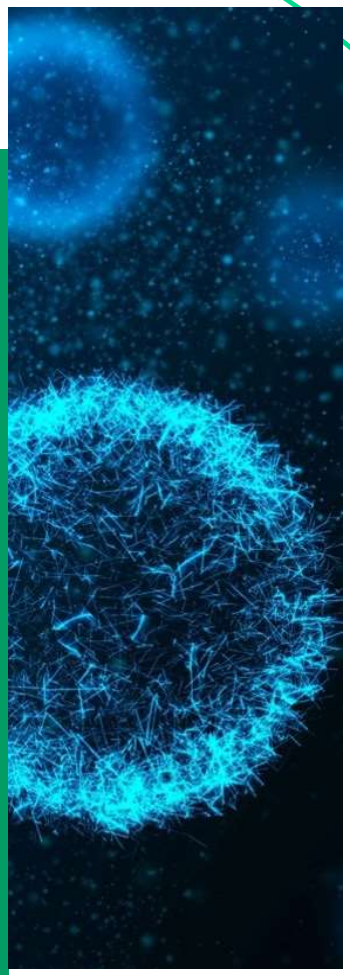
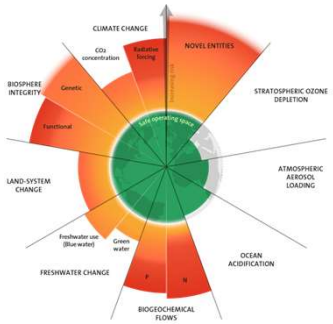
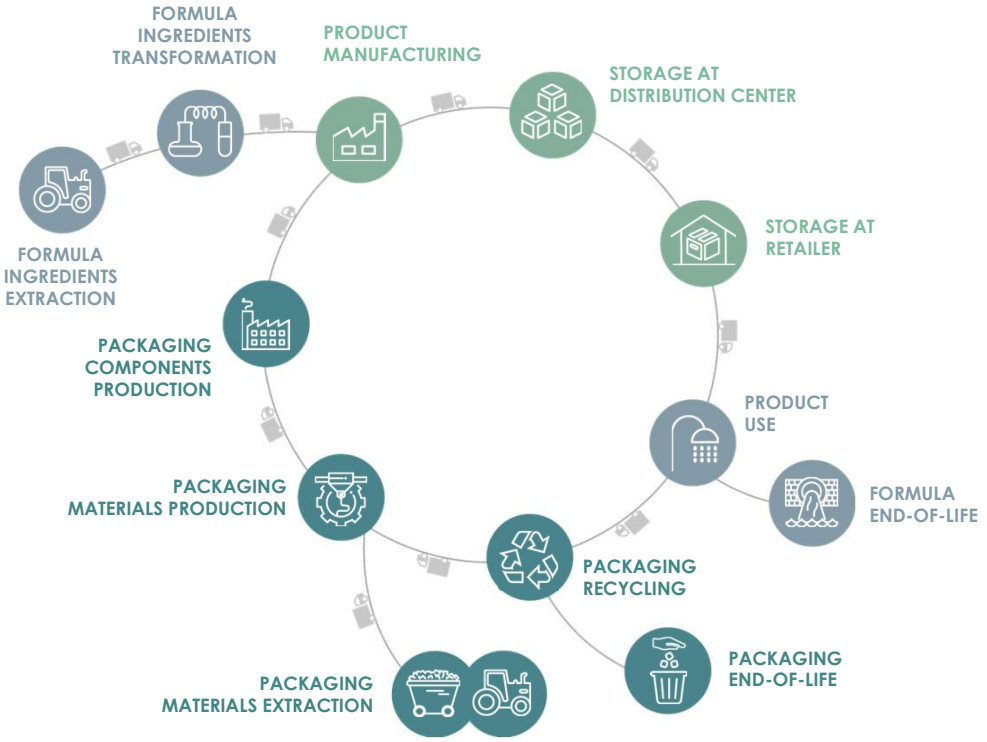


QUESTION 1

L'OREAL FOR THE FUTURE

OUR 2030 SUSTAINABILITY PROGRAMME





INGREDIENTS – PRODUCTION & END OF LIFE

PACKAGING – PRODUCTION & RECYCLING

FORMULATION & DISTRIBUTION

A CIRCULAR, LIFE CYCLE-BASED APPROACH

Credit: Azote for Stockholm Resilience Centre, Stockholm University. Based on Richardson et al. 2023, Steffen et al. 2015, and Rockström et al. 2009)

L'OREAL FOR THE FUTURE

OUR SUSTAINABILITY COMMITMENTS

L'ORÉAL FOR THE FUTURE

TRANSFORMING OURSELVES

CLIMATE

By 2025, all of our sites will achieve carbon neutrality by improving energy efficiency and using 100% renewable energy.

