Arome AI

Creating Fragrance Molecules with AI and Synthetic Biology

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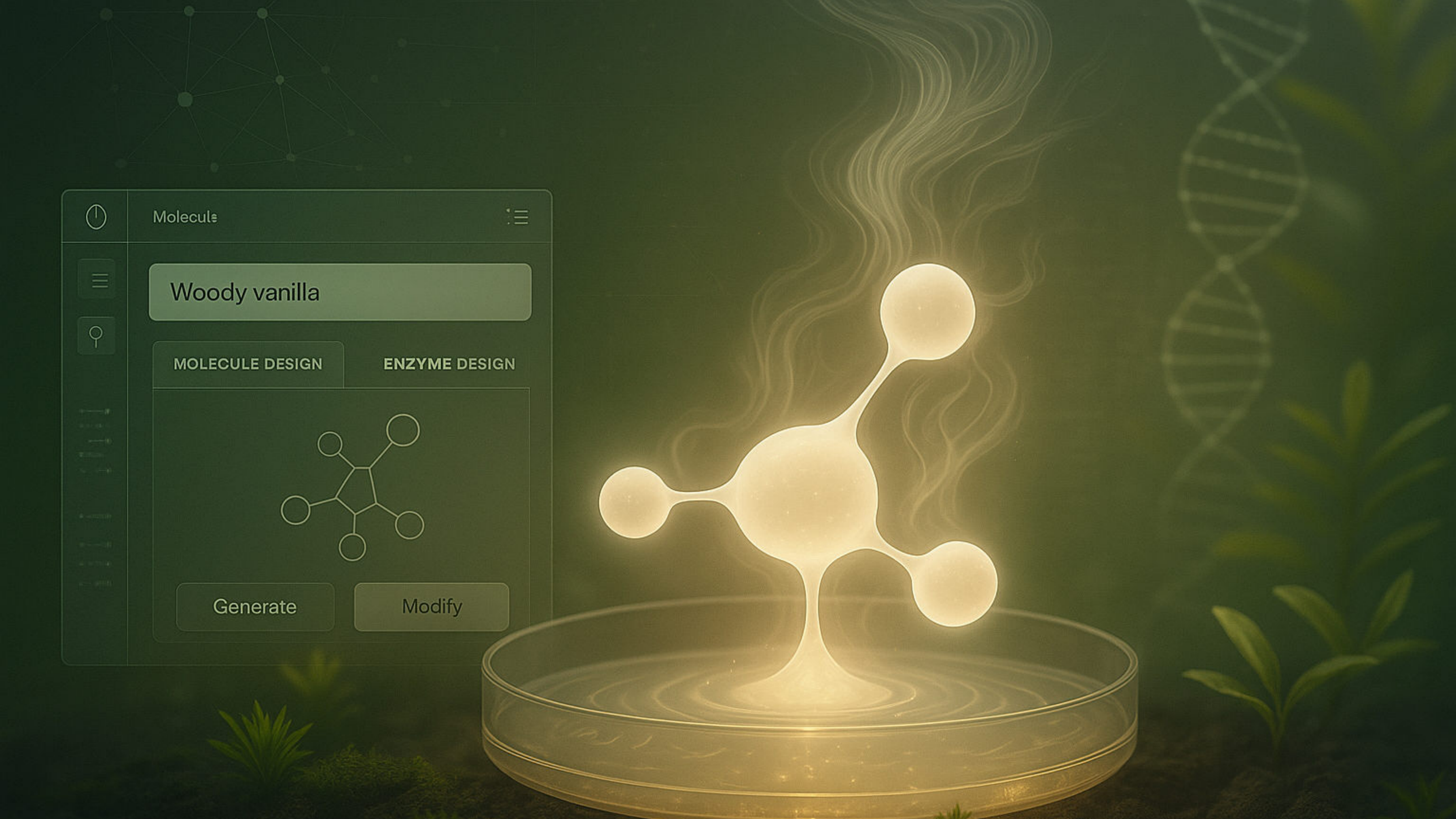
Arome AI is a platform for designing
novel fragrance molecules
through AI and synthetic biology.

