

IFSCC 2025 full paper (IFSCC2025-839)

“DROPLET CONTROL TECHNOLOGY FOR ETHANOL-FREE FRAGRANCE”

Eva BERTELOOT¹, Géraldine PEREZ² and Julie GIX^{2,*}

^{1,2,2*} P&B Recherche et Innovation, Saint-Chamas, FRANCE;

1. Introduction

Those last few years, the perfume market is in expansion, with a notable growth these last few years. One example is the rising of ‘dutes’ perfume, mimicking the smell of widely known perfumes, or mists, with a fainter scent, but used more frequently. The customs are changing in the perfume world.

This growth is even more notable that the ethanol is more and more controversial. It causes problems for humans - photosensible, the ethanol is affiliated with skin irritation and even bigger health problems¹. But it also causes problem for the environment². For instance, in California, for perfumes there are restriction on levels of uses that should be reduced³.

At the crossroads of those two major impacts on the perfume market, the DROPLET TECHNOLOGY CONTROL allows ethanol-free perfume. A true augmented perfume that is a skincare in itself with the ability to add actives in your daily fragrance. Sprayability and enhanced sensoriality are inherent in the formula because of the specific process. The likeliness of the notes and the remanence are proved herewith.

2. Materials and Methods

Droplet Control technology recently developed in order to obtain the next generation of emulsions with ultra-sensory textures developed using microfluidics and nanofluidics.

A disruptive innovation based exclusively on patented technology for a smarter approach to Next-Gen emulsion.

The technology is based on the physical principle of fluid elongation. Fluid elongates when it is subjected to a force that stretches its volume or surface area in a given direction. This process makes it possible to obtain precise and reproducible droplet sizes of the emulsion.

In cosmetic applications, this precise control of droplet size represents a major advance, notably by overcoming barriers related to solubility.

Moreover, this technology removes the following barriers : highly concentrated ethanol-free fragrances (>15% to 25% fragrance), high stability of active ingredients known to be sensitive, highly sensorial milky mist and sprayability.

This is possible with the development of a new equipment called "Morpho".

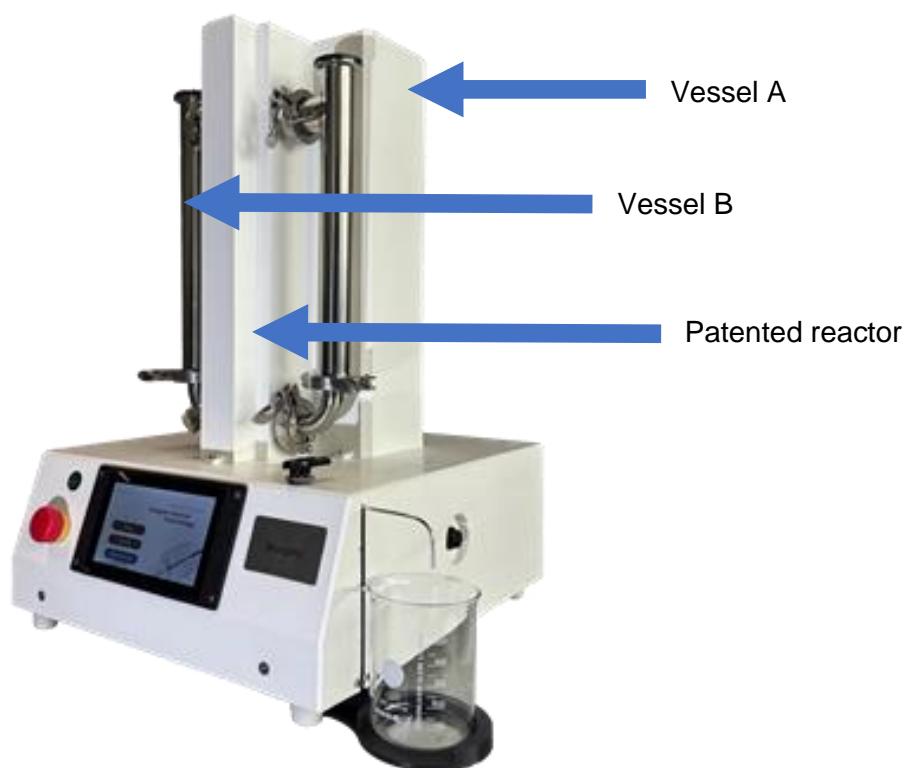
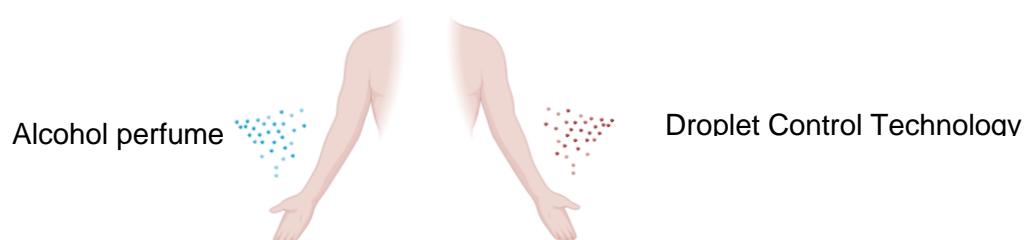


