



# Microencapsulating All Good Things in Life

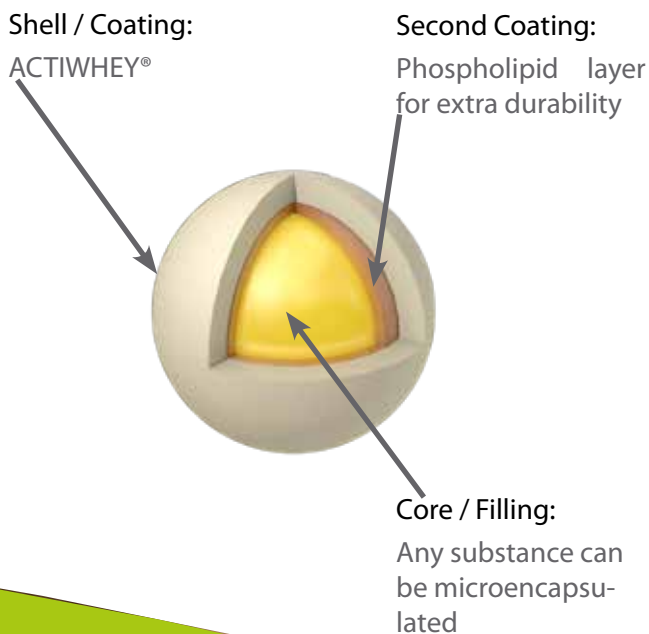
Gently coating your ingredient with ACTIWHEY®-microencapsulation technology. Solution for sensitive ingredients previously impossible or too costly to microencapsulate.

# ACTIWHEY®-microencapsulation protects and improves your product

Uniq Bioresearch Ltd has developed and patented a reliable and natural technology for microencapsulation of even the most delicate and challenging ingredients.

The first customer solutions are already on the market and new customer specific ingredients are tested and produced for market trials in ACTICAPS project, which started in October 2015 and will be completed in two years in September 2017.

This technology and the ACTICAPS project won the tight competition on the EU Horizon 2020 SME Phase 2 funding. Please see the page 8 for information on the ACTICAPS project.



The novelty of the ACTIWHEY® microencapsulation comes from:

1. Improves the **efficiency** of the original substance by preserving the quality and bioactivity of the ingredient;
2. Best microcapsule **durability** and reliability that guarantee remarkably **prolonged shelf life** and stability of the core ingredients (e.g. microencapsulated flaxseed/linseed oil intact after 7 years of storage)
3. **Superior nutrition** profile of the ACTIWHEY® coating material that comes from patented low-temperature activation process.
4. The most **safe and healthy** microencapsulation material that is rich of active SH-groups that provide antioxidative features (see page 6: The Science behind ACTIWHEY).
5. Market-leading microencapsulation efficiency, enabling up to **70% fill ratio**.



The ACTIWHEY® microencapsulation solution outperforms current alternative solutions for protecting the core from degenerative surroundings (oxygen, liquids, heat, UV); retarding evaporation of a volatile coreimproving the handling properties of a sticky or oily materials; and many other reasons.

### Why should you microencapsulate your product?

Protecting your delicate products usually means keeping them in a cool, dry and dark place. ACTIWHEY® microencapsulation technology is a solution which solves these issues. When you microencapsulate an oil it becomes a powder that is easily preserved in room temperatures and can be added into any product. The taste of ACTIWHEY® microcapsules is very mild, so any flavor can be added (eg. vanilla or lime). ACTIWHEY® microcapsules can prolong the shelf-life of oil ingredients up to 5 years. Imagine a vanilla flavored powder that is made of more than 55% omega 3 or other oils and the remaining part is nutritious whey protein. It couldn't get healthier than that.

