

1. BIOPREPARATION and BIOFINISHING

BIO-PREPARATION

Substrates: cotton, flax

Enzymes: pectinase, cutinase, xylanase, laccase

Advantages: process integration, energy saving, less polluting wastewaters

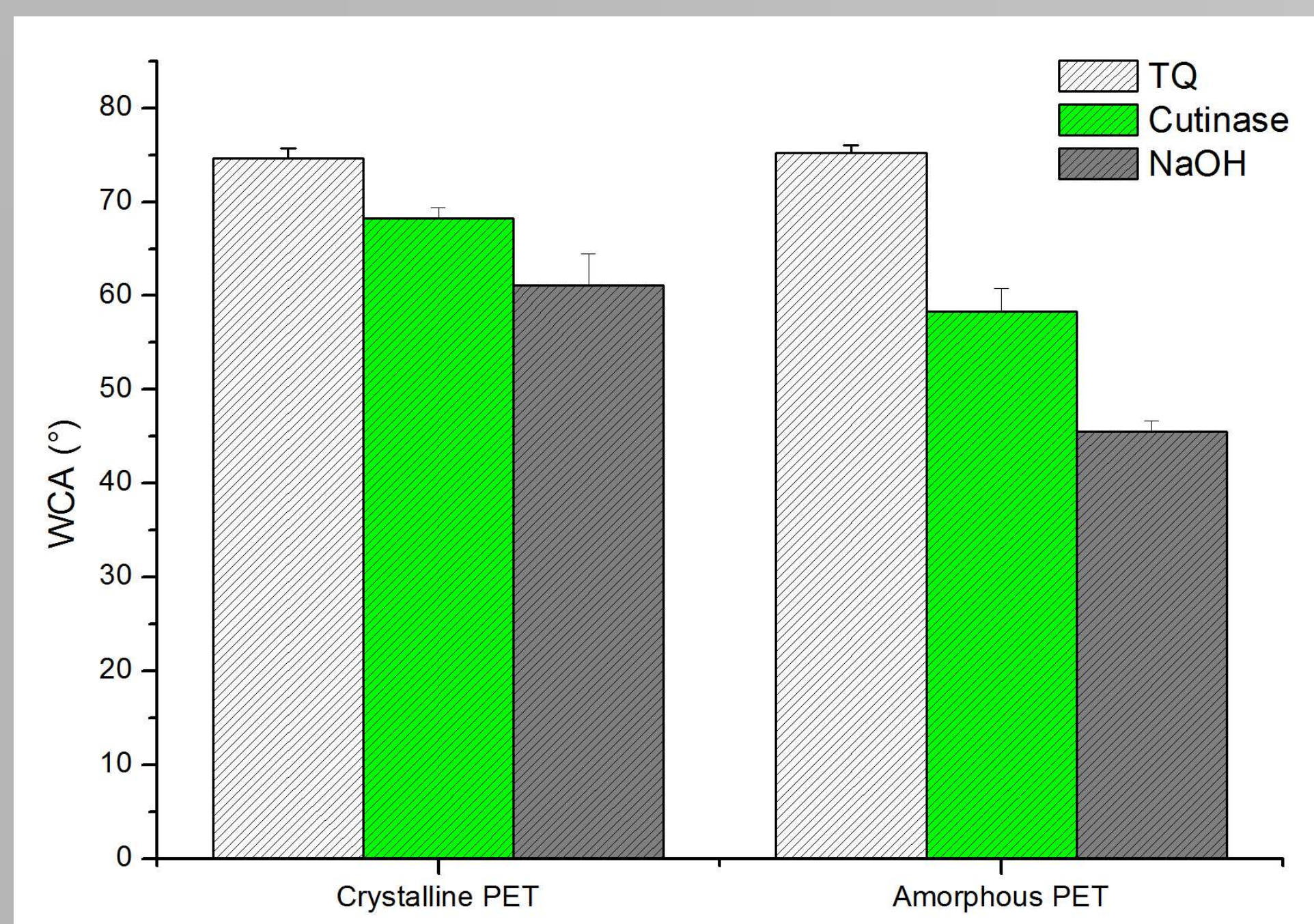


BIO-FINISHING

Substrates: wool, cotton, polyester, polyamide, blends

Enzymes: protease, cellulase, cutinase, laccase

Effects: softness, anti-pilling, hydrophilicity, dyeing capability, antimicrobial functionalization



Cutinase

Enzyme used to increase superficial hydrophilicity of polyester based materials substituting of conventional alkaline treatment.