Fig. 1 Droplet Control Technology lab equipment « Morpho »

This process is made possible by moving the formulation back and forth between vessels A and B through the main important technical piece called reactor, to refine the droplet size to the desired one, which is measured and controlled by DLS.

Intern protocol on 50 volunteers

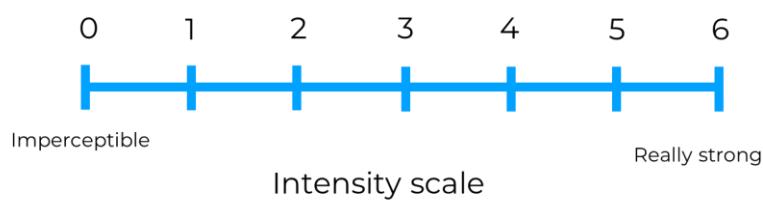
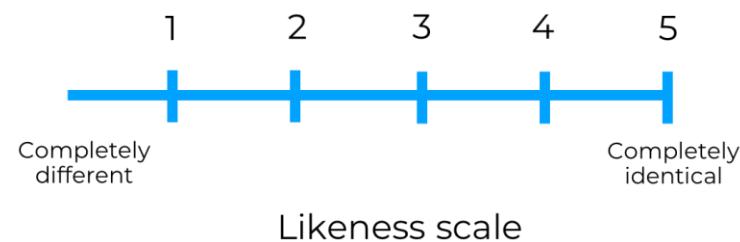


On each volunteer, an “eau de toilette” formula containing 15% of perfume is sprayed on one forearm and on the other forearm is applied the same quantity of “Droplet Control technology” chassis formula also containing 15% of the same fragranceX.

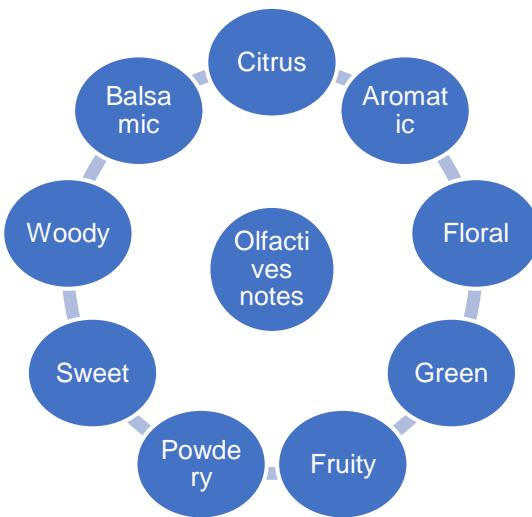
Both bases contain 15% of fragrance, the subjects were asked about the intensity, the notes as well as the likeness of both bases.

The perfume were applied blindfolded.

The experiment consists of 5 repeated evaluations at 3 different times of the day: at time T, 30 minutes later and 8 hours later.



For the olfactory notes, here the selection :



