Responsible Tannery Chemistry

Technical Guide

Version 1.1

KIND LEATHER®

RTC

Summary

Responsible Tannery Chemistry

This document aims to detail the sustainability assessment criteria in chemicals used by JBS Couros. For this purpose, the Responsible Tannery Chemistry was developed, here in after referred to as RTC.

1. Introduction

Based on the historical evolution of the concept of sustainability, and the development of science on the subject, JBS Couros dedicates its efforts to analyse and optimize its production processes, generating indicators that aim at the precise preparation of strategies to continuously reduce environmental impacts of its supply chain.

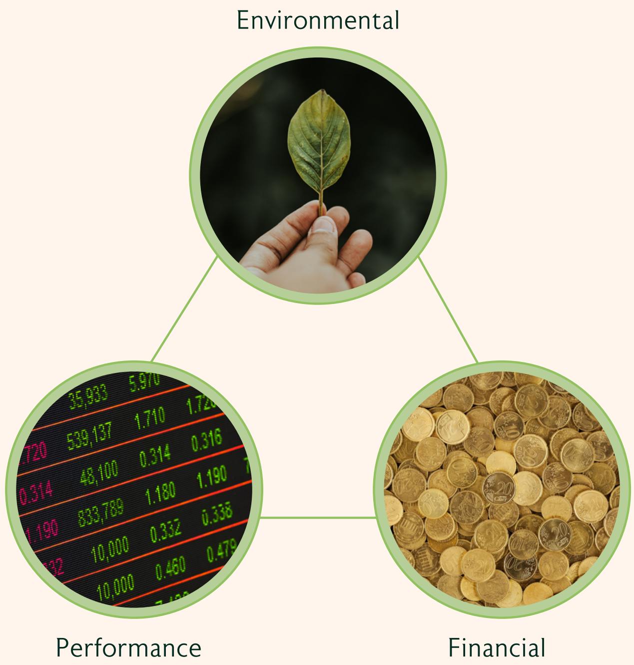
JBS Couros understands its responsibility in this matter and acts proactively to meet its sustainable development commitments. However, it is clear that in addition to its internal processes it is of paramount importance to also address the impacts of the inputs consumed in the industrialization stages.

In the search for best practices, the Life Cycle Assessments (LCAs) carried out by the Company proved to be important allies in understanding the impacts of the leather industry on the environment and the factors that are most influential to them. Among these factors, livestock accounts for most of the impact, followed by chemicals used in the production processes.

Thus, JBS Couros decided to work together with the two most significant sectors for the leather supply chain in terms of potential environmental impact – livestock and chemicals – and align what contributions can be made to establish joint leadership in sustainability.

The RTC is a system conceived to collect and analyse information on environmental parameters related to chemicals, as well as their respective application in recipes for the production of leather goods.

The result of these analyses serves as one of the criteria for making a decision regarding the use of the proposed chemical.



2. Objective

JBS Couros' main intention with the RTC is to assess, based on shared scientific knowledge, the level of environmental sustainability of a chemical used in tannery processes, and make it part of its decision for its inclusion (or not) in its recipes.

Through the system, JBS Couros has developed a decision-making structure to proactively engage its technical team and partners in the assessment of new chemical solutions for their processes, based on the main indicators adopted by entities and platforms.

By applying this method of environmental performance assessment, JBS seeks to standardize the way in which the environmental impacts relevant to the leather production processes are evaluated, empowering its technical team to focus on solutions that make today's leather always better than yesterday's, with respect to nature.

3. Methodology

3.1. Creating the RTC

The RTC is a quantitative system composed by 4 parameters, hereinafter referred to as “Sustainability Criteria” or “SC”. Every required SC has the results reported as an independent score, each of them having a different weight in the system.

The chemical considered for use by JBS Couros is assessed in the context of the recipe in which it is applied, and this recipe is then compared with its previous version (without the presence of the new chemical). If the new chemical enters the recipe of a new article under development, is compared with the reference article used by JBS’ R&D.

The selection of the criteria chosen to compose the RTC was based on published scientific bibliography and were widely discussed by the Technical and Sustainability Departments of JBS Couros, together with external supply chain experts.

The basic premises for applying the RTC are described in Figure 1, and the SCs defined for its generation and their respective weights are specified in Table 1. In addition, item 3.3 describes the analysis and quantification process carried out by the JBS Couros Sustainability Team.

