

✦ FUNGI BIODYES ✦

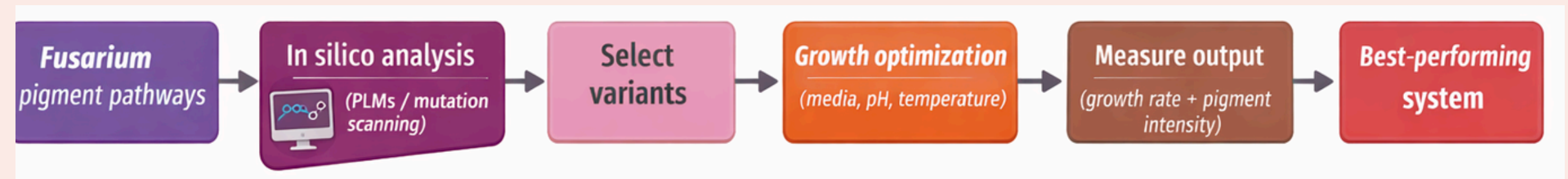
María José Ortiz , Medellín, Colombia, SynBioGenetics
T.A: Carlos Silvera



- **Problem:** The textile dyeing industry generates ~20% of global water pollution due to toxic and non-biodegradable chemicals, harmful to ecosystems and human health.
- **Background:** Fungi naturally produce pigments that can serve as biodegradable and less toxic textile dyes.
- **Current limitation:** Low yield, variability in color, and limited fixation and durability on textiles.



- **Goal:** To develop and optimize a biotechnological process for producing and applying fungal pigments onto textiles under controlled conditions.



Aim 1

Expected results

Analysis to create mutations

Mut	Position Residue	Original AA	pLDD T	Structural Classification	Change (Old → New)
M1	178	GLY	56.5	Very flexible loop	GLY → ALA
M2	226	SER	56.6	Very flexible loop	SER → ALA
M3	151	GLY	57.9	Very flexible loop	GLY → SER
M4	152	ILE	69.5	Flexible loop (semi-rigid)	ILE → VAL
M5	223	ASP	50.9	Very flexible loop	ASP → ALA

Figure 2

Implement mutations

Identification of a novel effector gene and its functional tradeoff in *Fusarium oxysporum* f.

