

2022 ARCHROMA SUSTAINABILITY AWARDS

Application Form

1. Team

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2. Main contact name:

- Joan Manel Blanquera Llerena, R&D Technician, PPA Sulphur Dyes, JoanManel.blanquera@archroma.com

3. Title of the application:

NEW EVOLUTION SULPHUR BLACK, "SAFE & SUSTAINABLE BY DESIGN"

4. Award category

Please choose one of the following award categories. If you wish to apply for several categories, please complete one application form per category.

We apply for the following category:

- Business Win
- Diversity & inclusion
- Environment
- Excellence
- Innovation**
- Safety First
- Sustainable partnership

5. Elevator pitch

ARCHROMA's "EVOLUTION BLACK"

Is an innovative dye synthesis developed from the design, for a safer and more sustainable Black production.

With the new Archroma's "EVOLUTION BLACK" we want to be sustainable, less pollutant and environmentally more neutral, following the CSS (Chemical Sustainability Strategy) in accordance with the European green agreement.

6. Describe how your project and its impact help achieving the category-specific criteria

The traditional synthesis of sulphur black 1, comes from more than 100 years ago, and generates a lot of wastes (salts, gases, liquid effluents) consuming a huge amount of resources (water, energy, equipment...), In fact, the actual sulphur black 1 technology is a dye commodity that was born in the 1890's, remaining basically intact until now, only modified during this time with some improvements also developed by Archroma.

250.000 Tons of "Sulphur Black 1" liq., are produced every year, as a dyestuff commodity mainly used in Denim. As we have said before, this production requires high quantity of energy and water, generating as byproducts amounts of salts, wastewater, and ammonia effluents.

ARCHROMA's "EVOLUTION BLACK" is a new manufacturing synthesis for obtaining a Sulfur Black dye, safe, clean, and much more sustainable. This new dye, drastically reduces the needs of resources, energies, and water, not generating salts neither ammonia wastes.

The Evolution Black represent a total new process synthesis that accomplish the dream of a greener and more sustainable chemistry: a reaction that not only don't generate by-products, also reduces the water consumption, don't produce waste, and save time and energy giving a Black dye that can compete against the standard one.

According the recent studies, the textile industry is the second more pollutant of the world, after the petrol industry. This project is a little help for changing this. And it's an example for the entire dyeing industry that how the chemistry can make the world more sustainable. The Sulphur Black 1 is as unit dye, the dyestuff produced in highest quantity, so its replacement for another chemistry much more sustainable can have very positive and significative affectations.

The Innovative synthesis of this dye follows the concept of the European green deal and new European CSS (Chemical Sustainable Strategy), basically the products must be **safe and sustainable by design**, and is since the design that this new dye has been developed, looking for a new way to produce Sulphur Black dyes, replacing the use of old established raw materials by new ones, this has been the way how this new dye has been developed.

In summary, the new "EVOLUTION BLACK" is based in a new synthesis design, where the main raw material (2,4 Dinitrochlorobenzene) has been replaced.

This Synthesis Innovation allows to eliminate completely the generation of wastes, requires much less resources, and makes the reaction safer.

Due to the big quantity of classic sulphur Black 1 that is sold in the market, the substitution of part of that old production may represent a big impact in terms of environmental care, and also in the Archroma business, being a new tool to reinforce their leadership in the Sulphur dye technology.

7. Describe how your project supports “The Archroma Way to a Sustainable World: Safe, efficient, enhanced, it’s our nature” (Max. 1000 words)

1.-Why the project is **Safe**.

This is a safer process since the chemical point of view because the synthesis of the old Sulphur black 1 is much more complex due to the high number of different operations and reactions involved, including an exothermic reaction between the raw material used, that must be controlled with the corresponding security measures.

In the new process this reaction has been avoided by the use of different raw material, and the amount of operations and reactions has been drastically reduced.

Also is safer for the environment because, as it has been mentioned, the old synthesis needs more resources, generates a high amount of salts (Thiosulfates, Chlorides...) and residual gases (ammonia), which makes necessary the use of specific treatments to eliminate from the effluents.

In fact, the new synthesis does not generate any waste at all, clearly being safer for people and environment.

See the following table with the comparative data for a clear vision:

	Sulphur Black 1 The Old Technology	Evolution Black A New Technology <small>ENVIRONMENTALLY CONSCIOUS PRODUCED</small>
Water Consumption at process	1.86 Kg / Kg dye	0.51 Kg / Kg dye
NH₃ waste	0.21 Kg / Kg dye	0
Sodium salts waste	0.42 Kg / Kg dye	0
Liquid effluents	1.75 Kg / Kg dye	0
Reaction time/ton produced	4.16 h	1.5 h
Water necessary to dilute the salts until the OMS limit of 1g/l	422 Kg / Kg	0
Total water Consumption	424 Kg / Kg dye	0.51 Kg / Kg dye

2.-Why the project is **Efficient**.