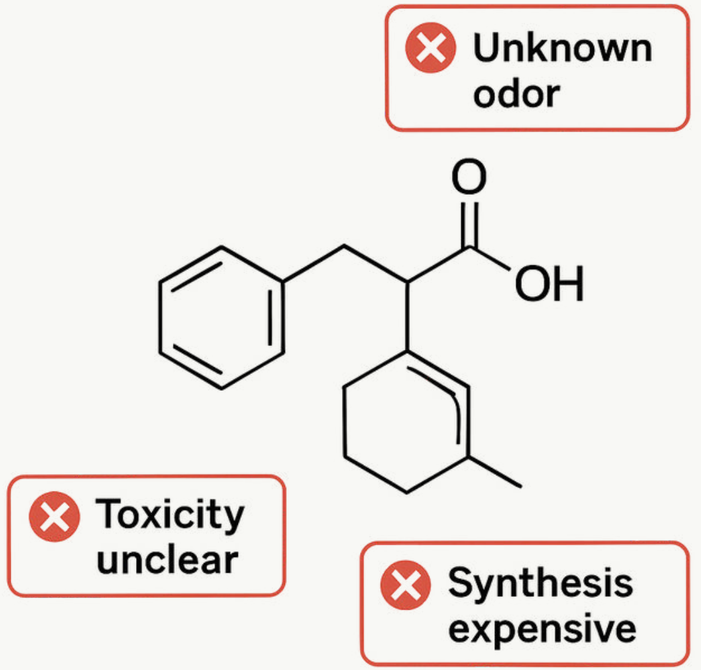

Molecule
Woody vanilla
MOLECULE DESIGN
ENZYME DESIGN
Generate
Modify

Why Creating New Fragrance Molecules Is So Difficult

Requires deep chemistry expertise

No way to preview scent

Slow, manual, and high-cost



This limits true innovation to a small number of industry leaders.

Why the Fragrance Industry Needs New Tools

Too Slow, Too Expensive

- Slow
- Inaccessible
- Expensive

The Pressure to Go Green

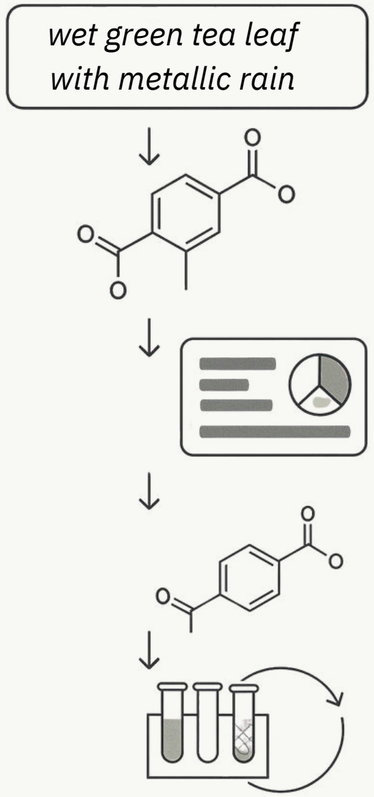
- Greener Expectations
- Supply Chain Limits
- Biosynthesis is Promising

New Tools = New Possibilities

- AI-driven molecule creation
- Digital-first fragrance development
- New materials, not just new blends

From Idea to Molecule and Microorganism

From Prompt to Production



1 **PROMPT**

Input a text prompt

2 **MOLECULE GENERATION**

AI generates novel, valid molecules aligned with the input

3 **PROPERTY EVALUATION**

Each candidate is evaluated for novelty, and biodegradability, safety

4 **BIOSYNTHESIS PLANNING**

Biosynthesis pathways are predicted; novel enzymes are designed if needed

5 **LAB TESTING**

Enzyme candidates are tested in the lab

Arome AI: From Molecule to Microorganism

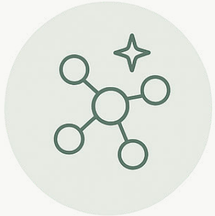
AI Generated Molecule Design

Biosynthesis Planning
Includes enzyme matching & design

Lab Testing

Built for creativity and grounded in scalable biosynthetic production.

