

ONE MORE PROOF OF INDENA'S UBIQSOME® EFFICACY

NEW CLINICAL EVIDENCES CONFIRM BETTER MUSCLE UPTAKE IN INDIVIDUALS AFTER SUPPLEMENTATION WITH COENZYME Q₁₀ PHYTOSOME™

Milan, December 14th 2023 – A recently issued, new ex-vivo study demonstrates that CoQ10 Phytosome™, i.e. Indena's UBIQSOME®, optimizes cellular ubiquinone uptake in muscle cells in comparison to unformulated CoQ10¹. Those evidences confirm the uniqueness of muscle uptake with UBIQSOME® supplementation, already shown by a previous study².

Moreover, for the first time in CoQ10 formulations, UBIQSOME® resulted in scientific evidence of amelioration of CoQ10 muscle absorption after oral administration, being the only product on the market succeeding in enhancing both plasmatic and muscle CoQ10 levels.

COENZYME Q10 ORAL SUPPLEMENTATION HAS POINTS OF STRENGTH AND WEAKNESS: INDENA'S UBIQSOME® EMPOWERS IT, THANKS TO PHYTOSOME™ MULTI-TALENTED TECHNOLOGY PLATFORM

Coenzyme Q10 plays a central role in generation and regulation of cell bioenergy, being involved in transferring of electrons within the mitochondrial oxidative respiratory chain and hence, ATP production, and has reported to have antioxidant and beneficial effects in improving human health and well-being. On the other hand, CoQ10 has a low oral bioavailability, due to its poor water solubility, high molecular weight, low solubility in lipids and low intestinal permeability.

UBIQSOME® is the innovative food grade delivery system of coenzyme Q10 formulated with the proprietary Multi-Talented Technology Platform developed by Indena. It's Phytosome™, the breakthrough 100% food-grade delivery system that optimizes the performance of many natural actives in multiple ways, allowing to exploit their power and health benefits. Today, Phytosome™ is the most reliable and customizable solution in the nutraceutical field.

Thanks to its Phytosome™ formulation, UBIQSOME® is a food-grade highly bioavailable form, standardized in coenzyme Q10 (18-22% by HPLC), which optimizes coenzyme Q10 levels not only in blood but also in muscles. Indeed, the scientifically demonstrated significative presence of CoQ10 at muscular level represents a unique and successful goal which unequivocally differentiates UBIQSOME® from other ingredients.

THE LAST CLINICAL EVIDENCES SHOW THE CAPACITY OF UBIQSOME® TO REACH THE RIGHT BIOLOGICAL TARGET

The most recent human study¹ on CoQ10 Phytosome™ involved, using a crossover design, eight volunteers randomized to supplement 100 mg/daily CoQ10 for two weeks, delivered both in Phytosome™ form and in CoQ10 crystalline form. After supplementation, plasma was collected, and low-density lipoproteins (LDL) were extracted, normalized for CoQ10 content, and incubated with two different cell lines for 24 h.

The in-vitro results show that UBQ-enriched lipoproteins showed a higher bioavailability compared with crystalline CoQ10-enriched ones in both dermal fibroblasts and myoblasts. Those data suggest that Phytosome™ carriers might provide a specific advantage in delivering CoQ10 to skin and muscle tissues.

*"We're happy and proud of these new results from the study led by professor Tiano, which confirm that our UBIQSOME® is a great formulation of coenzyme Q10 - says **Serena Tongiani, Chief Product Officer at Indena** -. They are added to the scientific data build for our product, starting from the multiple evidences which show enhanced plasmatic levels of coenzyme Q10 thanks to UBIQSOME®. Moreover, this studies demonstrated for the first time in humans that UBIQSOME® optimize muscles levels of CoQ10 after oral supplementation compared to baseline. Last but not least, UBIQSOME® has been recently demonstrated to enhance endothelial function already after the first dose in young healthy subjects, showing itself as an effective support to cardiovascular health and healthy ageing even in absence of any specific disease.*

¹ Marcheggiani, F.; Orlando, P.; Silvestri, S.; Cirilli, I.; Riva, A.; Petrangolini, G.; Orsini, F.; Tiano, L. CoQ10Phytosomes Improve Cellular Ubiquinone Uptake in Skeletal Muscle Cells: An Ex Vivo Study Using CoQ10-Enriched Low-Density Lipoproteins Obtained in a Randomized Crossover Study. *Antioxidants* **2023**, *12*,964. <https://doi.org/10.3390/antiox12040964>

² Drobnic, Franchek, et al. "Efficient muscle distribution reflects the positive influence of coenzyme Q10 Phytosome in healthy aging athletes after stressing exercise." *Journal of Food Science and Nutrition Research*, 2020, vol. 3, num. 4, p. 262-275 (2020).