Research institutions



Industrial partners



2. BIOACTIVE TEXTILES

Different applications were studied and developed:

- . Textiles with antifouling activity
- . Bioprotective textiles
- . Bio-filtering devices
- . New biotechnology approaches to bio-traceability

Enzyme stability is one of the most important functional parameter. It depends on the textile substrates, on the immobilizing agents, on the treatments conditions (time, temperature).



Enzymatic activity stabilization:
OPERATIVE CONDITIONS

⇒ Washing resistance
to be improved



Enzymatic activity stabilization:
SHELF LIFE

⇒ Optimum up to 12 months



PROCESSES/MATERIALS UNDER PATENTING

Research institutions



Industrial partners

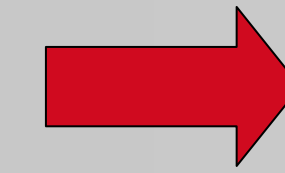
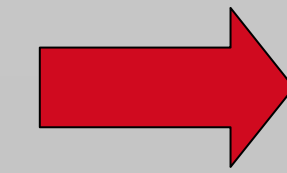
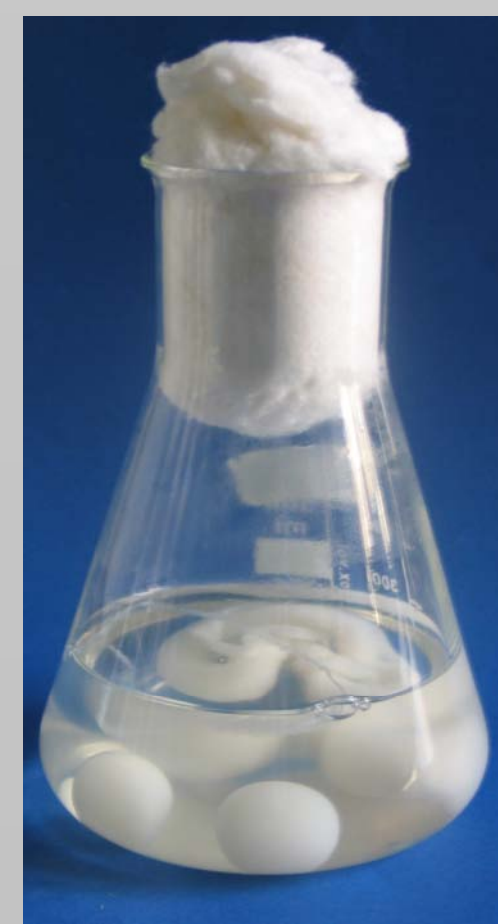


3. BIOSORPTION

A selected fungal strain of *C. elegans* was used for treating both spent dye baths and textile wastewaters. The biomass was cultured in a medium containing starch, harvested, washed and inactivated by heating.