By 2030, we will innovate to enable our consumers to reduce their greenhouse gas emissions resulting from the use of our products by 25% compared to 2016, on average and per finished product.

By 2030, we will reduce by 50% on average and per finished product, the greenhouse gas emissions linked to the transport of our products, compared to 2016.

By 2030, our strategic suppliers will reduce their direct emissions (scopes 1 and 2), by 50% in absolute terms, compared to 2016.

WATER

By 2030, we will evaluate all our formulas thanks to our environmental test platform, to guarantee they are respectful of all aquatic ecosystems, whether continental or coastal.

By 2030, we will innovate to enable our consumers to reduce by 25%, on average and per finished product, the water consumption linked to the use of our products, compared to 2016.

In 2030, 100% of the water used in our industrial processes will be recycled and reused in a loop.

In 2030, all our strategic suppliers will use water sustainably in the areas where they operate.

BIODIVERSITY

By 2030, 100% of the biobased ingredients for formulas and packaging materials will be traceable and will come from sustainable sources, none of them will be linked to deforestation.

By 2030, we will hold flat the the total land occupancy vital to the sourcing of our ingredients, compared to 2019.

By 2030, 100% of our industrial sites and all our operated buildings will have a positive impact on biodiversity, compared to 2019.

RESOURCES

By 2030, 95% of our ingredients in formula will be biobased, derived from abundant minerals or from circular processes.

By 2030, 100% of the plastic used in our packaging will be either from recycled or biobased sources (we will reach 50% in 2025).

By 2030, we will reduce by 20% in intensity the quantity of packaging used for our products, compared to 2019.

By 2025, 100% of our plastic packaging will be refillable, reusable, recyclable or compostable.

By 2025, 100% of our new displays will be ecodesigned, taking into account circular economy principles for end of life management, and 100% of our new Free Standing Stores will be designed and built following our sustainability principles.

By 2030, 100% of the waste generated in our sites will be recycled or reused.

EMPOWERING OUR BUSINESS ECOSYSTEM

By 2030, 100% of our strategic suppliers' employees will be paid at least a living wage covering their basic needs and those of their dependents, calculated in line with best practices.

By 2030, we will help 100,000 people from disadvantaged communities gain access to employment.

By 2030, 3 million people will benefit from our brands' social engagement programs.

By 2022, the Product Environmental and Social Labelling system will apply to all the Group's rinse-off products.

By 2030, all the Group's products will be ecodesigned.

CONTRIBUTING TO SOLVING THE CHALLENGES OF THE WORLD

By 2023, we will have invested 50 M€ to support highly vulnerable women.

By 2030, the L'Oréal Fund for Nature Regeneration will have invested 50 M€ to help restore one million hectares of degraded ecosystems.

By 2030, the Fund will have helped capture 15 to 20 million tons of CO_2 and we will have created hundreds of job opportunities.

By 2030, we will have invested 50 M€ to finance projects that will help promote a more circular economy.

R&I lead, KPI responsibility

R&I co-lead, KPI responsibility shared with Operations

R&I contribution, contribute to results

FOCUS ON OUR INGREDIENTS

SOME KEY 2030 COMMITMENTS

L'ORÉAL FOR THE FUTURE

SOURCING

By 2030, **100%** of our bio-based ingredients will be traceable and sustainably sourced, none of them will be linked to deforestation

