ISGC 2022

N°610 / OC
TOPIC(s) : Biomass conversion / Industrial chemistry

PIVERT: The Accelerator of the Industrialisation of your Biobased Innovation

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PURPOSE OF THE ABSTRACT

PIVERT is a French SME specialised in the development and the scaling-up of processes in the field of green chemistry. We address multiple markets answering requests of clients from start-ups to large industrial groups. Our specificity relies on our high level and equal competences in two technical fields: biotechnology and chemistry. We offer the possibility for our clients to transfer their innovative projects into industrial processes by optimisation of the technical steps and the reduction of operating costs. Hence, we are positioned as an accelerator of industrialisation to reduce the time-to-market of biobased products. We can carry out nearly all the transformation steps from the pre-treatment of raw material to the final purification of the product of interest. We therefore combine different technologies such as grinding, extraction, and transformations. One other typical example is our integrated approach to perform fermentation followed by down-stream processes including chemical extraction with green solvents and purification.

We also offer the opportunity to young companies to be hosted in our 10,000 square meters technical hall. Today 3 companies: Evertree, CIMV, and Protera benefit from office spaces, laboratories and pilot facilities areas and we also supply administrative services, utilities, and technicians if needed. For two of them, we collaborate in early-stage projects developing new and innovative technologies.

In the presentation, recent success stories of processes optimisation and transfer to industrialisation will be detailed and a focus will be made on the development of PIVERT own technologies. As an example, a technology able to form surfactant-free emulsions using plant coproducts will be presented: Naturality is an important principle for customers in markets such as food and cosmetics. Therefore, efficient formulations with a minimum of natural ingredients without additives are nowadays favoured. In the case of emulsions, surfactants and sometimes antioxidants are needed and even if natural additives are appearing as alternative solutions, the high number of ingredients on product labels can still constitute an issue for customers.

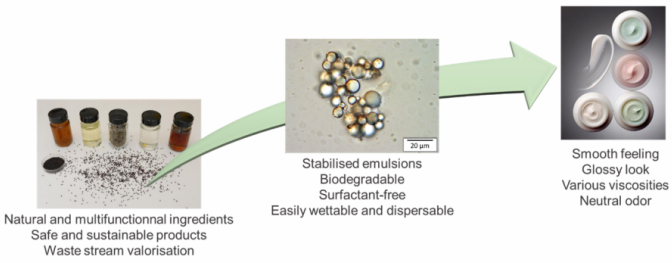
To tackle this challenge PIVERT has developed an innovative new technology that allows the formation of stable emulsions using only vegetal powder as stabilizer. The patented technology[1] generates highly stable oil-in-water emulsions due to a careful control of the process parameters. Different plant materials have been used as stabilizers and the more efficient emulsifying properties are obtained with oleaginous cakes and meals. The intrinsic properties of the oleaginous cakes provide a natural antioxidant protection of the formulated oils. Thus, no supplementary additives are needed and the list of ingredients of the formulation could be simplified. The technology was tested with success on different types of oils such as food grade oils and standard cosmetic oils.

Using a second patented process,[2] the stable emulsions can be dried by lyophilisation or atomisation. After a long storage period, the addition of water followed by a simple stirring, forms again the original stable emulsions. Analysis of the regenerated emulsions shows no loss of the stabilising properties. Hence, the technology gives access to dry emulsions that can be stored and reformulated without difficulty and opens the way for powdery products that can be easily rehydrated by customers.

Today the technology has been validated at pilot scale (TRL 5) and we are currently looking for prospects willing to test this technology to substitute surfactants and antioxidants in their formulations and to create new dry emulsified products. Thanks to a collaborative approach with the Iterg Group (Iterg-Improve), we provide a skilful

and complementary team able to develop all the processes for new formulations, from the proof-of-concept till the preindustrial production.

FIGURES



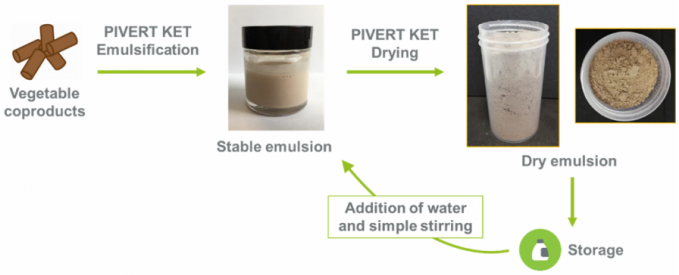


FIGURE 1

Figure 1

Stabilised emulsion using oleaginous cake powder

FIGURE 2

Figure 2

Dry emulsion process

KEYWORDS

Process scale-up | Pickering emulsion | Surfactant-free | Plant based ingredients

BIBLIOGRAPHY

[1] C. Faure, C. Joseph, F. Leal-Calderon, D. Pintori, FR1756459, 2017.

[2] C. Faure, C. Joseph, F. Leal-Calderon, D. Pintori, FR1756451, 2017.

This innovative technology emerged from a collaborative project between the SAS PIVERT, ITERG and the Institute of Chemistry & Biology of Membranes & Nano-objects (CBMN, Bordeaux), and was supported by the Programme d'Investissements d'Avenir (ANR-001-01).