3. Results

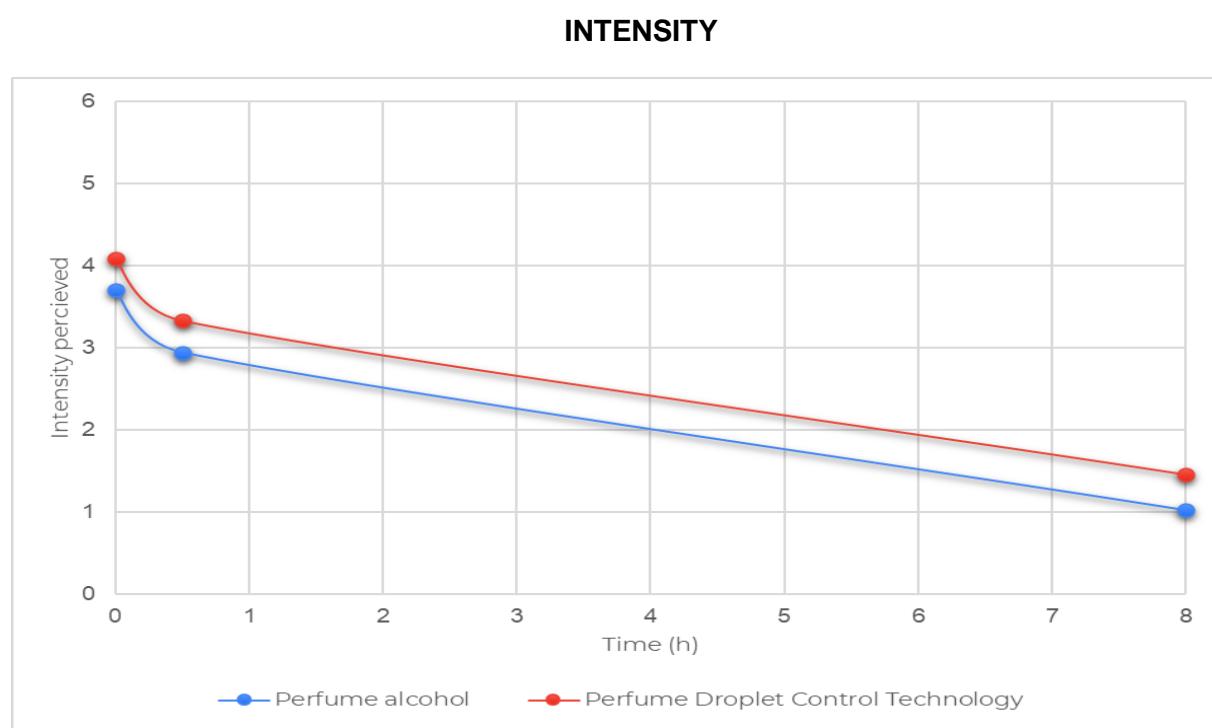


Fig. 2 Comparison of the intensity perceived at different times

The intensity perceived by the volunteers is higher for the Droplet Technology Control perfume compared to the alcohol-based one by 10% at the application, 13% after 30 minutes and up to 36% after 8h.

