Introduction
A range of different in vitro chemistry-based, like DPRA or GSH reactivity as well as cell-based methods like hCLAT or Keratinosens, have been developed and allow evaluating sensitization potential of cosmetic ingredients, however these are still limited. Metabolisms as well as bioavailability of ingredients are not taken into account.

A compound sensitizing potential depends firstly on its capacity to penetrate the skin. This potential could also be reduced or increased by the bioavailability of the test compound.

The SENS-IS test, developed by ImmunoSearch, assesses the ability of the test compound (ingredient or finish product) to specifically induce the gene expression of irritation and sensitization biomarkers in an in vitro 3D model of reconstructed skin (Episkin®).

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Material and methods
Application of irritant or sensitizing compounds at different concentrations induces the reversible destruction of the tissue and activation of immune system. These biological changes are induced by the specific expression of 62 different biomarkers analyzed by qRT-PCR.

To address all the aspects of complexity of skin sensitization and to take into account the variety of different types of chemical sensitizers SENS-IS uses a protected set of 62 biomarkers split into 3 groups:

- (1) a group of 24 genes will evaluate skin irritation and determined the minimal irritating dose.
- (2) a group of 17 genes is involved in the REDOX detoxification pathways (ARE genes).
- (3) a group of 21 genes will regulate inflammation, cell trafficking and tissue homeostasis (SENS-IS genes).

By measuring the number of overexpressed genes inside these three groups of genes at a given time after application and comparing them to controls, the SENS-IS test determines the sensitizing potential of compounds.

Indeed, a chemical is considering positive when it express more than 6 genes among the groups of ARE or SENS-IS genes defined for the SENS-IS test.

Moreover, by using escalating doses of the test chemical (typically, 50%, 10%, 1% and 0.1%), the SENS-IS test classifyes test chemicals from non sensitizer to weak (positive up to 50%), moderate (positive up to 10%), strong (positive up to 1%) to extreme sensitizer (positive up to 0.1%).

Conclusion
The primary goal in-between laboratories study was to assess the transferability and reliability of the SENS-IS assay (within and between laboratory reproducibility, WLR and BLR respectively) based on a test set of chemicals.

A secondary goal of the study was the evaluation of the reliability of the SENS-IS assay to clarify the tested chemicals into one of 5 reactivity classes (NS, Weak, Moderate, Strong and Extreme).