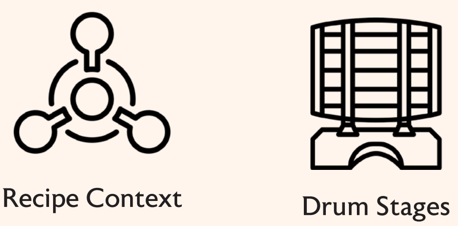


Figure 1: RTC Premises

Sustainability Criteria	Weight
Environmental Impact Categories	50%
Biodegradability	20%
Hazardous Substances	15%
Biogenic Carbon	15%

Table 1. RTC Sustainability Criteria.

3.2. Preparation and presentation of the Sustainability Criteria by suppliers

During the preliminary process regarding the use of the chemical, the supplier must present the following SC results, considering the most recent version of the applicable specific methodology:

I. Biodegradability

- The biodegradability assessment test of the chemical must be conducted following the OECD 301 Guideline for Testing of Chemicals.

II. Hazardous Substances

- **Suppliers should present, the chemical's ZDHC MRSL certificate of compliance.**
- In addition, if the chemical is inserted in the ZDHC Gateway, the compliance report should also be presented.

Note: It does not apply to commodities.

III. Biogenic Carbon

- The biogenic carbon present in the material must be quantified under EN 16640:2017: Bio-based products. Bio-based carbon content. Determination of the bio-based carbon content using the radiocarbon method.

IV. Environmental Impact Categories

- Within the life cycle perspective, environmental impact categories refer to predefined sets of indicators representing different dimensions of environmental impacts throughout the life cycle of a product or process. As defined by ISO 14040 and ISO 14044, these categories are used in Life Cycle Assessment to quantify and assess the environmental effects associated with various stages, spanning from raw material extraction to the end of the life of the analysed process or product.

- The supplier must classify the specialty within the list of Proxies that will be sent by JBS Couros.

- Proxies are categories created using secondary data, which classify chemicals according to the main active substance present in them.

- In other words, a Proxy is a category shared between chemicals that have the same active substance.

- Thus, the Proxy works as the best available value, in the absence of primary data, to approximate the environmental impact of a chemical.

- To enhance the accuracy of the results for the Environmental Impact Categories in the RTC, the JBS Couros team may request an update of the classification from chemical suppliers whenever the Proxy list is renewed and expanded with new categories.

In the existence of primary data of the Life Cycle Assessment:

- The supplier must submit a Life Cycle Assessment study standard ISO 14040 and 14044:2006, following the "Product Environmental Footprint Category Rules (PEFCR)".

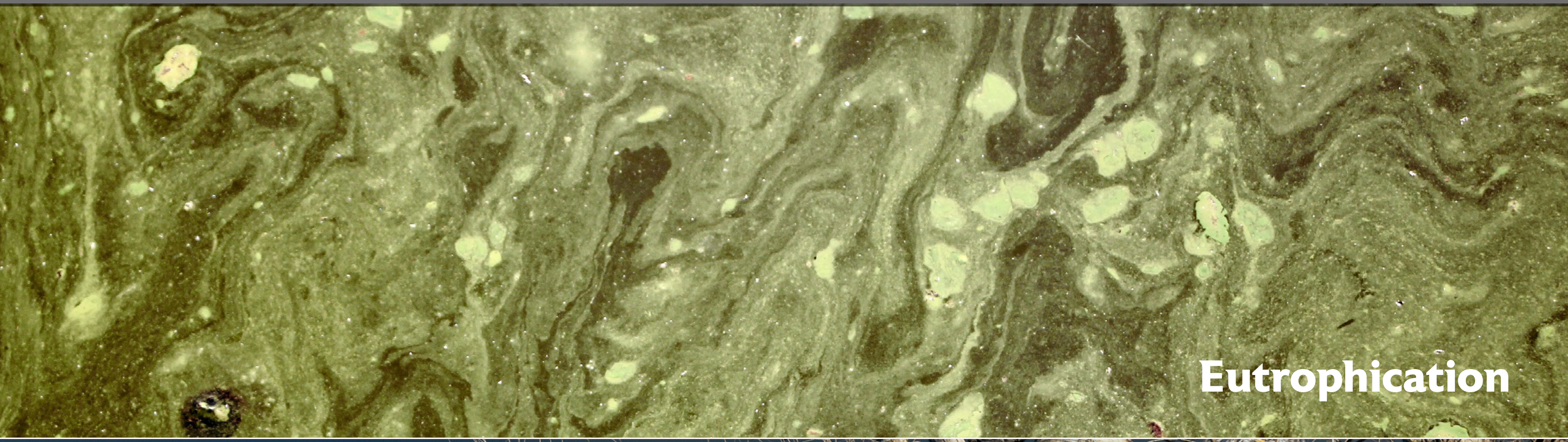
- With these data, RTC will be calculated using the results of the study to offer better accuracy in the analysis, and it is not necessary to classify the chemical according to the Proxies table.

