SILKbioTECH
Biotechnological production of antimicrobial silk

In the textile world, silk is a niche product but of high added value. The Lombard silk industry (district of Como) is totally dependent for the supply of the raw material, but is the world leader in the production of high-end textiles for clothing (fashion) and furniture because of quality and quantity. China holds a monopoly position in the world production of silk (~ 70%) and it is the most important supplier of raw materials for our silk-processing companies. Almost all the silk today available is absorbed by the textile production. The excellent aesthetic and functional properties of the fibre are well-known. In addition to traditional textile applications, silk is acquiring interesting positions in two other areas, cosmetics and biomedicals. In the cosmetic field the use of one of the silk protein (sercin) as an additive in creams, shampoos, lotions, soaps, has become very popular. The volumes are reduced, the amounts added to each product are quite low (<5%), but the claimed effects are extremely interesting (protective film forming, anti-wrinkle, moisturizing, regenerating, etc...). In the biomedical sector silk (fibroin) is gaining an increasing interest for the development of devices for tissue regeneration (skin, cartilage, bone, blood vessels, nerves, tendons, ligaments, etc...); biomedical devices made from silk are not commercially available, because many still are in the phase of pre-clinical evaluation, others have just reached the clinical phase. SILKbioTECH intends to radically innovate the production of silk by adopting an interdisciplinary and intersectoral technological platform, which coagulates skills and interests of various actors: silk, cosmetic and biomedical industries, supported by research institutions specialized in the field of textile technology, (bio) polymer science, biotechnology and molecular biology. In summary, SILKbioTECH would aim at developing and manufacturing a totally new silk fibre endowed with antimicrobial peptides "in vivo" co-extruded with the silk proteins by the worms, and at implementing the traditional techniques of silkworm rearing with advanced biotechnological solutions. Not only does this idea possess a scientific value and an original and innovative technology, but it also presents important cultural implications as it relates to the past Lombard tradition in moriculture and sericulture; therefore it intends to innovate two ancient agro-industrial activities with a view of multidisciplinary integration of knowledge and know-how.

CONSORTIUM:

Industrial Partners

- The Ratti group is a leader in the design and production of printed, solid and yarn dyed fabrics for apparel, shirts, swimwear, intimates and home decor and in the manufacturing and worldwide distribution of men and women accessories for the most important international fashion designers. The Ratti group produces over 3,000 km of fabrics and employs about 550 people in two manufacturing plants.

- Tintoria Clerici have been working for more than 100 years in the dyeing of silk with particular attention at the future. The company is a pioneer in the industrial automation and in computerization of machinery.

- Bioengineering Laboratories SpA (BEL) is a slim, young, polyhedric organization offering a deep technical knowledge, acquired with more than 20 years of experience, in the design, clinical testing and manufacture of innovative devices in the bioengineering field. It consists of a pool of specialized professionals capable to face and critically review the key fundamentals of a modern design in the medical field.

- Cosmetic division of Res Pharma Industriale, develops the supply of tensioactives, active ingredients, functional products, plant extract and raw materials. The company is equipped with modern manufacturing facilities where it is possible to perform sophisticated production runs.

Research Centres

- Silk Division of Innovhub-Stazioni Sperimentali per l'Industria is a textile research centre with a large specialization in the silk sector. It's involved in the development of advanced textile materials both in textile, biomedical and cosmetic area.

- Department of Biotechnology and Life Sciences (DBSV) of University of Insurbia has expertise in cell and molecular biology. Over the years this research unit has gained broad experience in the field of insect biotechnology and is a member of the Interuniversity Consortium for Biotechnology (CIB).

Consultants

- CRA-API (Consiglio per la ricerca e la sperimentazione in agricoltura) is active on two main fronts: research and services for agriculture and sericulture. The Sericulture section is developing several research fields, in particular the activity is divided into two complementary sectors: sericulture and moriculture.

- Systems Division of Linificio e Canapificio Nazionale SpA, studies, plans and manufactures linen and hard fibre hacking and spinning machinery within the Company and for the market too. The Systems Division can count on skilled technicians closely working with the production sector and extremely qualified technology experts who have been working in this sector for the past years.

- Torcitura di Asso was founded in 1983 as a handicraft business. In the mid-90s began twisted import market, supporting thus the activity of trade with craft pure. In 2007, the production moved to the local drive in Mandello del Lario, where is a micro-model of twisting that has the function of managing samples, small special manufacture and quality control.