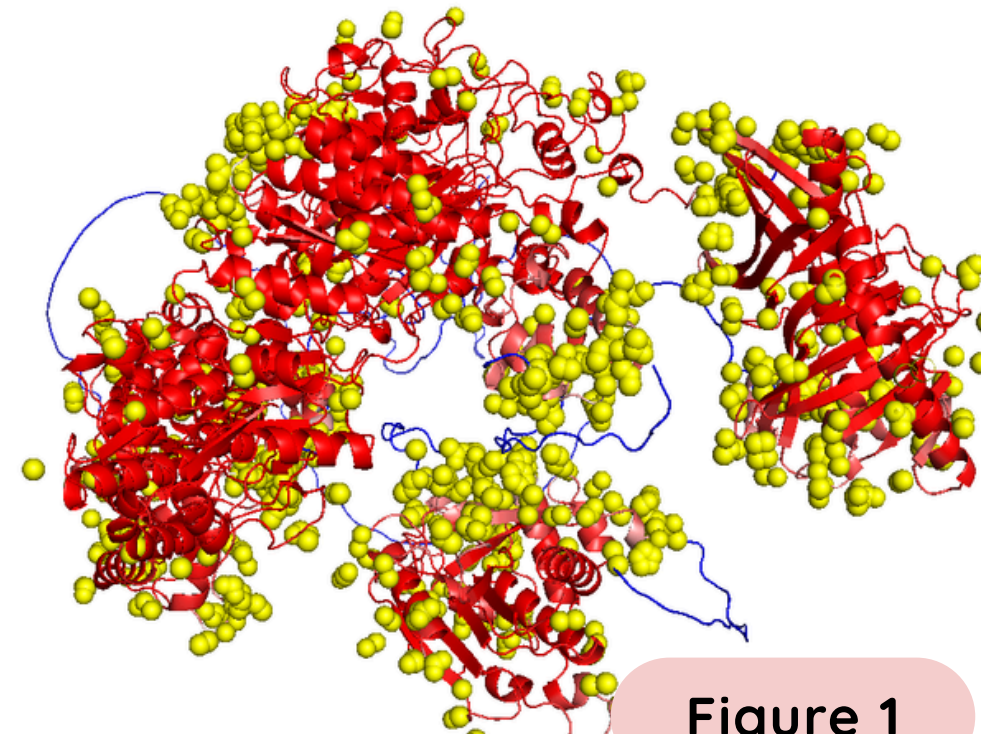


Figure 1

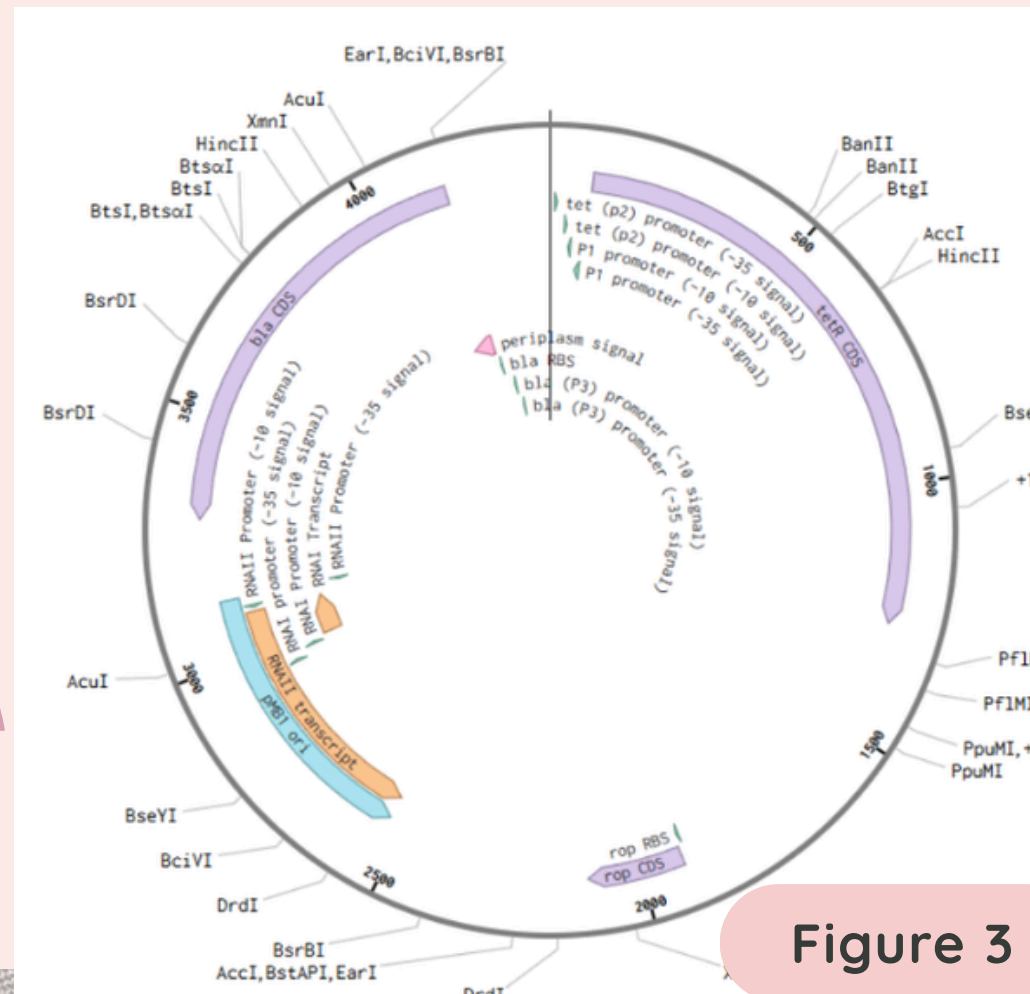


Figure 3



In silico-guided mutations in the FoBIK1 enzyme led to strains with significantly higher pigment production compared to the wild type.

