

**PRESENTED BY:**  
Andrea Fumagalli



# Client's request

The client Livio Marossi, director of the company "LMB Laboratorio Microbiologico Biotecnologie", asked us for a fast and dynamic tool capable of obtaining the following toxicological values: NOAEL and LD50 related to ingredients present in cosmetic products.



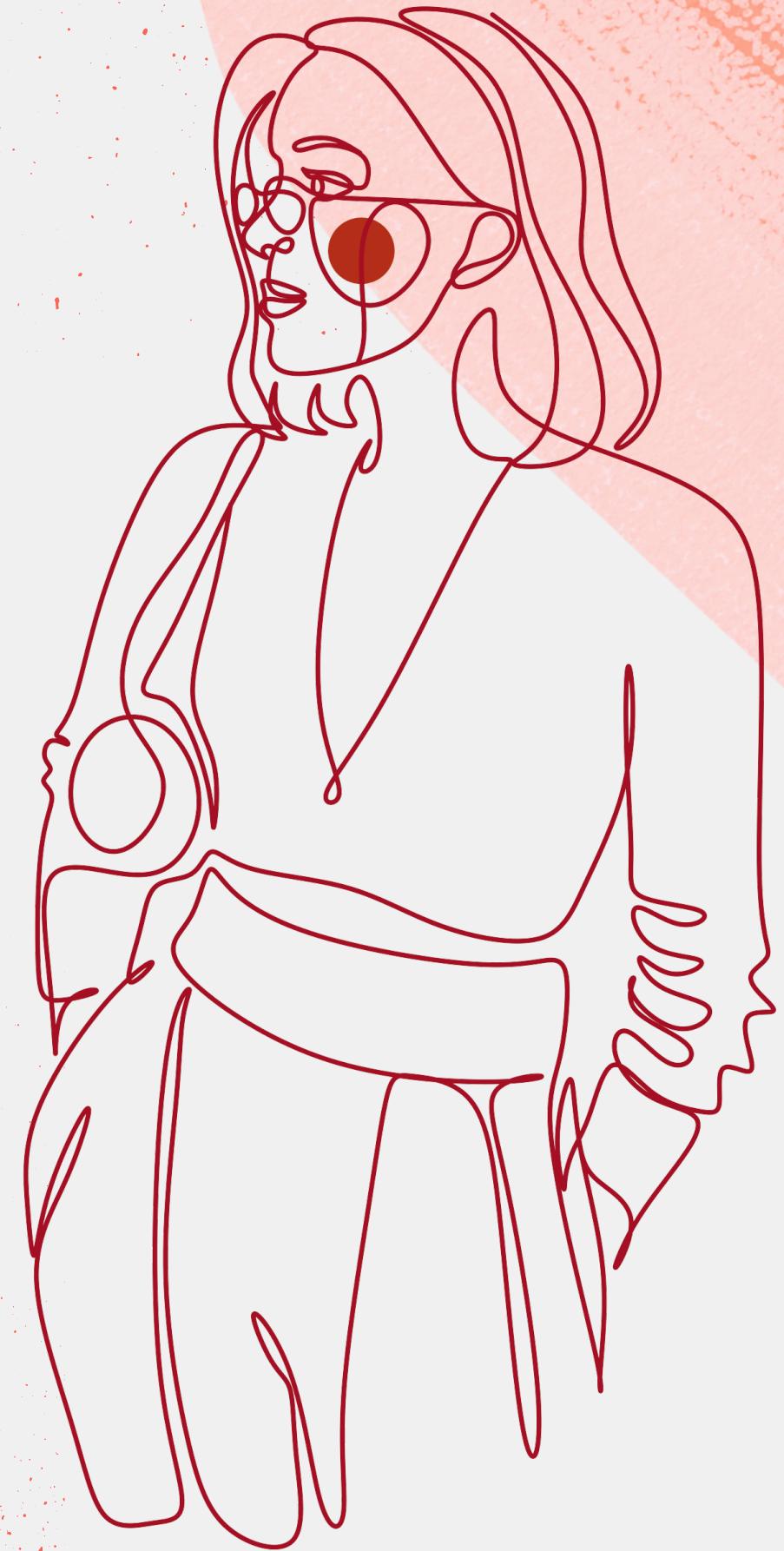


# What's the problem?

The project sponsor is facing significant difficulties in finding the **toxicological values** needed for cosmetics approval.

