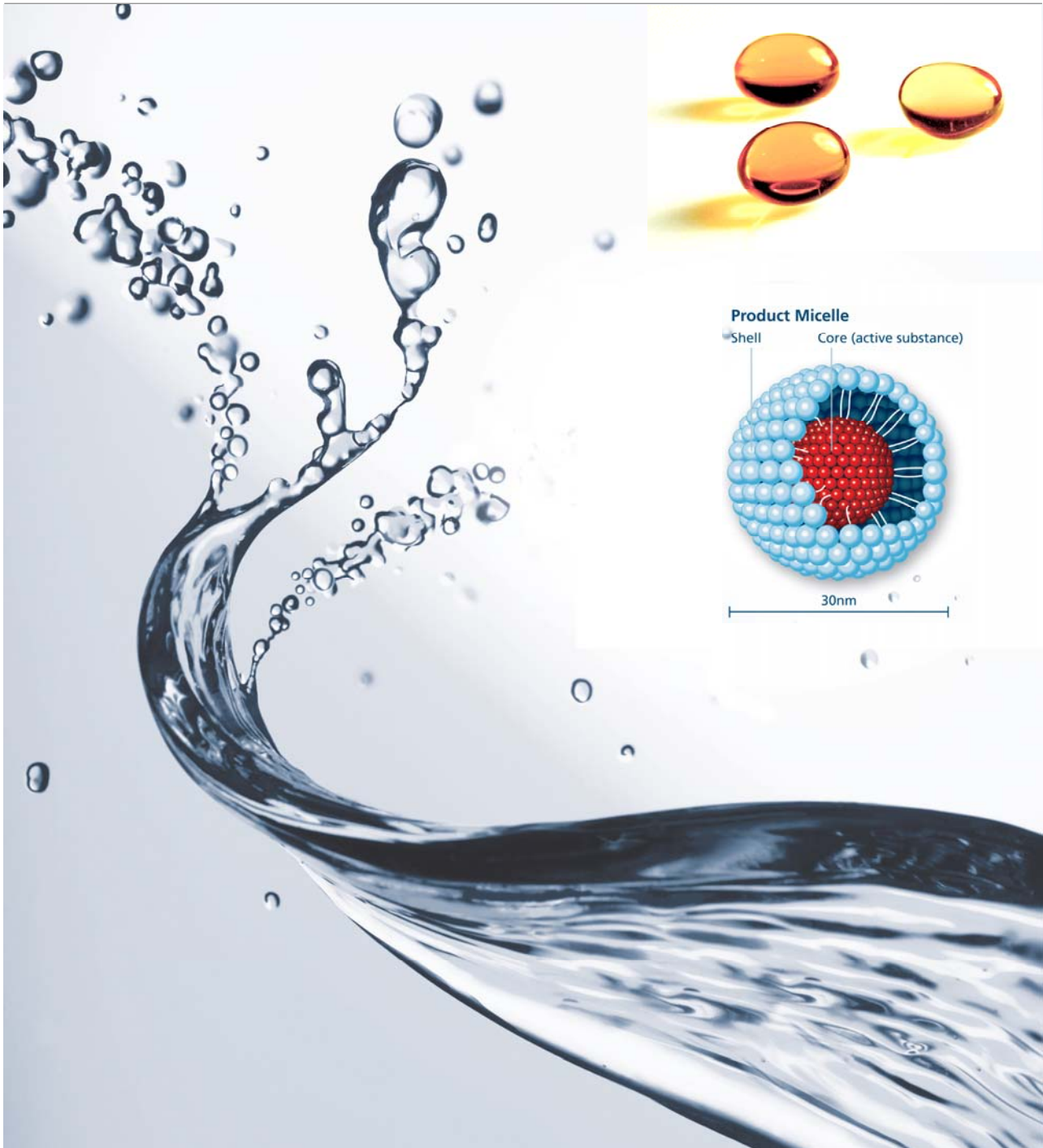


# NovaSOL® Technology

## Innovative Liquid Formulas for Dietary Supplements



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## Innovative Liquid Formulas for Dietary Supplements

### Vision and Objective

When we at AQUANOVA began developing our NovaSOL®-Technology, it was our objective to help our customers make their dietary supplements more effective by improving their bioavailability, in other words, increasing and/or accelerating their absorption. And this is still our objective.