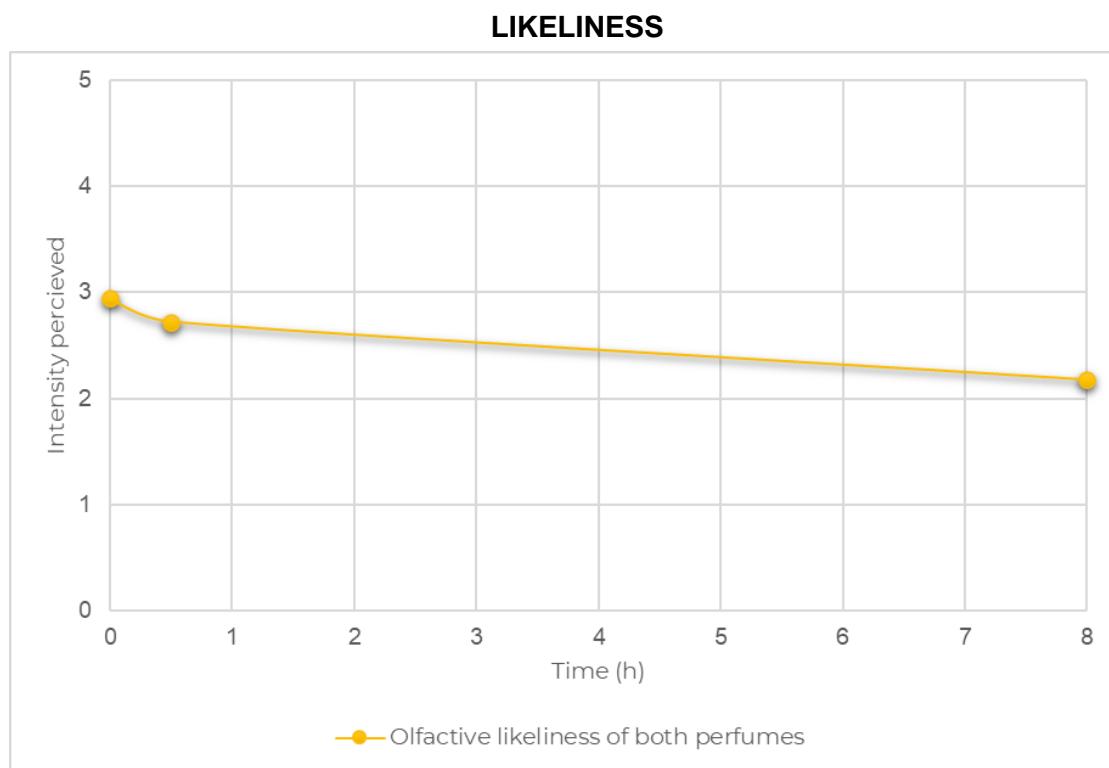


Fig. 3 Olfactive likeliness between both perfumes

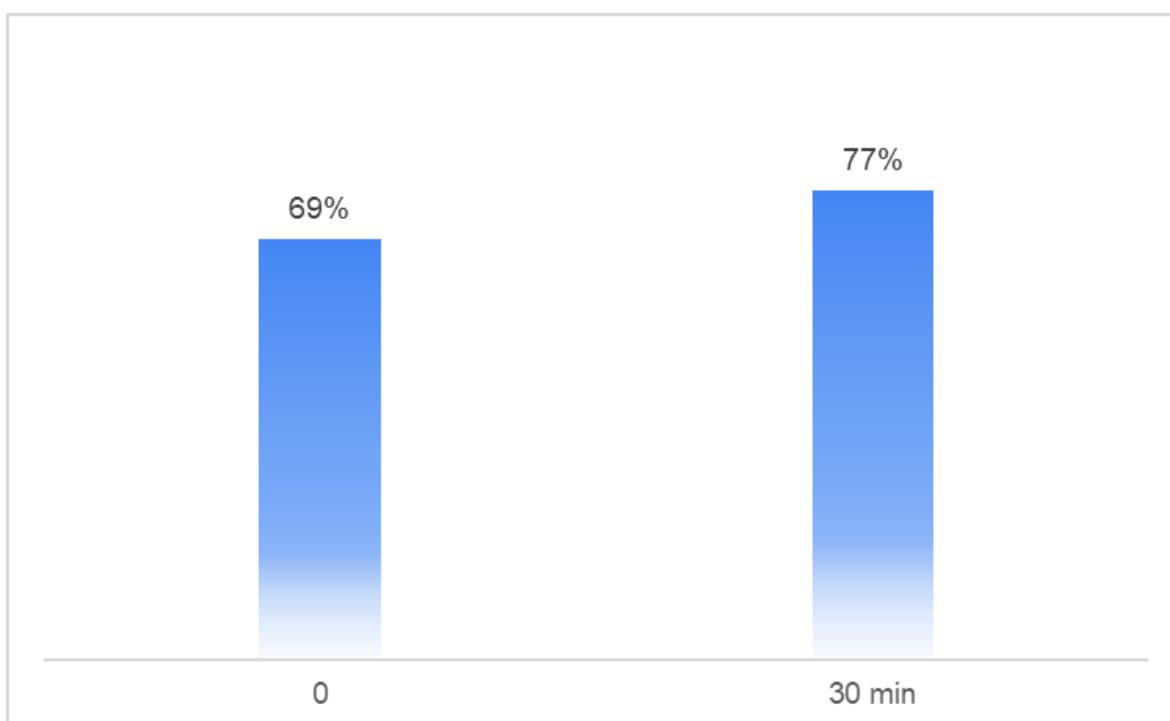


Fig. 4 Individual average percentage of same note cited

The olfactory likeliness between both perfumes is deemed identical at the application and 30 min after. At 8 hours, the perfume are more different, this can be explained by the lack of scent felt by many volunteers.

It can be noted that individually, the volunteers selected in average 69% of the same notes after application and 77% after 30 minutes.

4. Discussion

The study shows that the Droplet Control technology perfume follows the same curve as the alcohol one

The study shows that the intensity perceived is higher by 10% at the application and up to 36% after 8 hours.

The likeliness of both perfume was deemed quite identical, but in average 2 out of 3 notes cited are identical after application and 77% after 30 minutes.

The Droplet Control technology has proven to have an even higher intensity than the alcohol-based perfume. For the likeliness of the perfume, to better characterize the notes, we could run a test with a panel of experts.

Nonetheless, this technology is breaking barriers within the perfume world but not only, this technology will open doors in toiletries, skincare, suncare, haircare and more ...

5. Conclusion

In the case of alcohol-free fragrance, this technology also makes it possible to be very faithful to the “eau de toilette/eau de parfum” olfactory notes and to be long-lasting.

It is also the skinification of perfume, which can be infused with active ingredients for a new skin care experience, while creating a new category of products.

It now makes it possible to develop entirely water-based galenic formulations, opening the way to new textures and sensorial performances, while ensuring a strong sustainability commitment. This technology is based on a low-energy consumption and highly precise process making production more eco-friendly in terms of carbon footprint and more respectful of water resources.

References

- ¹ : <https://pmc.ncbi.nlm.nih.gov/articles/PMC2596158/> Lachenmeier DW. Safety evaluation of topical applications of ethanol on the skin and inside the oral cavity. J Occup Med Toxicol. 2008 Nov 13;3:26. doi: 10.1186/1745-6673-3-26. PMID: 19014531; PMCID: PMC2596158.
- ² :https://e360.yale.edu/features/the_case_against_ethanol_bad_for_environment
- ³ : <https://www.premiumbeautynews.com/en/alcohol-free-fragrances-towards,24143>