Currently, each ingredient requires several minutes to obtain the **NOAEL** (No Observed Adverse Effect Level) and **LD50** (Lethal Dose 50%) values, making the process time-consuming and inefficient.

This **slowness** represents an obstacle to the rapid and accurate evaluation of products, highlighting the need for a system that can significantly speed up the search for such toxicological values.





# Requirements



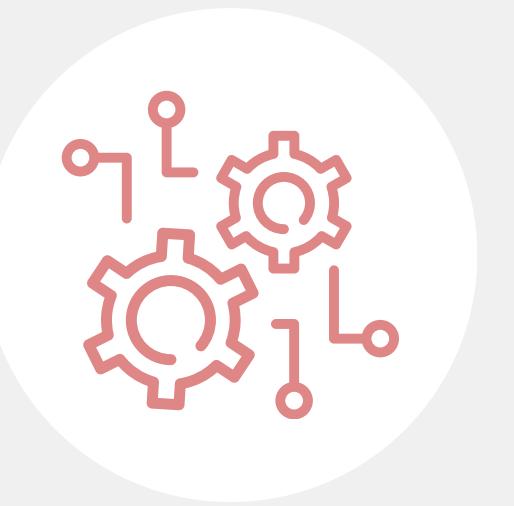
## CORRECT AND ACCESSIBLE VALUES

Make official and easily available data available to the user.



## USER-FRIENDLY INTERFACE

Provide the user with an intuitive interface to speed up the work.