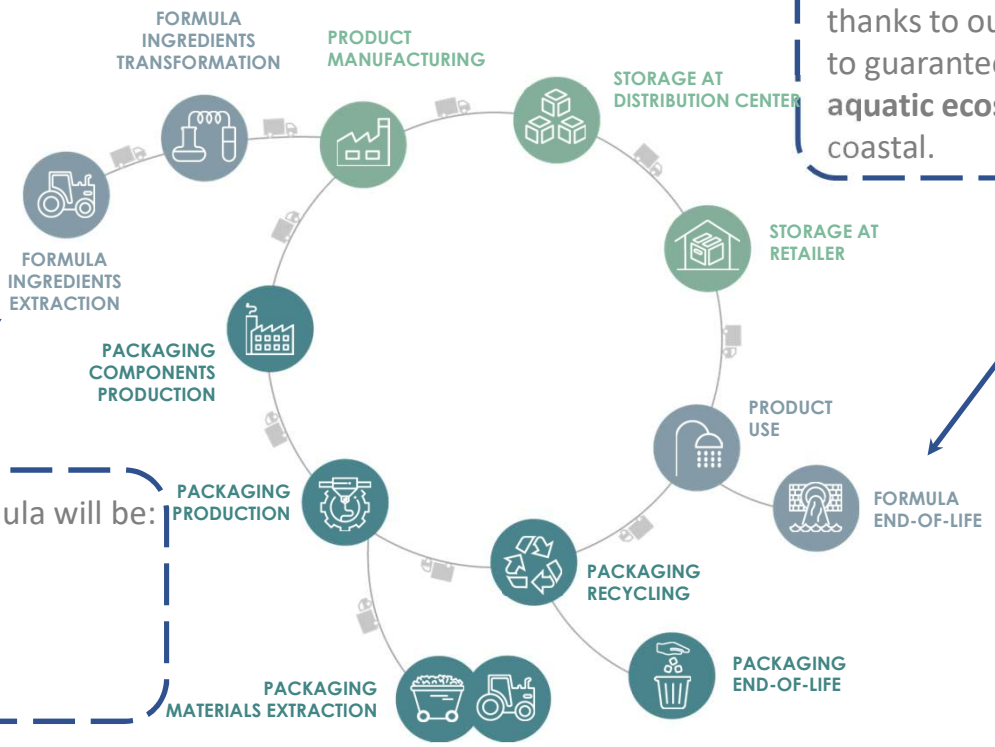
ORIGIN

By 2030, **95%** of our ingredients in formula will be:

- **biobased**
- derived **from abundant minerals** or
- from **circular processes**.

END OF LIFE

By 2030, we will evaluate **all our formulas** thanks to our environmental test platform, to guarantee they are **respectful of all aquatic ecosystems**, whether continental or coastal.