All the evidences we got in the last years, including the last ones recently issued, allow us to say that UBIQSOME® - CoQ10 Phytosome™ - is a reliable and promising ingredient for all traditional applications of CoQ10”.

How UBIQSOME® ACTUALLY WORKS?

Another *in-vitro* study³ has been made to investigate the mechanism of muscle absorption. Scientific evidences proved that macropinocytosis may underly the cellular internalization of UBIQSOME® in both intestinal and cardiac cells, mainly thanks to its Phytosome™ formulation. Indeed, lecithin matrix proper of Phytosome™ structure allows a higher internalization of Coenzyme Q10 compared with CoQ10 alone. Such evidences show that UBIQSOME® and the lecithin vehicle significantly increased the number of intracellular lipid droplets, especially in cardiac cells, suggesting that both CoQ10 and lipids from Phytosome™ can be internalized as lipid aggregates.

Data showed that UBIQSOME® increased CoQ10 in cell but also within mitochondria, leading to improved oxygen consumption, higher ATP and cell proteins production, higher mitochondria biogenesis and reduced oxidative stress.

Thanks to Phytosome™ delivery system, UBIQSOME® can make the difference in delivering CoQ10 within both muscle cell and mitochondria compared with traditional CoQ10 ingredients.

INDENA: SUSTAINABLE PRODUCTION AS A PART OF GLOBAL GOVERNANCE SUSTAINABILITY-ORIENTED

Sustainability has been an approach to governance for Indena for many years. The company makes a major commitment to protect nature, a source of inspiration but also of business, in innovating technology to address climate change and in taking care of people as the real source of sustainable success.

There are five main global sustainability challenges that Indena constantly addresses, to guide its vision and plans: climate change, loss of biodiversity, waste, social vulnerability and health.

Moreover, UBIQSOME® is produced in Indena's main plant at Settala near Milan, which is run according to sustainability principles, starting from an efficient energy management. In fact, Indena is equipping all its European sites with state-of-the-art photovoltaic panels. The total renewable energy self-production by 2024 will be of 5,013, 000 kwhours per year, equivalent to 2,340 Tons of CO₂. saved. In 2024, 67% of the energy used by Indena will be self-produced, of which almost 23% from renewable sources, and 5,177 Tons of CO₂ equivalent will be saved.

Indena SpA is an Italian company, a global leader in the identification, development, production and sale of extracts and pure active ingredients, mainly derived from medicinal plants, for use in the pharmaceutical, health food, cosmetics and veterinary industries. Backed up by a century of botanical experience, the company owns 100 patent families, has published more than 1000 scientific studies and co-operates with the world's most prestigious universities and private research institutions. Indena employs over 900 staff, investing a significant amount of its annual turnover in research, making this activity the key to its success. Headquartered in Milan, Indena has 4 production sites and 5 international branches throughout the world and manages sales in more than 80 countries. The company's experts communicate and interact constantly with the major international regulatory authorities and cooperate on the update of all the main pharmacopoeias.

CDMO activities are the priority in Indena's strategic vision. Today, Indena has a multipurpose GMP plant equipped with reactor ranging from 250 lt to 10,000 lt (Stainless Steel, Hastelloy, Glass-lined); a kilo lab LK2 to offer different capacities for products at the highest containment level (OEL 20 ng/m³ or OEB5); two spray dryers, large and a mid-size, working with organic solvents; a 20-liter hydrogenator being complemented by a 250-liter hydrogenator (ready at the end of 2023) to satisfy a wider demand for this kind of chemistry.

Find more on indena.com

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³ Rizzardi, Nicola, et al. "Coenzyme Q10 Phytosome Formulation Improves CoQ10 Bioavailability and Mitochondrial Functionality in Cultured Cells." *Antioxidants* 10.6 (2021): 927.