

High-Control Production Technologies for Innovative Natural Cosmetics

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The project aimed to develop a tool for the production of cosmetic creams capable of offering a high degree of flexibility, advanced process control, and the ability to integrate with other manufacturing processes, enabling the full application of Toyota Production System principles in the cosmetic industry.

The need arose from the market's lack of tools with such characteristics, capable of addressing an increasingly diverse range of products in small volumes, controlling the process even in the face of a rise in inherently less standardized natural raw materials, and achieving these results by integrating with other processes to avoid a negative impact on costs.

The project was combined with another research aspect aimed at defining "green" extraction methodologies for natural raw materials, particularly in the realm of cream preservation, for use specifically with the new machine. The achieved result is a demonstrative prototype currently capable of processing a portion of the product range with the desired flexibility, control, and integration characteristics. This will be further enhanced by evolving the prototype through the adopted modular approach. The main challenges encountered relate to sensory aspects and certain structural elements, which were overcome with the fundamental contributions from FBK for sensors and Pro[M]'s additive manufacturing capabilities for structural elements.

The project's natural evolution, conceived from its inception, involves a complete integration aligned with Industry 4.0 principles to fully industrialize the machine and incorporate it into the production cycle.

The project once again demonstrated the importance of productive collaboration between the company, research institutions, and the public sector, represented in this case by the Autonomous Province of Trento, to which special thanks are extended. The realization was made possible by the funding provided through law 6/99.