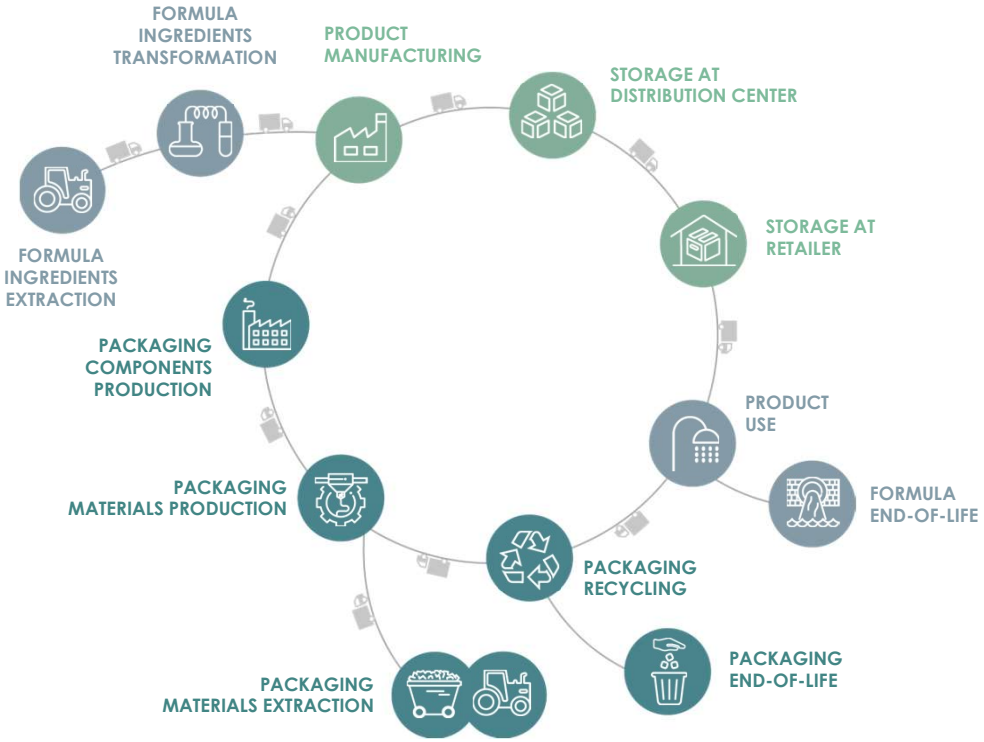


A CIRCULAR, LIFE CYCLE-BASED APPROACH

FOCUS ON PRODUCTS

ONE OF OUR KEY 2030 COMMITMENTS

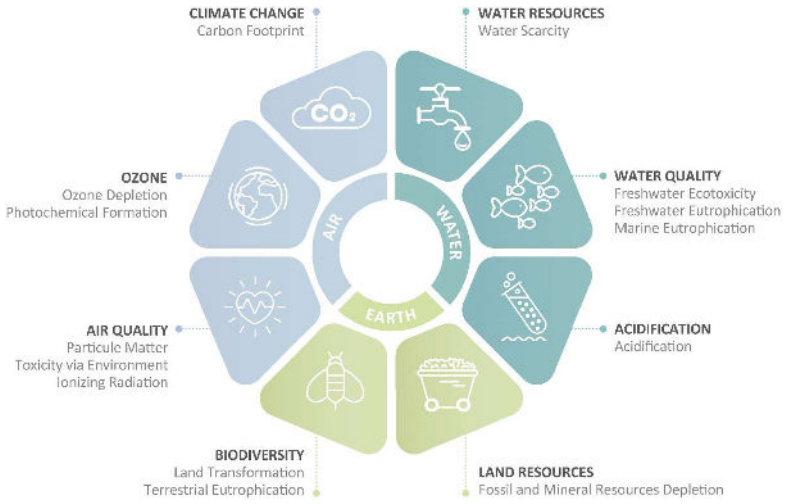
L'ORÉAL FOR THE FUTURE



WHOLE LIFE CYCLE

By 2030, all the Group's products will be eco designed.