Arome AI: From Molecule to Microorganism



AI-Generated Molecule Design

- AI generates new molecular structures based on olfactory intent
- Generative AI trained on Molecules and Olfactory Receptors data
- Evaluates for scent profile, safety, biodegradability, and novelty

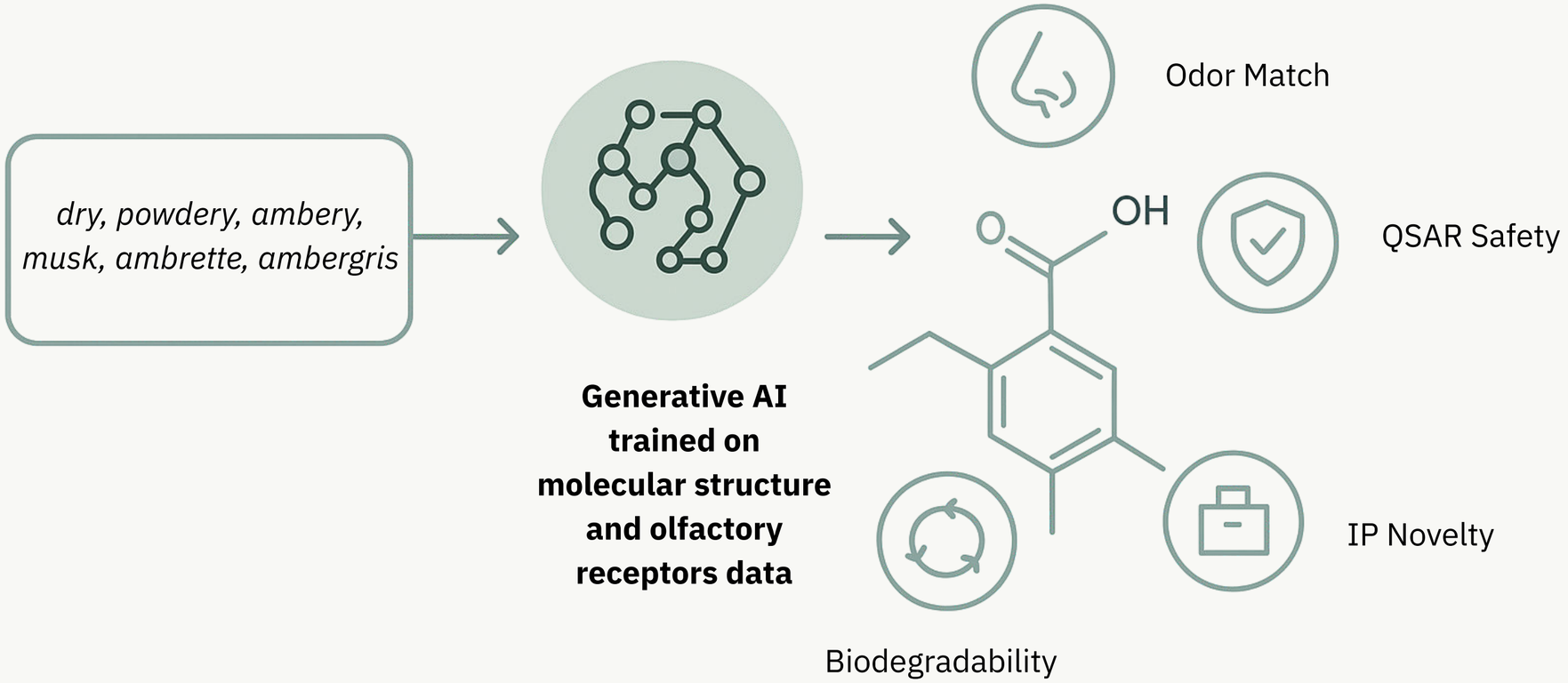
Biosynthesis Planning

- Maps biosynthetic pathways from simple feedstocks (e.g., glucose)
- Searches enzyme databases (e.g., UniProt, BRENDA)
- Proposes novel enzymes using AI when no match exists
- Models enzyme structures with AlphaFold to assess expressibility