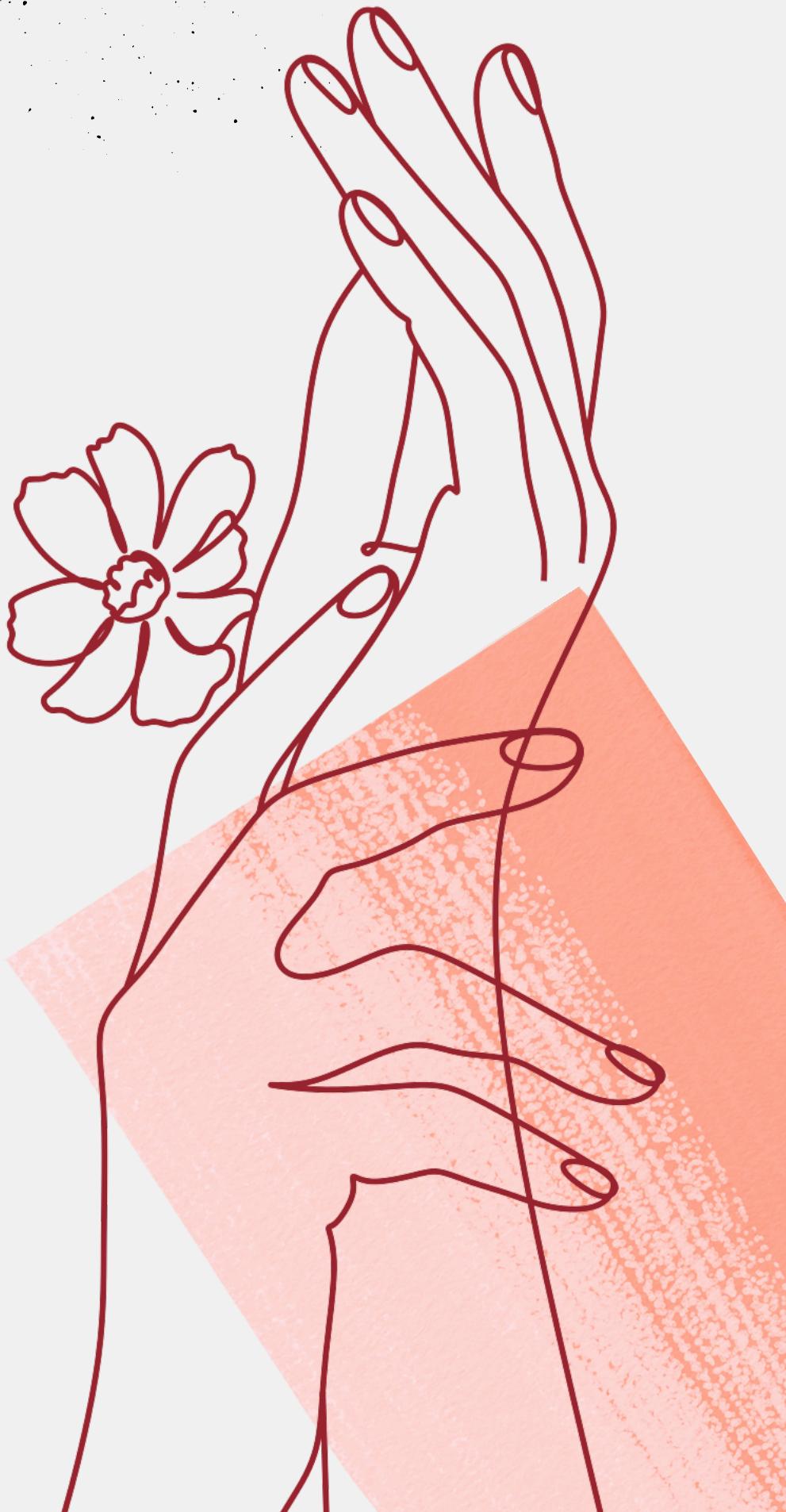
## EXTRA FEATURES

Add additional functionality related to the user's work to simplify complex actions.

# Our approach to the problem

We decided to approach the problem by creating an effective and intuitive **tool**, relying on the **Python** programming language to create the algorithms for the various features of our website, which we created using the **streamlit** library.

Our approach was to provide data and features that were as clear and comprehensive as possible.





# How did we put it into practice?

The primary goal was to obtain the **NOAEL/LD50** value in an automated way on different sites such as **CIR, ECHA, EFSA and PubChem.**

We studied the structure of the various sites to find the toxicological values of the ingredients in the fastest and most complete way possible.





# The difficulties we encountered

The main challenges we faced were:

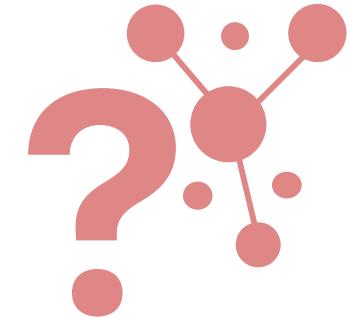
- Extracting values from non-textual PDFs
- Ingredients without value
- High value search time



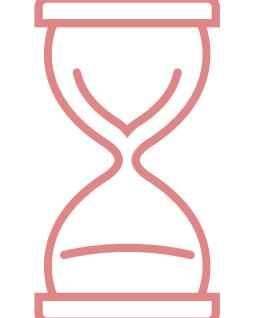
# Problem resolution



Creating an **algorithm** that extracts text from PDF images and searches for toxicity values.



Search for values on **sites** other than CIR and added the ability to manually enter the toxicity level.