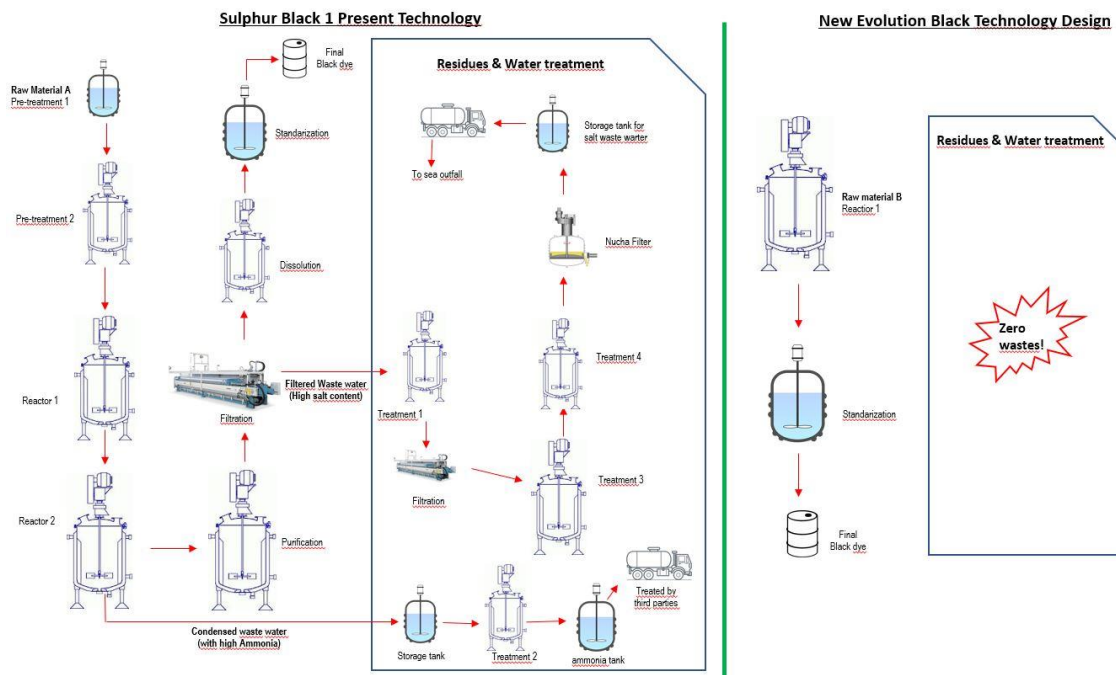
Is efficient because it can cover the same dyeing applications where the Sulphur Black 1 is used but with production and application advantages:

Production:

The time reaction it's shorter compared to the old technology. The total time for old reaction was about 45 hours but, with the new synthesis and process takes only 15 hours.

The generation of residues is zero compared with the classical Sulphur Black 1 manufacturing, which also eliminates the need to use post-treatments to eliminate such wastes. The resources needed are much less (energies, water, equipment...) Another important fact is that the old process involves many different reactors and vessels and many different industrial operations. The new one requires fewer industrial steps: only one reactor and a simple operation

See next picture for a clear vision:



Application

- The new dye can be used in the same markets and application systems and using the same machinery than the old one (Denim, Pad-Steam Exhaust., Pad-Ox...)
- Some dyeing properties are better (Chlorine fastness, tendering, repetitive washing...)
- Shade is only slightly greener with no bronzing tendency which is well appreciated by the market

3.-Why this project is **Enhanced**.

Today is well known that one of the problems for the mankind is the degradation of the environment and the lack of resources. In a few words the planet and all ecosystems are in danger. It's necessary do something. Is in our hands, do something.

We, as chemical industry, are obligated to be an example for increase this planet sustainability. It's the time for taking the old chemical technologies that are not exactly friendly with the environment and re-thinking, re-formulating, and looking for improved new synthesis and new processes, searching for an enhanced company sustainability.

In fact, this project wants to help Archroma to achieve their sustainability goals and KPI's, following the rules of the European green deal and the Chemicals Sustainable Strategy based on the idea that the products must be sustainable by design.



This is the spirit of this project.

Then, this project wants to be aligned with the new green deal European spirit, considering that now is the moment to re-think in the necessity to redesign these old procedures. Most of these old products have been used for many years and still today commercialized in big quantities, as much we were able to substitute, bigger will be the benefits for the environment .

One clear example of the "ENHANCED" characteristic of this new technology is when the LCA (life cycle analysis) could be compared with the old one. Is expected to be much better in all the aspects: Carbon footprint, water consumption, toxicity, effluent generation, health affectation, etc....

8. Describe how your project demonstrates the company mindset “Everybody sells!” supported by our ACTS (Max. 1000 words)

This is a project that due to their characteristics can be addressed not only to our classical customer (dyeing mills), but It can and should be also explained to the Brands and to the final consumers.

- To the brand can be offered as an opportunity to commercialize the new most sustainable Sulfur Black (for example Black-Jean), that could be produced, and also easy to differentiate from the old one by simple chemical test.

- To the mills can be offered also by their better sustainability, but also by their technical differences compared with the classic S.B.1 that makes it different for brands and consumers.

So, this new dye then would require the implication, not only of the salespeople, also the technicians that can influence in brands (Brand studio, company direction), and not only that, also can participate everyone that can communicate and explain to the final consumer through the available communication channels, the message that it exists, has been developed and is available a new Black dyestuff technology with improved sustainable characteristics in comparison with the old one.

The improvements shown in this new dye technology can be understood by everybody, so any person could help and contribute to the promotion of this new Planet friendly "EVOLUTION BLACK".

It's about the sustainability, **because is our Nature.**