### Example of ACTIWHEY® microencapsulated omega oil

Ingredients	
Rapeseed oil	Phospholipids
WPC (whey protein)	Antioxidants
ACTIWHEY®	
Product information	
Appearance	Light cream colored powder
Taste / odor	Mild (unflavored)
Microcapsule size	2-5 µm
Oil content	55%
Protein content	40%
Bulk density	0.6 g/cm <sup>3</sup>
pH	Approx. 6,5

### Description

Double coated, spray dried omega 3 rapeseed oil with optional flavor (e.g. lime, vanilla)

### Coating Material Comparison

Microcapsule Coating Material	Shelf life	Bond	Size	Nutrition	Content
ACTIWHEY®-protein	Excellent	Strong	1 - 20 µm	YES	40 - 55%
Carbohydrates	Leaks	Weak	*	YES	appr. 20 -30%
Celluloses	N/A	Weak	*	NO	appr. 20 -30%
Gums	N/A	Weak	*	NO	appr. 20 -30%
Lipids	Leaks	Weak	*	YES/NO	appr. 20 -30%
Proteins	Leaks	Weak	*	YES	appr. 20 -30%

# Actiwhey® - The Better Whey to Health

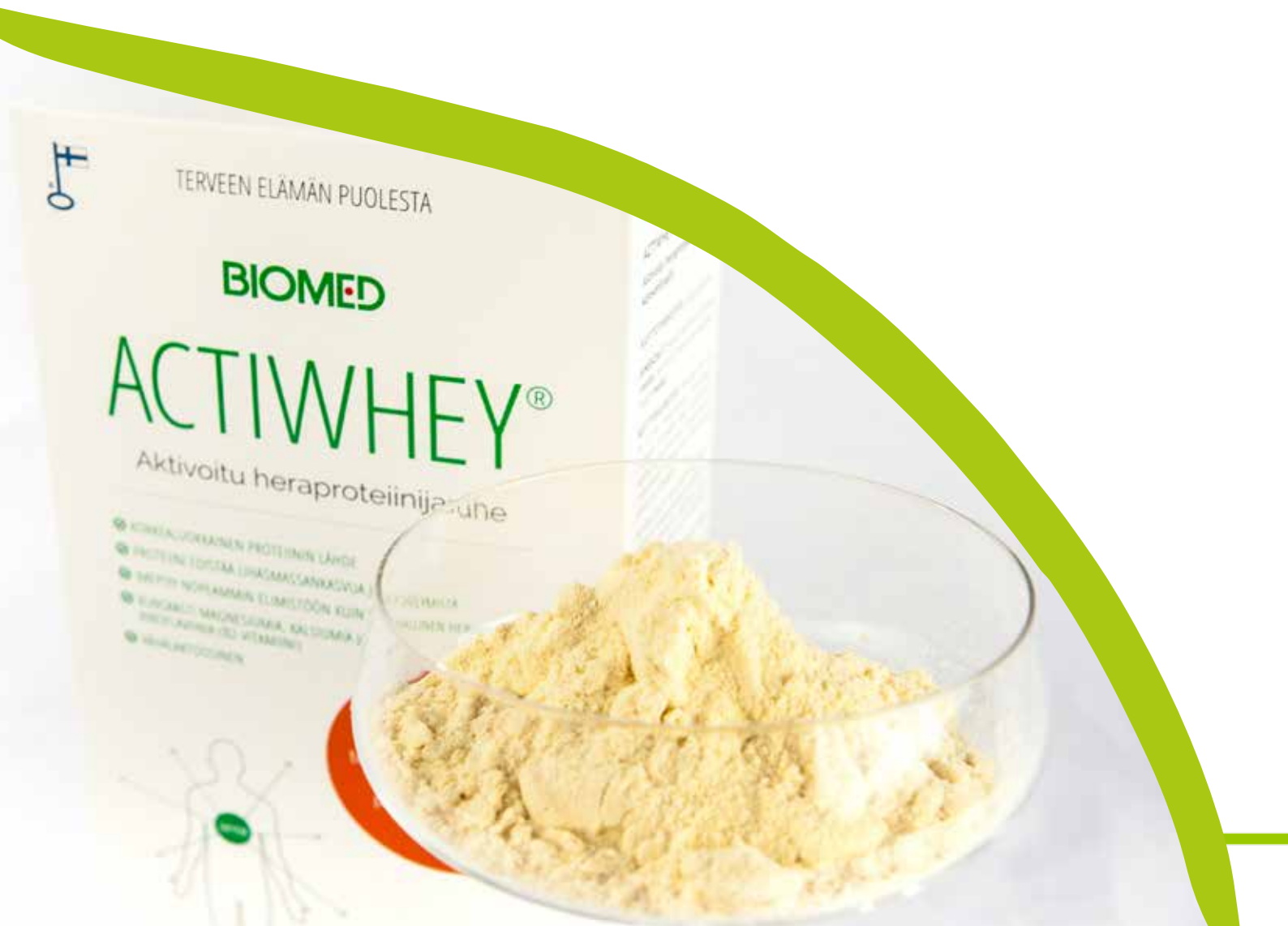
ACTIWHEY® is the purest form of good and nutritious protein. It is also a good source of magnesium, riboflavin, calcium, potassium and other compounds necessary for a balanced health. UniQ Bioresearch Ltd has developed a gentle method and process for whey protein activation, which unlocks additional SH-groups (antioxidants), increasing its antioxidative properties.