SPOT SUSTAINABLE PRODUCT OPTIMISATION TOOL



GREEN SCIENCES

A KEY LEVER TO MEET OUR SUSTAINABILITY AMBITIONS & CONSUMER EXPECTATIONS

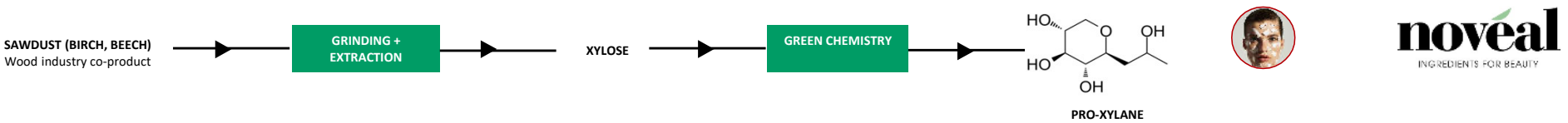
SUSTAINABLE CULTIVATION

GREEN CHEMISTRY

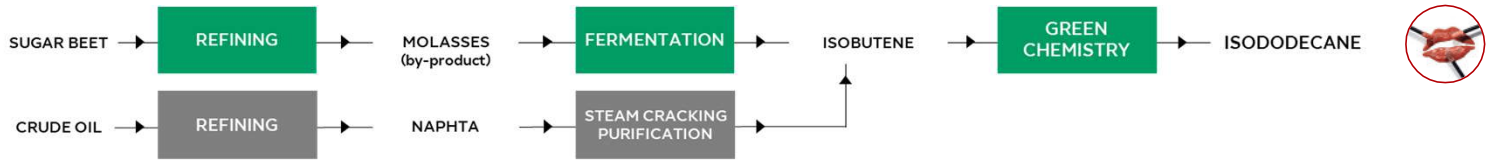
BIOTECH

GREEN EXTRACTION

A COUPLE OF EXAMPLES



novéal
INGREDIENTS FOR BEAUTY



Global Bioenergies

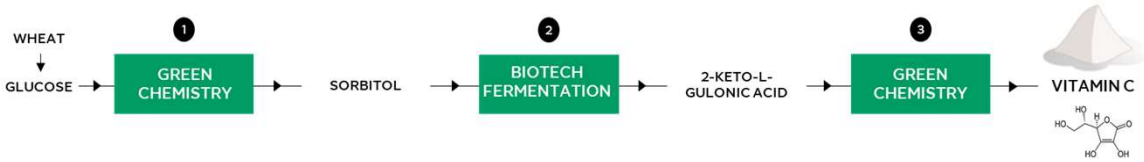
QUESTION 2

FOSTER R&DDD COLLABORATIONS

PARTNERS

Partnering with long-standing suppliers

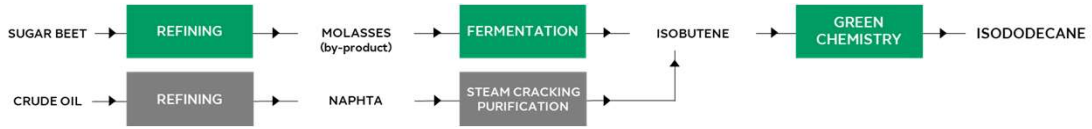
APPLICATION



DSM

Partnering with forward thinking start-ups

APPLICATIONS



Global Bioenergies

→ Cosmetics Ingredients from micro-algae

microphyt

Joining multi-partner ventures

APPLICATIONS

→ Sustainable surfactants

geno L'ORÉAL KAO Unilever

UPSKILL & RESKILL

24.1 Increase corporate training

• Provide company-based training, and reskill workers so they are prepared for the professions of the future. Link this training to job-to-job transition plans	Industry	S/M
• Provide in-company training opportunities, career paths, and apprenticeships	Industry	S/M

23.2 Adapt secondary, post-secondary and university education

• Contribute to the activities of the European Year of Youth in cooperation with national associations of chemical employers	Industry	S
• Adapt university curricula to industry needs, by adding courses on regulation, sustainable chemistry, green chemistry and the principles of SSbD to university programmes in chemistry. Adapt apprenticeships and vocational education and training programmes to teach future-proof knowledge	EU/MS	S/M

SUSTAINABILITY EVALUATION METHODOLOGIES

Green Chemistry

Dynamic Article Links

Cite this: *Green Chem.*, 2012, **14**, 952

www.rsc.org/greenchem

PAPER

Industrial commitment to green and sustainable chemistry: using renewable materials & developing eco-friendly processes and ingredients in cosmetics

Michel Philippe,* Blaise Didillon and Laurent Gilbert

Received 26th October 2011, Accepted 20th December 2011
DOI: 10.1039/c2gc16341a

Integrating green chemistry principles into the development of new processes or ingredients and the re-evaluation of existing processes and ingredients is a pivotal element of sustainable development. The aim of this article is to provide a brief description of how L'Oréal, a leading specialist in cosmetic products, is committed to this objective. This commitment is founded on corporate social responsibility (CSR) based on the respect for the five axes of vigilance as shown below, thus allowing analysis throughout the lifecycle of products. The approach of the group regarding the use of renewable raw materials, the development of environmentally-friendly processes and the introduction of green indicators will be presented in more detail later. To illustrate how a green process is implemented we have chosen a recent development, "C-glycosylation in water", as well as an earlier example, "ceramide synthesis from renewable raw materials" to demonstrate long-term commitment.

1. Introduction

Research and development chemists have always tried to develop processes using raw materials and solvents with the lowest possible toxicity levels, even avoiding the use of solvents[1] by relying on high-safety processes. The primary objective has always been to develop ingredients industrially which present neither safety problems nor risks to human health.

The development of corporate social responsibility (CSR), the price and scarcity of oil and the proposition of the 12 green chemistry principles in 1998 by P. Anastas and J. Warner[2] have been key elements in establishing sustainable chemistry. Eco-friendly, straightforward processes and innovative products which lessen environmental impact are now being given top priority. This also means that green chemistry has to be based on renewable plant chemistry and less and less on petrochemicals.