Lab Testing

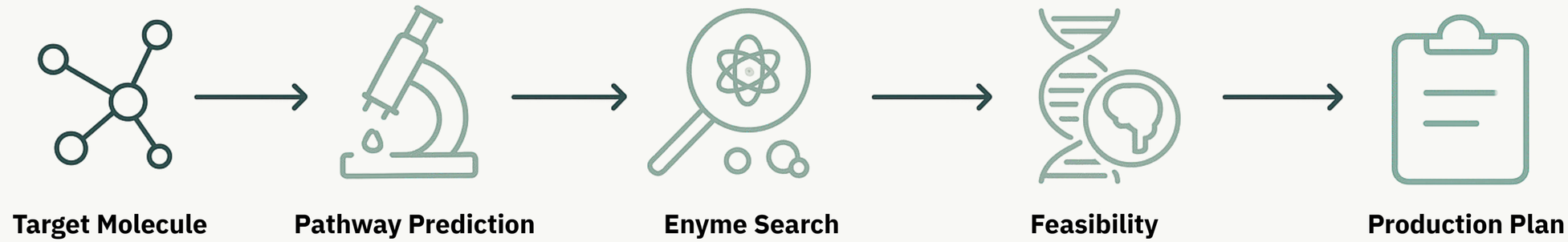
- Expresses candidate enzymes in microbial hosts (e.g., yeast, E. coli)
- Tests for yield, selectivity, and pathway viability
- Returns experimental data to refine AI models

How AI Designs Fragrance Molecules



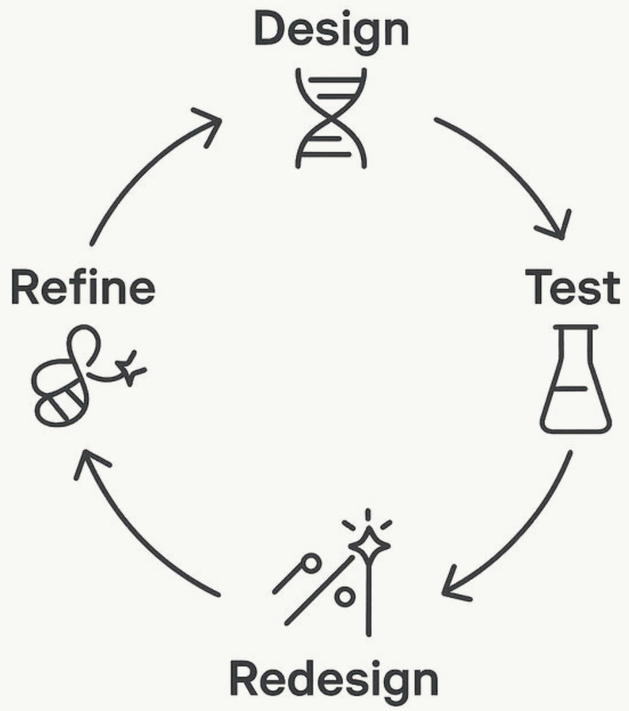
Planning Biosynthesis with AI and Enzymes

Arome AI helps plan how a promising molecule could be produced using biosynthesis.



Learning From the Lab

- AI proposes biosynthesis-ready enzyme candidates
- Labs test them for: expression, yield, and selectivity
- Results feed back into Arome AI
- Models are refined and retrained
- The system improves with every cycle



Demo Video

Why This Changes Fragrance Creation

Expands Access

- Molecule design is no longer limited to large R&D labs
- Indie perfumers and startups can now participate

Supports Sustainability

- AI enables greener molecules from the start
- Biosynthesis avoids petrochemical dependence

Empowers Creativity

- Go beyond catalog ingredients
- Design custom scent signatures at the molecular level

Why Design a Custom Molecule?

Common Objection	Arome's Value
"Can't I just make a unique scent from existing ingredients?"	Yes — but your palette is limited
"Why not just mix what's already there?"	Everyone's using the same 2,000 materials
"Perfume is about art, not chemistry"	Exactly — so give artists new colors to paint with
"It's too risky to invent new molecules"	Ours are designed to pass safety tests and go to market.

Beyond Dupes

The Problem (Dupe Culture)

Dupes via GC-MS
Everyone uses same palette
Brand identity gets copied

Clones flood the market

The Arome AI Solution

Molecules designed from scratch
Structurally and olfactively novel
Unique = ownable signature

Harder to reverse engineer

Where We Are Now

- **Molecule generator prototype built**
- **Property prediction models trained**
- **Enzyme design module in development**
- **Initial lab testing partnerships underway**

This is the groundwork for a scalable and sustainable fragrance design system.

Let's co-design the next generation of scent molecules.

Reach out to pilot Arome AI or collaborate on lab testing.

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