## Patented technology

UniQ Bioresearch Ltd.'s innovation is based on patented ACTIWHEY® whey protein.

Due to the great properties of ACTIWHEY® and the innovative microencapsulation technology, almost any substance can be microencapsulated with ACTIWHEY®. ACTIWHEY® enables new ingredients to be merged into (microencapsulated) many traditional food products that were impossible or too costly to incorporate before the invention of ACTIWHEY®.

ACTIWHEY® is approved by Evira as a safe food product in EU and an FDA equivalent GRASS notification is pending for approval. ACTIWHEY® is produced in Finland, from the best and purest whey ingredients.



# ACTIWHEY® - The Superfood of the year 2016

## So much more than just a regular whey protein!

The Finnish Health Product Traders Association (Suomen Terveystuotekauppiain Liitto) has chosen ACTIWHEY® as the Superfood of the Year 2016.

## ACTIWHEY® whey protein is

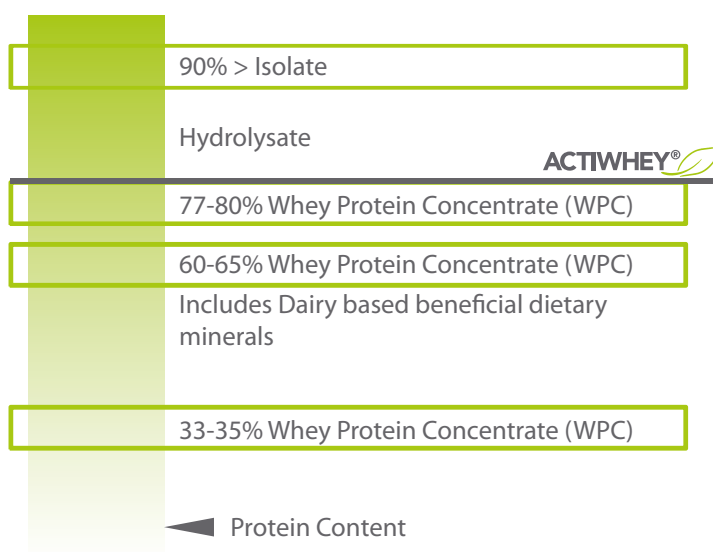
- An excellent source of protein, essential dietary minerals, as well as a source of vitamins
- A good source of necessary amino acids (100g contains approximately 22g BCAA)
- Great source of Calcium, Magnesium and vitamin B (One 20g serving includes Riboflavin (B2) 0.1 mg which is 10 % of the daily allowance)
- Easily digestible (Hydrolyzes quickly)
- Whey protein speeds up the body's own glutathione (essential antioxidant) production