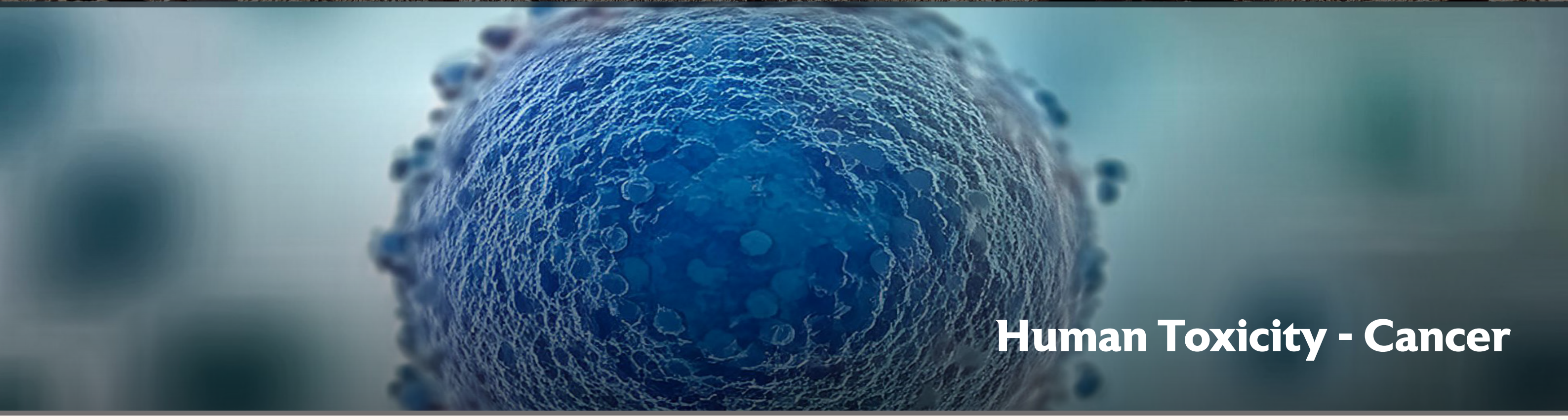
- The environmental impact categories considered in the system and the specific methodology can be seen in Table 2.

Environmental Impact Categories	Specific Methodology
Global Warming Potential ($kgCO_2eq/m^2$)	IPCC 2013 GWP 100 1.03
Eutrophication ($kgPO_4eq/m^2$)	CML-IA BASELINE 3.06
Freshwater Ecotoxicity (CTUe)	USEtox (recommended + interim)
Water Scarcity	Boulay A-M, Bare J, Benini L, et al (2018) The WULCA consensus characterization model for water scarcity footprints: assessing impacts of water consumption based on available water remaining (AWARE). Int J Life Cycle Assess 23:368–378
Human Toxicity - Cancer (CTUh)	USEtox (recommended + interim)

Table 2. Environmental impact categories and corresponding methodology.

Environmental impact categories





3.3. Analysis of the Sustainability Criteria

All parameters are assessed by taking into account the recipe of application. This means that whenever a new chemical is being anayzed for JBS Couros' articles, the results of the required criteria are analyzed by comparing the recipes before and after the insertion of the chemical. Therefore, the results depend on its dosage in the recipe together with its influence on the dosage of the other chemicals..

Thus, for each SC, the result of the chemical performance is multiplied by its dosage in the recipe. At the end of the particular weightings, a weighted average of these values will be taken, then quantifying the final result of the SC for the old recipe and its new version. To better understand the math, Table 3 exemplifies the calculation for the SC **Biogenic Carbon (B.C.)**.

Old recipe			Recipe with new chemical		
Chemicals	**Dosage**	**Biogenic Carbon**	**Chemicals**	**Dosage**	**Biogenic Carbon**
Name	**% on lot weight**	**Value**	**Name**	**% on lot weight**	**Value**
Chemical A	1%	5%	Chemical A	5%	5%
Chemical B	2%	10%	Chemical B	2%	10%
Chemical C	10%	20%	Chemical X	5%	50%
Total		17%	Total		25%

Table 3. Example of calculating a Sustainability Criterion within the RTC.

