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MASTER THESIS PROJECT

In vitro ecotoxicity tests of UV filter molecules on *C. vulgaris* and Common Carp Brain (CCB) cell lines

CONFIDENTIAL

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ABSTRACT

Yves Rocher, a French cosmetic manufacturer, currently wants to investigate 4 UV filter molecules coded as KB01, KB02, KB03, and KB04 for the possibility of the incorporation into their new products in the future. Final environmental concentration of each UV filter used in this investigation was 25 µg/L, corresponding to 10x the maximum estimated concentration in a swimming area. The concentration of each UV filter molecule inside their chassis was 3%. The pure chassis was coded KB06 in this project. As a cosmetic manufacturer that cares about the environment and animal welfare, Yves Rocher planned to use *in vitro* toxicity tests to find out which UV filter is the safest for aquatic environment among those 4 molecules. In cooperation with UMR-I 02 SEBIO laboratory University of Reims Champagne Ardenne (URCA), this *in vitro* test used the cells of aquatic organisms from two different trophic levels. Those cells were taken from microalgae *Chlorella vulgaris* and cell lines of CCB (Common Carp Brain) fibroblast. Endpoints measured on *C. vulgaris* were growth rate, ROS production, mortality, and autofluorescence after 16 hours and 72 hours of exposure using flow cytometry analysis. For CCB, we measured mortality after 24 hours of exposure using flow cytometry analysis and wound healing (i.e. immunomodulatory activities) assay using live imaging microscopy after 26 hours and 48 hours of exposure. UV filter molecules that were assessed in this study did not cause high mortality compared to the negative control in *C. vulgaris* and CCB assays at the tested concentration. Significant difference in growth rate after 16 hours of exposure between the negative control and all UV filter molecules treated samples was observed, suggesting a longer lag phase of the microalgae due to UV filter molecules effects. Besides, KB02 and KB04 induced autofluorescence inhibition after 16 hours of exposure. In addition, they did not alter CCB fibroblast immunomodulatory activities. Nevertheless, further study should be carried out to assess the toxicity of these UV filter molecules on other species and other endpoints, notably In addition, they did not alter CCB fibroblast immunomodulatory activities.