**The better the bioavailability the higher the efficacy!**

Many actives are either fat soluble or hardly soluble at all, and, as a consequence, have a poor bioavailability. In order to get absorbed, they need to be physiologically "pre-processed" in the small intestine. However, this "pre-processing" takes time and is by no means quantitative. Very often only a small proportion of the active arrives where it is needed; the larger proportion is excreted without exerting any effect.

In addition, there are a number of factors that can inhibit the physiological "pre-processing" of the actives, which reduce the absorption even further. Those factors are more or less pronounced in different individuals but generally become stronger with age.

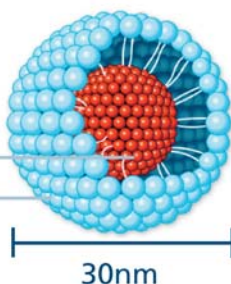
In patients with cystic fibrosis, a severe inborn metabolic disorder, the process is strongly hampered, resulting in insufficient, in severe cases, no absorption.

AQUANOVA's NovaSOL®-Technology renders insoluble actives truly soluble and makes the physiological "pre processing" unnecessary, which results in a significantly faster and more efficient absorption.

**NovaSOL® makes dietary supplements more efficacious!**

### NovaSOL® Product micelle

Core (active substance)  
Shell



### AQUANOVA offers

- Highly bioavailable, ready to encapsulate ingredient formulations (solubilisates)
- Encapsulated solubilisates (bulk soft gels)
- Liquid dietary supplements (containing the solubilisates)
- Custom development & manufacturing
- Scientific and technical support

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### Customer Support

We back our products with serious science and support our customers technically and scientifically with literature and studies as well as extensive product documentation. Please ask for:

- Individual Product data sheets
- Individual Product Folders
- Bioavailability studies of NovaSOL®-products
- Weight loss/weight management study NovaSOL® SUSTAIN

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### The NovaSOL® Technology

AQUANOVA's patented NovaSOL®-Technology involves the micellation and solubilization of actives which leads to nano sized particles called Product Micelles. They consist of a core and a shell. The core is formed by one or more active ingredients, the shell by a surfactant (solubilizer) system. If the core consists of more than one active, we call it a Mixed Product Micelle. The technology allows combining several ingredients in the same ratios in each Mixed Product Micelle.

The Product Micelles are spherical particles with diameters of approximately 30 nm, hence small enough for direct absorption through the intestinal membrane. The particle size distributions are extremely narrow; all micelles of one product have practically the same size. They are neither hydrophilic nor lipophilic but amphiphilic, which means they are soluble in both water and lipids. The Product Micelles are nanosized carriers for active ingredients. They mimic the micelles that are physiologically formed prior to absorption. So the NovaSOL®-process can be considered a mimicked digestion process. NovaSOL®-products are "pre-digested" active ingredients. This allows for a much faster and efficient absorption.

The Product Micelles are extremely pH-stable and pass the stomach without being affected by the gastric pH of ~1. At the site of absorption the active is released from the micelle, the solubilizer system gets excreted. The biological release mechanism is the same as with the physiological nutrient micelles.

For the shell material of the Product Micelles AQUANOVA uses safe and food approved ingredients only.

The NovaSOL®-technology yields liquid formulations of the active ingredients, which allows direct encapsulation without any additional excipients and pretreatment.



### Presentation

NovaSOL® products are crystal clear, liquid formulations („solubilisates“)

- Kosher
- Halal
- GMO-free



Electronic microscopic image of a product micelle in solution

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### Unique Properties of NovaSOL®-Products

AQUANOVA's NovaSOL®-ingredient formulations offer a wide array of practical advantages for the Nutrition industries i.e.:

- Strongly enhanced systemic absorption (bioavailability)
- Can be directly encapsulated. Do not need additional excipients or pretreatment
- Soluble in both aqueous and lipid systems
- Yield crystal clear solutions, e.g. in functional beverages or liquid supplements
- Optimal and homogenous distribution in the final product
- High stability against heat, shear and pH

### Ready to use product portfolio

Standard product portfolio: AQUANOVA supplies the following standard - products as liquid bulk formulations, bulk soft gels or packaged soft gels:

- |                    |                                                             |
|--------------------|-------------------------------------------------------------|
| • NovaSOL® Q       | - CoQ10-solubilisates                                       |
| • NovaSOL® Lipoic  | - α-Lipoic acid-solubilisate                                |
| • NovaSOL® SUSTAIN | - Special mixed solubilisate for weight loss and management |
| • NovaSOL® A       | - Vitamin A solubilisate                                    |
| • NovaSOL® ADEK    | - Mixed solubilisate of the fat soluble vitamins            |
| • NovaSOL® ADEKQ10 | - Mixed solubilisate of the fat soluble vitamins + CoQ10    |
| • NovaSOL® E       | - Vitamin E solubilisate                                    |
| • NovaSOL® Lutein  | - Lutein solubilisate                                       |
| • NovaSOL® BC      | - β-Carotene solubilisate                                   |
| • NovaSOL® ISO     | - Isoflavone solubilisate                                   |

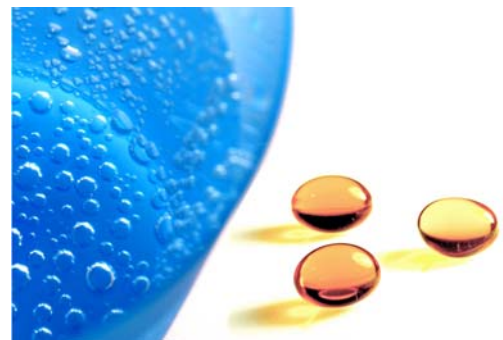
### Contract development and manufacturing

Contract development and manufacturing: Beside its standard product range AQUANOVA offers contract development and manufacturing of tailor-made ingredient solubilisates.

**We love to help our customers develop new innovative, more efficacious dietary supplements, and functional foods.**



Example for a liquid dietary supplement containing NovaSOL®



### Documentation & samples

On request we provide you with

- Product Data Sheet
- Safety Data Sheet
- Studies and analysis
- Samples

## Innovative Liquid Formulas for Dietary Supplements



Marco Hi-Tech JV LLC provides quality and consistent commodity ingredients as well as unique trademarked and patented ingredients to the dietary supplement industry. Marco Hi-Tech as the marketing and distribution partner for Taiyo is the premier supplier of Green Tea Extract in North America. Marco Hi-Tech is also one of the leading suppliers of Chondroitin and Glucosamine to the Joint Care market. Marco Hi-Tech is headquartered in New York City and maintains offices in Beijing, China and Orange County, CA. MHT has been developing and conducting clinical trials on patented ingredients such as Huperzine A to continue to drive the dietary supplement market since 1996. The Company's core business focuses on supplying specific quality ingredients to fulfill the development and existing raw material sku pipeline in the Weight Loss, Energy and Sports, Women's Health and Joint Care categories. Marco partners with research and development companies such as Forbes Medi-Tech on their cholesterol-lowering patented product Reducol® and Taiyo Kagaku on Green Tea Extracts such as the Sunphenon® Brand and AQUANOVA on their NovaSOL® CoQ10 product to continue to bring proprietary ingredients to the nutritional, functional food and beverage marketplace.

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AQUANOVA is a leading supplier of innovative and versatile formulations of food and cosmetic ingredients, nutrients and pharmaceutical actives with superior properties providing new application opportunities. AQUANOVA develops and produces nano structured liquid solubilisates (product brand "NovaSOL") utilizing its proprietary technology, and in close cooperation with renowned scientists. The solubilisates consist of nano-sized micelles with a diameter of 30 nm only, which are thermally, mechanically and pH stable, even in gastric acid. Owing to the special properties of these product micelles, the solubilisates allow for the development of novel innovative and pioneering dietary supplements, functional foods and beverages, cosmetic products and pharmaceuticals. The absorption (bio-availability) of the active substances from the solubilisates (product micelles) and hence the efficacy, is significantly increased and optimized. In addition the solubilisates exhibit unique technical features and benefits such as superior antioxidative capacity for essential oils or pH-independent function of food preservatives. The company's headquarter is located in Darmstadt (near Frankfurt), Germany.

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