To achieve these goals and to replace processes and products with strong environmental impact, it is essential to incorporate eco-design with predictive methods into new processes and products. New processes must use nontoxic materials, save energy and generate less waste. New catalytic methods (chemical catalysis and biocatalysis) developed over the last few years have fully contributed to these objectives. Reductions in the number of steps, "atom economy" and energy reduction through new synthesis routes in particular allow new processes with high chemo-, regio- and stereo-selectivity[3,4] to be designed.

The proposition by P. Anastas and J. Zimmerman of the 12 green process principles further amplifies these initial recommendations. In particular, this one introduced the "level of green chemistry" indicator used during any new process and/or product development with the introduction of the lifecycle analysis.[5,6] For more than ten years now, several green indicators have been proposed, notably by R. Sheldon,[6,7] to evaluate past and future efforts better.

For a responsible and innovative company measuring these indicators as early on as possible is essential for the eco-design of new synthesis routes and thus to be able to proceed to the best choice of reagents and technology. This green metrics is fundamental to making sure only eco-friendly products are launched on the market.

2. Commitment to green and sustainable chemistry

2.1 Green chemistry strategy for sustainable development

For several years our group has been implementing action plans for sustainable innovation and reporting progress annually in the sustainable development report.[8]

Various research and development actions have been reported including green chemistry initiatives in particular and results achieved.

One of the key concepts is the complete integration of green chemistry within sustainable development as described in Fig. 1.

Respecting the green chemistry principles as closely as possible is essential for sustainable development. The selection and evaluation of the ingredients we use are based on five axes of vigilance adhered to throughout the product lifecycle:

- Health and safety of people.
- Respect for the environment.
- Preservation of biodiversity.
- Fair trade practices.
- Social and societal impacts.

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sustainability

MDPI

Article

SPOT: A Strategic Life-Cycle-Assessment-Based Methodology and Tool for Cosmetic Product Eco-Design

Jacques L'Haridon [1,*], Laure Patouillard [2], Julien Pedneault [2], Anne-Marie Boulay [2], François Witte [3], Marcial Vargas-Gonzalez [3], Philippe Bonningue [4], Isabelle Rollat [1], Thierry Blanchard [4], Gabriel Goncalves [4], Alice Hervio [4] and Laurent Gilbert [1]

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Abstract: The cosmetics industry is facing growing pressure to offer more sustainable products, which can be tackled by applying eco-design. This article aims to present the Sustainable Product Optimization Tool (SPOT) methodology developed by L'Oréal to eco-design its cosmetic products and the strategies adopted for its implementation while presenting the challenges encountered along the way. The SPOT methodology is based on the life cycle assessment (LCA) of a finished product and its subsystems (formula, packaging, manufacturing and distribution). Several environmental indicators are assessed, normalized and weighted based on the planetary boundaries concept, and then aggregated into a single footprint. A product sustainability index (a single rating, easy to interpret) is then obtained by merging the environmental product rating derived from the single environmental footprint with the social rating (not covered here). The use of the SPOT method is shown by two case studies. The implementation of SPOT, based on specific strategic and managerial measures (corporate and brand targets, Key Performance Indicators, and financial incentives) is discussed. These measures have enabled L'Oréal to have 97% of their products stated as eco-designed in 2022. SPOT shows how eco-design can be implemented on a large scale without compromising scientific robustness. Eco-design tools must strike the right balance between the complexity of the LCA and the ease of interpretation of the results, and have a robust implementation plan to ensure a successful eco-design strategy.

Keywords: eco-design; life cycle assessment; implementation; strategy; change management

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Citation: L'Haridon, J.; Patouillard, L.; Pedneault, J.; Boulay, A.-M.; Witte, F.; Vargas-Gonzalez, M.; Bonningue, P.; Rollat, I.; Blanchard, T.; Goncalves, G., et al. SPOT: A Strategic Life-Cycle-Assessment-Based Methodology and Tool for Cosmetic Product Eco-Design. *Sustainability* **2023**, *15*, 14321. https://doi.org/10.3390/su151914321

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1. Introduction

The cosmetics industry is facing sustainability concerns regarding the choice of sustainable ingredients, the energy and water use during manufacturing, the choice of packaging, the product safety for the consumer, the emissions into water, and packaging waste [1]. In addition, from a life cycle perspective, the environmental impacts of the cosmetics use phase due to heated water and of the end-of-life (EoL) due to freshwater ecotoxicity are often pointed out in the literature [2,3].