As can be seen, in the old recipe there are 3 chemicals, Chemicals A, B, and C, the latter being replaced in the new formulation by Chemical X. In addition, the dosage of Chemical A was modified.

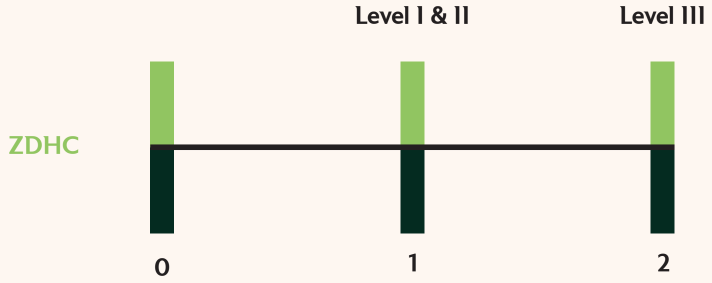
It is also noted that while the dosage of Chemical C is 10% and its percentage of Biogenic Carbon is 20%, the dosage of Chemical X is 5%, and the amount of B.C. in its composition is well over 50%.

The difference between the results of the old and new recipes for a given SC is calculated in percentage terms. The RTC calculation is finalized by multiplying each SC with its respective weight in the system (Table 1). The final result of the RTC is a positive percentage if the new recipe performs better than the old one, or negative if the new recipe performs worse. To this end, the weights described in Table 1 are considered.

3.3.1 Analysis of Hazardous Substances

For the calculation to be applicable to Hazardous Substances as well, it is understood that:

- The chemical certified level 1 or 2 in ZDHC Gateway Compliance receives a score of 1.
- The chemical certified level 3 gets a score of 2.



Thus, Table 4 expresses how the Hazardous Substances SC is calculated under the same example used previously.

Old recipe				Recipe with new chemical			
Chemicals	**Dosage**	**ZDHC**	**SC**	**Chemicals**	**Dosage**	**ZDHC**	**SC**
Name	**% on lot weight**	**Level**	**Value**	**Name**	**% on lot weight**	**Level**	**Value**
Chemical A	1%	1	1	Chemical A	5%	1	1
Chemical B	2%	2	1	Chemical B	2%	2	1
Chemical C	10%	2	1	Chemical X	5%	3	2
Total		1		Total		1.41	

Table 4. Example of the calculation in the ZDHC Gateway Compliance in the RTC.

3.3.2 Analysis of Environmental Impact Categories

Regarding the quantification of Environmental Impact Categories in the recipe before and after the introduction of the new specialty, a simple arithmetic average will be calculated between the five different Impact Categories to determine whether there has been a reduction or increase in the environmental impacts of the recipe with the inclusion of the chemical. For a more in depth understanding, please refer to the example in Table 5.

Impact Categories	Unit of Measurement	Old Recipe	New Recipe	Difference
IPCC GWP 100a	kg CO2 eq	14.10	7.53	47%*
Eutrophication	kg PO4--- eq	0.06	0.04	-34%
Human toxicity (cancer)	CTUh	0.00	0.00	0%
Water scarcity	m3 eq	5.52	1.27	-77%
Freshwater ecotoxicity	CTUe	0.87	0.89	2%
		Total		**-31%**

Table 5. Example of environmental impact categories in the RTC..

As evidenced in the example, the inclusion of the new component positively impacted the performance of the recipe in all "Environmental Impact Categories," except for Freshwater Ecotoxicity.

