IN-VITRO TESTING: ALTERNATIVE METHODS TO ASSESS TOXICOLOGY AND EFFICACY OF COSMETICS

Opposition to animal testing of cosmetic products and ingredients, as well as an outright ban across the EU, has been a significant driver to the in-vitro testing sector in recent years. As a result, the industry has seen technological advancements and innovations to make it both more useful and cost effective.

In-vitro toxicology testing is commonly employed by the pharmaceutical, cosmetic, chemical, food, medical device and diagnostics industries to test the safety (toxicology/toxicity) and efficacy of chemicals, bio-chemicals, materials, preparations and vaccines. It offers an effective and ever-improving alternative to animal testing. In some areas, such as cosmetics destined for the EU, it replaces animal testing completely. In others it can be used to reduce the number of animals and tests required, or refine procedures to limit animal impacts.

IN-VITRO IN THE COSMETICS INDUSTRY

In the cosmetics industry, in-vitro testing is used to confirm the lack of certain toxic properties in cosmetic and personal care products, as well as their ingredients. It can be used both to test the efficacy of products and to achieve regulatory approval. For instance, data on skin irritation effects are required by the following legislation:

- EU Regulation on Cosmetics Products (EC 1223/2009)
- Classification, Labelling and Packaging (CLP) Regulation (EC 1272/2008)
- REACH Regulation (EC 1907/2006)

EU BAN ON ANIMAL TESTING

In 2013, EU Cosmetic Regulation (1223/2009) introduced a ban on animal testing for all new cosmetics sold in Europe, and their ingredients. The ban also applies to products, or ingredients, which have been subject to animal testing outside Europe.

In-vitro toxicology testing offers a non-animal alternative to the cosmetics and personal care industry. It allows the effective evaluation of the potential of end products and ingredients to cause skin (dermal) or eye (ocular) irritation, skin corrosion and other adverse side effects when consumers use them.

COSMETICS INDUSTRY IN-VITRO METHODS

The safety of cosmetic and personal care products is key for manufacturers, importers, retailers and consumers. Nobody wants to hurt people, or be hurt, by rogue products and ingredients. In-vitro toxicology testing helps you to evaluate a product or ingredients’ potential to cause dermal/ocular irritation or dermal corrosion when used by a consumer. The principal test methods are cell-based and biochemical assays, ex-vivo and in-silico.
ACUTE TOXICITY
Cytotoxicity tests assess the skin irritation potential on cultured human or mammalian cell lines. Cytotoxicity is the first test to provide reliable insight into the safety of cosmetics. Toxic effects on the cellular level could be identified by different viability tests including:
- Neutral Red Uptake (NRU, NRR)
- MTT Assay
- Microscopical LiveDead Test
Skin irritation tests assess the potential for chemically induced skin damage that is reversible (irritation) or irreversible, for example:
- Reconstructed human epidermis (RhE) test method (OECD 439)

Skin corrosion tests assess the potential of a substance/mixture to cause irreversible damage to the skin, such as:
- Epidermal Skin Test (OECD 431)

Eye irritation/corrosion tests assess the potential for chemically induced damage to the eye that is reversible (irritation) or irreversible (corrosion), for example:
- Bovine corneal opacity and permeability (BCOP) test
- Determination of haemolytic activity, red blood cell (RBC) test
- Hen’s Egg Test (HET-CAM)

PHOTOTOXICITY
Phototoxicity tests (OECD 432) assess the potential for chemically induced skin irritation, it is known as photoirritation, including for example:
- 3T3 Neutral Red Uptake (NRU, NRR)

MUTAGENICITY
Mutagenicity tests increase understanding of the potential for genotoxic hazard (DNA changes/damage), for example:
- Ames test in accordance with OECD 471, fluctuation and contact plate method
- Comet tests

SGS SERVICES
With extensive experience in non-animal testing methods, our scientists conduct a broad range of in-vitro testing services addressing the issues of skin and eye irritation, skin corrosion, phototoxicity, cytotoxicity and mutagenicity. Using state-of-the-art testing equipment, our labs deliver testing services that comply with international standards, under both GLP and accredited conditions.

Our global network of cosmetics and personal care experts are based at laboratories in Europe, Asia and the Americas, making SGS the perfect partner to help you develop cosmetic and personal care products and bring them to market.

For further details visit: www.sgs.com/cosmetics, contact your local SGS representative or reach out to our global team at: consumer.products@sgs.com.

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