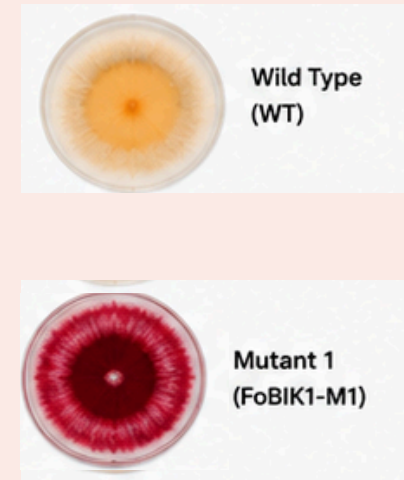
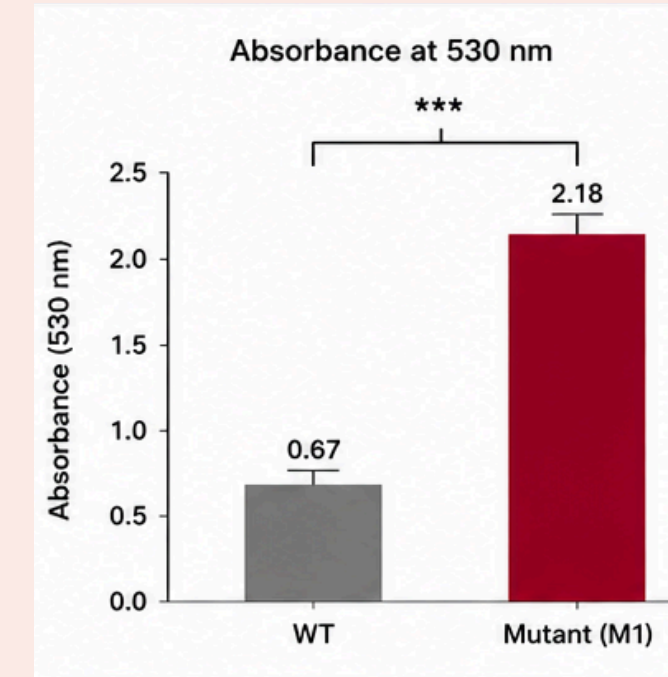
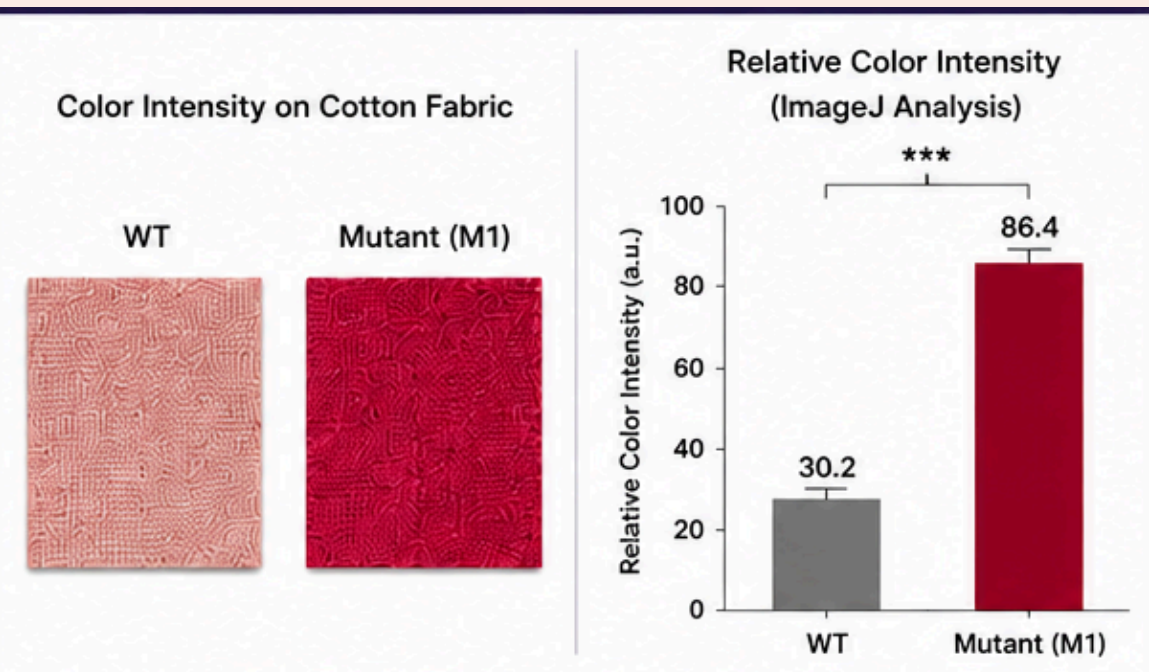


Figure 4



Textile assays demonstrated that pigments produced by engineered *Fusarium* strains generated more intense and stable coloration compared to the wild type.



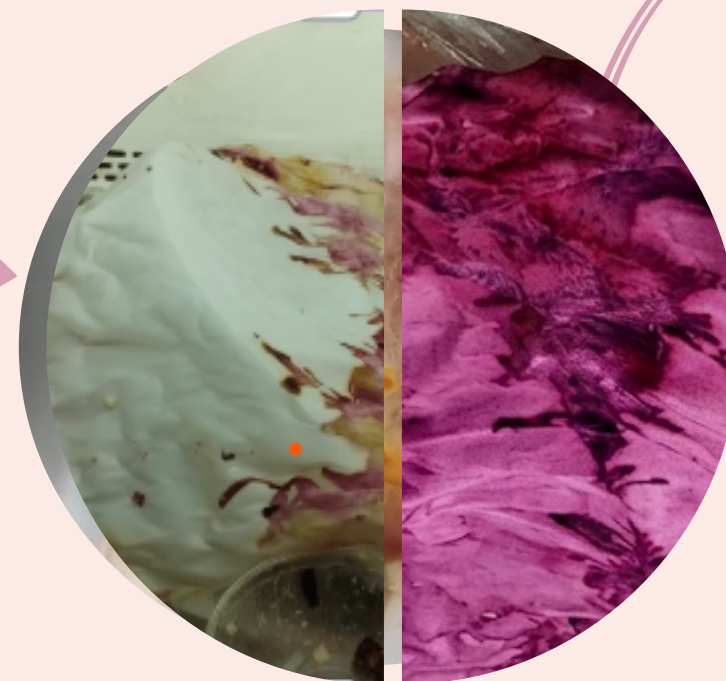


2. Refine this system into a more controlled and reliable textile application.

- Transfer fungal growth onto fabrics
- Maintain consistent and stable coloration on textiles
- Try to automate the process

3. Scale fungal-based dyes into a sustainable alternative to synthetic dyes.

- Transition from lab-scale cultures to bioreactor systems
- Ensure reproducibility and stability at larger scale
- Optimize yield for potential industrial application



THANKS