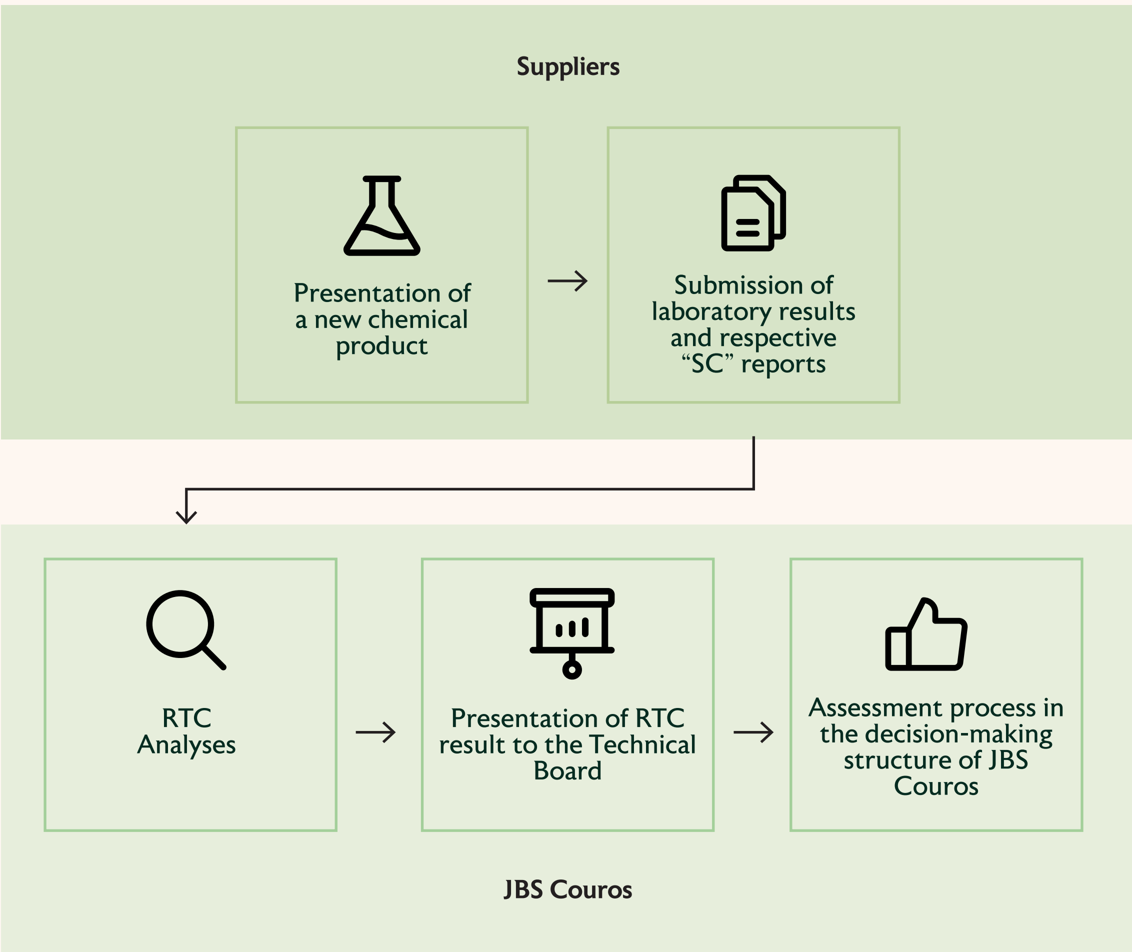
However, the SC Environmental Impact Categories in the RTC aims to discern whether there has been a reduction or an increase in the environmental impacts of the recipe considering all five of them. For this reason, an assessment that assumes equal relevance for all categories is conducted, leading to an average to determine whether there has been a reduction in the environmental impacts of the recipe or not.

If the result presents a negative value, it implies that the inclusion of the chemical reduced the average environmental impacts of the recipe. Conversely, if the result is a positive value, it means that the introduction of the chemical increased the environmental impacts generated by it.

4. Terms

The RTC will become effective in 06/01/2024. It is important to emphasize that the result obtained from the weighting of these indicators will be one of the criteria for decision-making regarding replacement of a chemical.

5. Flow of new specialty entry after the go live of the assessment via RTC



Annex - Definitions

a. Sustainability Criteria: Environmental parameters used in the RTC to quantify the sustainability performance of chemicals used.

b. Biodegradability: Is the ability of living organisms to biologically break down organic materials to their basic substances while being degraded by the environment.

c. R&D: “Research and Development” sector.

d. ZDHC Gateway: Database of non-hazardous chemicals created by the ”Zero Discharge of Hazardous Chemicals Foundation”, a coalition between companies in the textile, leather, clothing and footwear sector.

e. MRSL: Manufacturing Restricted Substances List.

f. Primary data: Data that has been generated by the researcher himself/herself, surveys, interviews, experiments, specially designed for understanding and solving the research problem at hand (definition provided by Benedictine University Library).

g. Secondary data: Are existing data that can be found in sources such as scientific articles, government reports, institutional databases, administrative records, censuses, among others.

h. Life Cycle Assessment: Technique developed to measure the possible environmental impacts caused as a result of the manufacture and use of a particular product or service.

i. Tanning drum: Cylindrical and rotating equipment, made of wood, polymers or metal, which is used in various stages of leather processing.

j. Weighted average: Average that takes into account the weight assigned to each of the values from which the average is to be calculated.

Access the RTC website

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