“APPLICATION OF I.A.R.A™ METHODOLOGY IN THE DEVELOPMENT OF COSMETIC PRODUTS WITH AQUATIC ENVIRONMENTAL IMPACT REDUCTION”

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Rinse off cosmetic products end up becoming effluents. This highlights the importance of assessing the aquatic environmental impact (EI) during the development of products. Facing this need, Grupo Boticario (GB) developed the I.A.R.A™. methodology. The methodology comprises the assessment of three aquatic environmental parameters: biodegradability, bioaccumulation, and acute toxicity of raw materials (RM). To conduct the assessment, no animal testing is performed, instead, the data available in the literature, from in vitro methodologies and/or in silico tools are used. For the assessment, a numerical risk classification was defined, in agreement with Environmental Protection Agency (EPA) and Regulation (EC) No 1272/2008. The highest value that could be applied to each parameter is 6, and the sum of them results in a final RM risk score. To assess the cosmetic product, the RM score is multiplied by the RM concentration in the product and the percentage of the active ingredient. The result is converted to decimal and divided by 100. The value obtained for each RM, is summed, resulting in the product EI value. The products' EI values are organized according to the product type, resulting in a mean EI value for the product subcategory. Using I.A.R.A™ methodology, the shampoos launched between 2018 and 2019 by the GB (n:31) achieved an EI mean value of 1,359 (±0,257). And the shampoos (n: 10) of the new GB brand, Eume, obtained an EI mean value of 1,169 (±0,171). The means were statistically different ($p<0,05$), according to the t-test. A 14% reduction in EI was acquired for Eume brand shampoos. This study showed that the I.A.R.A™ methodology is a powerful tool that enables to quantify the EI and to develop more eco-friendly cosmetics, in comparison to products already launched by GB.

Keywords: Aquatic environmental impact, Risk assessment, Cosmetic, Sustainability