## Actiwhey® - Packed with unique functional properties

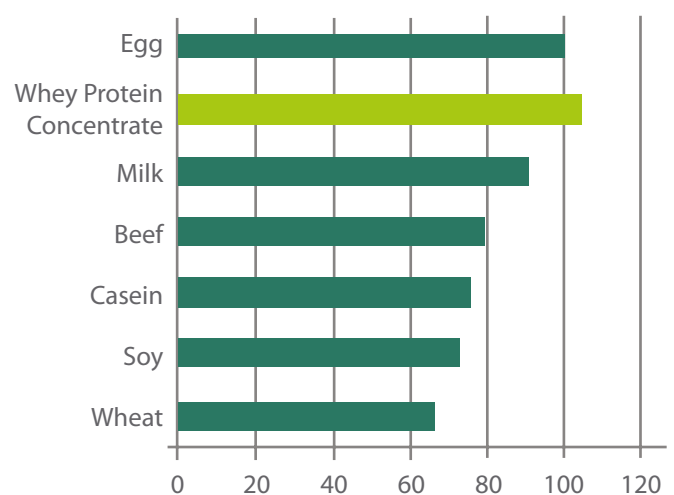
The amino acid composition of ACTIWHEY® is even more comprehensive than that of an egg – which is commonly considered to be the best possible. That is why ACTIWHEY® is an excellent source of protein, essential dietary minerals and vitamins. It has no additives or preservatives and it is low-lactose (below 0,2 g per daily dose). ACTIWHEY® also has a mild and pleasant taste.



## Whey Proteins



## Biological Data of Various Protein Sources



Egg serves as a reference value, so that different sources can obtain the value of more than 100.

# The Science behind ACTIWHEY®

ACTIWHEY® is based on **covalent bonds** because of the high concentration of **free SH groups** in its structure. Covalent bonds are stronger than the bonds formed by other microencapsulation materials thus resulting in more stable cores and improved shelf-life of the encapsulated commercial products.

In our tests together with LUKE Research laboratory it has been proven that **challenging and smelly oils like flaxseed oil are intact and fresh after 7 years of storage** in ACTIWHEY® microcapsules. Despite the durable and strong coating, the ACTIWHEY® microcapsules release the ingredients very efficiently.

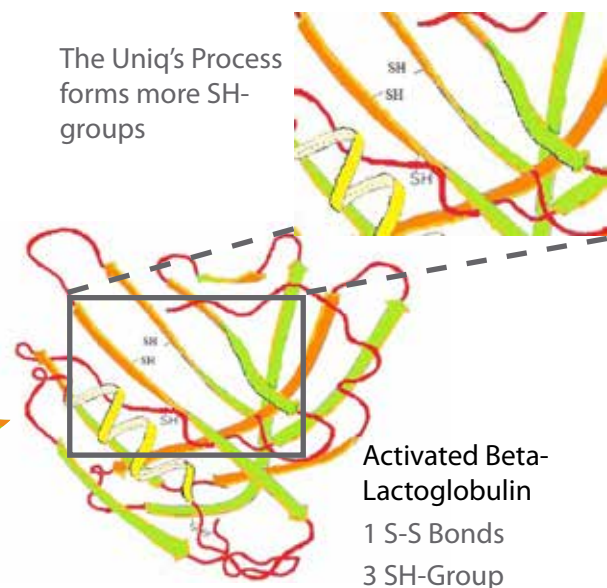
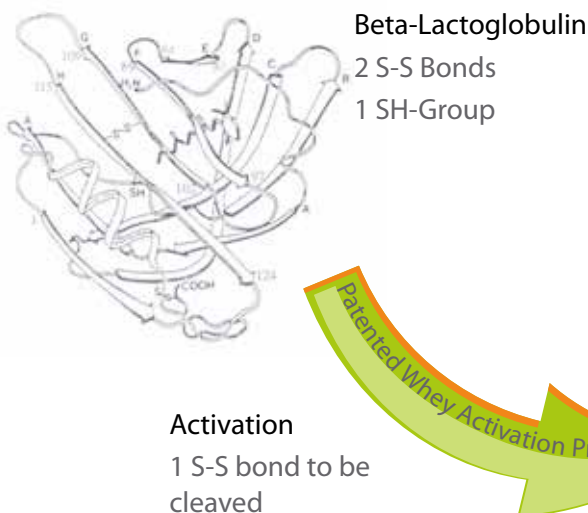
## The Better Whey to Health - ACTIWHEY®

- The only strong antioxidative whey protein on the Market
- Detoxifies the body
- Excellent source of protein, essential dietary minerals, as well as a source of vitamins
- A quality product from Finland
- No additives or preservatives
- A mild and pleasant taste

The competitive advantages of ACTIWHEY® microcapsules were proven lately by the tests **performed by an independent laboratory** on behalf of Uniq's potential customer. The test concluded that the ACTIWHEY® microcapsules have very good resistance to overheating and the coating has superb ingredients protection qualities even in extreme conditions. In addition, the independent laboratory test with customer's microencapsulated products revealed that the ACTIWHEY® microcapsules increased the ingredients efficiency and added additional functionalities to the existing product.