There is growing pressure from consumers and legislation for the cosmetics sector to adopt more sustainable practices and products [1]. Cosmetics manufacturers have to differentiate their products and improve them towards customers' expectations, which include a growing demand for natural products and products manufactured in a sustainable way and/or according to fair-trade principles [4]. This pressure encourages cosmetics companies to improve their environmental sustainability through new integrated strategies, using concepts from corporate social responsibility and circular economy in product

sustainability

MDPI

Article

Mineral Resource Abundance: An Assessment Methodology for a Responsible Use of Mineral Raw Materials in Downstream Industries

Nicolas Charles [1,*], Gaëtan Lefebvre [1], Rémy Tuloup [2,*], Audrey Carreaud [2], Antoine Boubault [1], Anne-Sophie Serrand [1], Maxime Picault [1], Virginie Piguet [2], Valeria Manzin [2], Fabien Deswarte [2] and Julien Aupoil [2]

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Abstract: The sustainability of mineral resources and, in particular, their abundance is a topic of growing interest. Nevertheless, the abundance of mineral raw materials is an extremely complex notion as it not only encompasses geological considerations but also environmental, technical, economic, and social constraints. In addition, to the best of our knowledge, no tools are currently available to allow a comprehensive evaluation of mineral raw material abundance. This research paper, therefore, aims to present an innovative and unique methodology to evaluate the abundance of non-energy mineral resources and determine a mineral abundance index (MAI). Based on a multicriteria analysis, MAI considers the natural abundance of a mineral raw material in the Earth's crust and its availability on the market and integrates the influence of factors that could constrain or promote future market changes. This new index ranging from 0 (very scarce) to 100 (very abundant) aims to qualify the abundance of mineral resources in a simple and rapid manner based on published and reliable data. This new methodology could be a powerful decision-making support tool for any downstream industrials and end-users making use of mineral raw materials.

Keywords: mineral resources; sustainable development; downstream industry; depletion; abundance; bentonite

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Citation: Charles, N.; Lefebvre, G.; Tuloup, R.; Carreaud, A.; Boubault, A.; Serrand, A.-S.; Picault, M.; Piguet, V.; Manzin, V.; Deswarte, F., et al. Mineral Resource Abundance: An Assessment Methodology for a Responsible Use of Mineral Raw Materials in Downstream Industries. *Sustainability* **2023**, *15*, 16783. https://doi.org/10.3390/su152416783

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1. Introduction

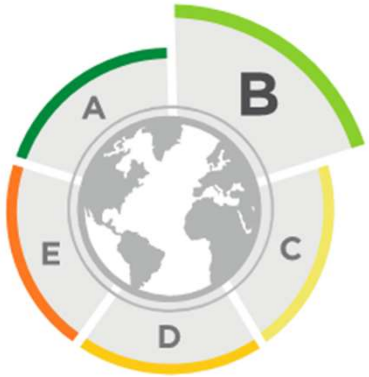
Throughout history, human beings have exploited natural resources and interacted with and transformed their environment [1,2]. According to [3] and references therein, human activities can be divided into four main subsequent phases: primitive, slavery, feudal, and capitalist, with the last one corresponding to the current period. Each of these phases involves varying degrees of interaction with the environment and use of natural resources. The impact of human activities on the environment, particularly since the capitalist phase, has been a major concern for the United Nations since June 1972, with the organisation of the first World Conference on the Environment in Stockholm, Sweden [4]. Concurrently, the Club of Rome published a report pointing out the risk of mineral resource depletion and environmental degradation due to human activities in a world of economic growth [5]. The year 1972 can, therefore, be considered a reference point for the formulation of concepts on the consumption of natural resources and economic development. Later on, this led to a definition of sustainable development by the Brundtland Report, published in 1987 by the Commission on Environment and Development of the United Nations: "Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [3,6,7].

ENABLE CONSUMER TO MAKE MORE SUSTAINABLE DECISIONS

PRODUCT IMPACT LABELLING

Overall environmental impact

Compared to other similar L'Oreal Groupe Products sold worldwide in 2020



Carbon footprint

CO_2

94 g[1] per average amount used (91g per 10mL)

Water footprint

9.4[2] per average amount used (9.6 per 10mL)