Creating a **database** containing values and useful links of the ingredient searched. Bringing the search time to less than **1 second**



# ToxApp Benefits

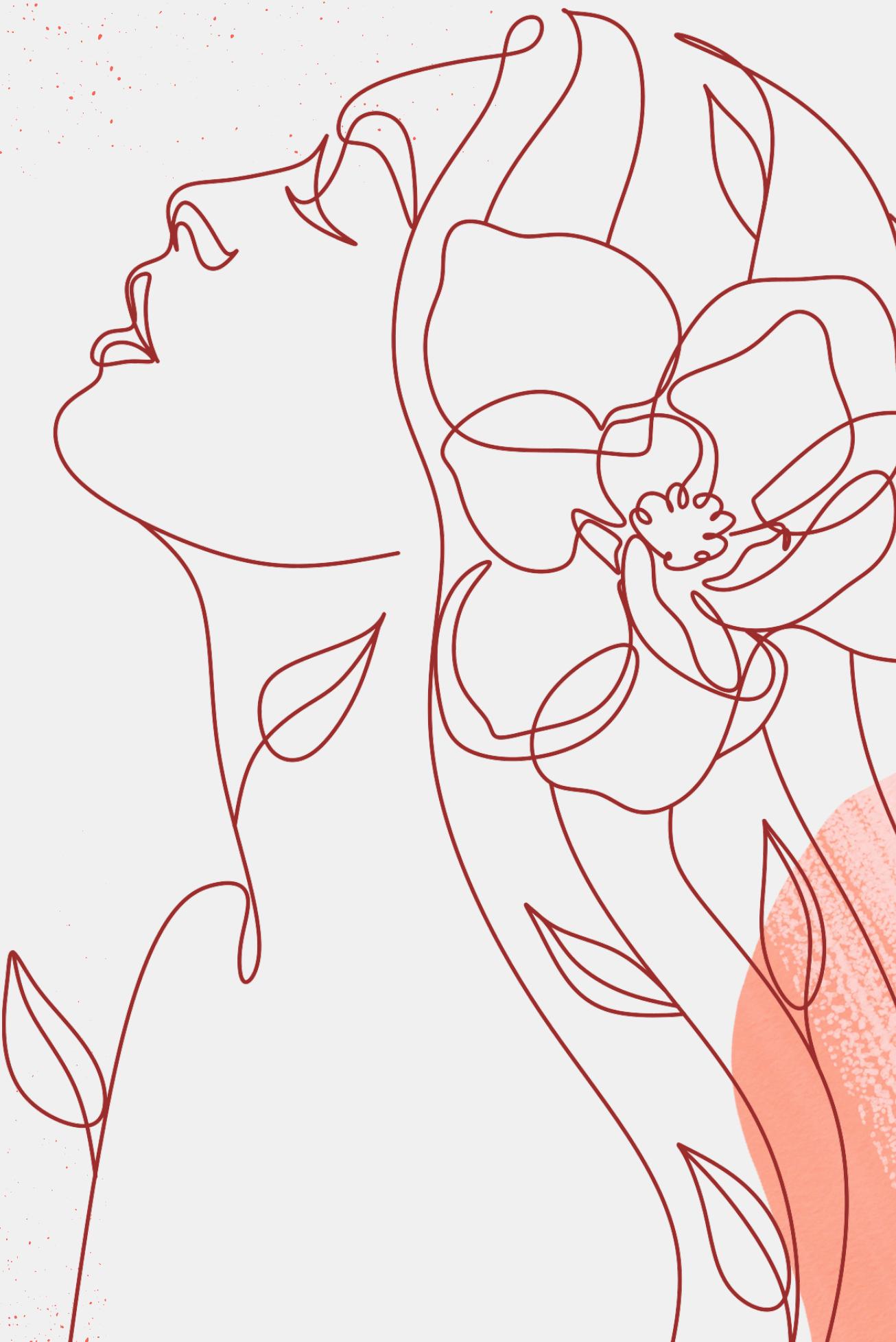
## Without ToxApp

- Slow
- Repetitive
- Cumbersome
- Difficult
- Manual
- Boring



## With ToxApp

- Fast
- Easy
- Interactive
- Automatic
- Accurate
- Convenient
- Upgradable





# TOXAPP Stats

**At least one value**

**>91,3%**

**Average search time**

**0.0232 sec**

**Percentage values**

ECHA values: 39.4%

LD50 values on CIR: 77.2%

NOAEL values on CIR: 59.7%

PubChem values: 6.5%

EFSA values: 27.3%



# Thank you for your attention!

Andrea Fumagalli