The patented activation process increases the amount of free SH groups in ACTIWHEY®. The benefits of free SH-groups are:

- Makes toxins harmless and removes them from the body
- Neutralizes microbial and plant based toxins, even aflatoxins
- Neutralizes acetaldehyde and acrylamide
- Chelates oxidizing metals e.g. Cu<sup>2+</sup>, Fe<sup>2+</sup> and heavy metals As<sup>3+</sup>, Cd<sup>2+</sup>, Co<sup>3+</sup>, Hg<sup>2+</sup>, Pb<sup>2+</sup> and Se<sup>2+</sup>
- Prevents the Maillard reaction
- Prevents the formation of Amador compounds
- Prevents enzymatic and non enzymatic browning



Hadley, W. M. (1975), The chemistry and biochemistry of the sulfhydryl groups in amino acids, peptides and proteins. By MENDEL FRIEDMAN. Pergamon Press, Elmsford, NY 10523, 1973. vii + 485 pp., J. Pharm. Sci. 1975, 64 (4), pp 715.

Friedman, M. Improvement in the safety of foods by SH-containing amino acids and peptides. J. Agric. Food Chem. 1994, 42 (1), pp 3-20.



## About Uniq Bioresearch

Uniq Bioresearch Ltd. is an innovative privately held Finnish biotech company developing new whey protein based product concepts and microencapsulation solutions for the health food, pharmaceutical, cosmetic, confectionary and dairy industries.

The Company offers novelty solutions using the patented activated whey protein ACTIWHEY®. Uniq Bioresearch has a number of industry and science cooperation partners and clients using its patented technologies.

Uniq Bioresearch Ltd won the tight competition on the EU Horizon 2020 Phase 2 funding with it's Project proposal: ACTICAPS - ACTIWHEY® based microencapsulation solution for sustainable food manufacturing.

The Company is headquartered in Espoo, Finland.

ACTIWHEY® is the Company's registered Trade Mark.

## The ISO-Certified Production Process

### Proper coating material makes a big difference

When processing delicate substances it is very important that the original quality and bioactivity remains. Our gentle ACTIWHEY® microencapsulation method is better for your product and better for the environment.

### Better sustainability with gentle activation process

The ACTIWHEY® microencapsulation technology requires remarkably less energy and heating compared to majority of the microencapsulation technologies.

The production process of ACTIWHEY® has been ISO 9001 certified.



# EU Horizon funding granted for ACTICAPS project

Uniq Bioresearch Ltd won the tight competition on the EU Horizon 2020 SME Phase 2 funding with its Project proposal: ACTICAPS - ACTIWHEY® based microencapsulation solution for sustainable food manufacturing.

The ACTICAPS project, which started in October 2015 will be completed in two years in September 2017.

The ambition in ACTICAPS project is to further improve the market-leading fill-coating ratio of ACTIWHEY® microcapsules; achieve significant production cost reduction and set-up a pilot production and testing line for scale-up analysis and dissemination.

## ACTICAPS project aims to

- reduce the microencapsulation costs by 91%;
- achieve up to 70% fill-coating ratio;
- improve controlled release and other key advantages;
- set up a larger production process for market validation and dissemination;
- create a scale-up package, incl. process planning strategy, production manuals and licensing concept;
- validate the innovation in three different market segments with most potential for fast market uptake.

This project is an integral part of the long-term development roadmap of Uniq Bioresearch. Our market uptake potential is based on 11+ years of R&D and business success, established key customer base, validated patented technology, experienced team and detailed feasibility study for identifying the best business and strategy.

The innovation project also enhances profitability and growth performance of Uniq Bioresearch's customers by combining and transferring new and existing knowledge into innovative, disruptive and competitive microencapsulation solution seizing European and global business opportunities. Our innovation will improve the current food production and processing systems by improving products shelf life, food safety and quality.



Project  
funded by the  
**EUROPEAN UNION**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 696601

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