Cunninghamella elegans

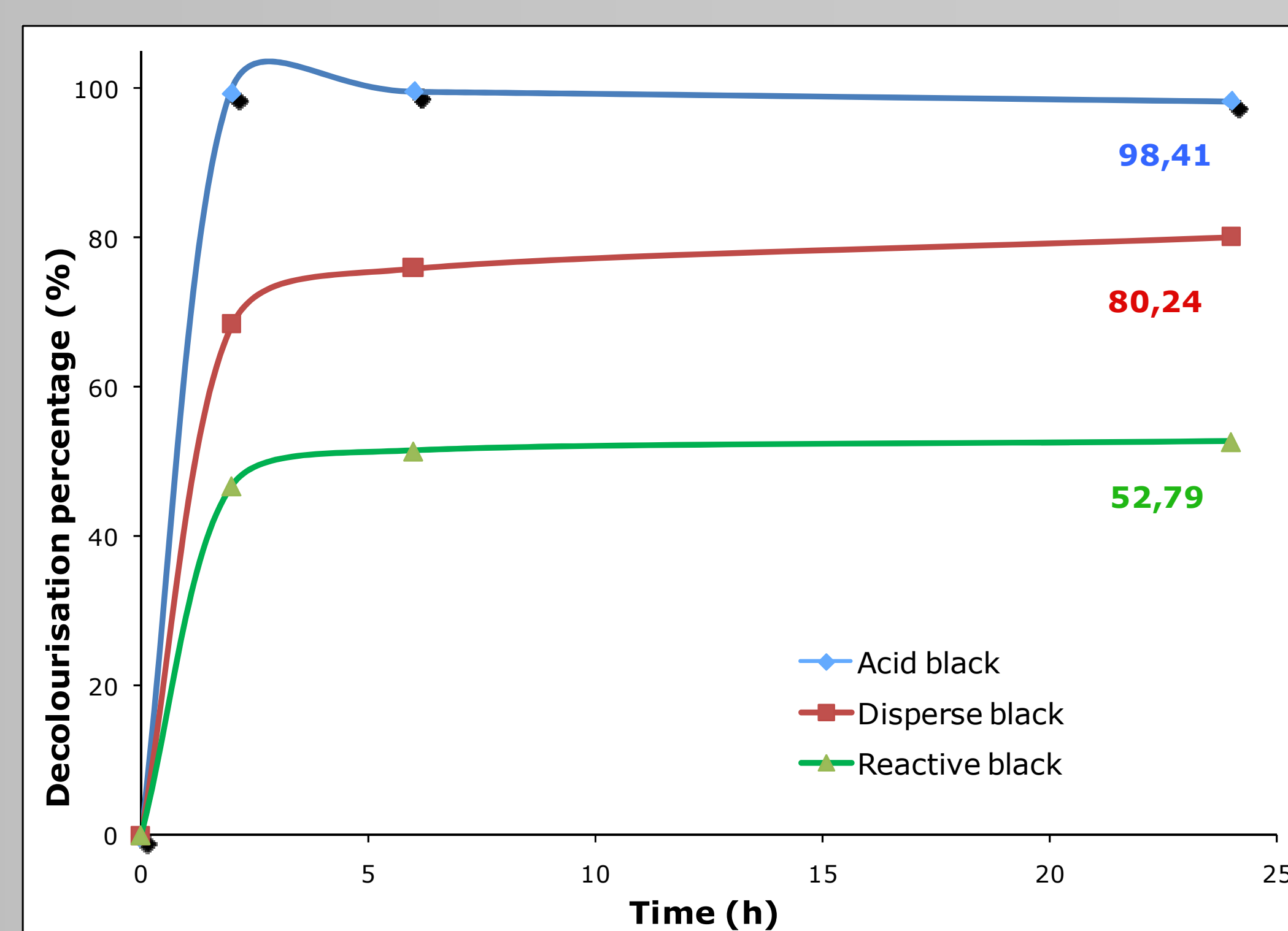


READY TO USE BIOMASS

- *C. elegans* is effective in removing dyes, surfactants and salts, irrespective of effluents composition.
- After 2h up to 98% of pollutants is absorbed by the biomass.
- Adsorption capacity of the fungal biomass is higher than traditional absorbents (eg. activated carbon).
- The biosorption treatment turns in an effective detoxification of the effluents.



Acid bath for polyamide



PATENT: *Fungal biomass preparation for the treatment of industrial wastewaters containing pollutants* - Appl. n° 10153195.2-1213, PAN-ECO S.A.

Research institutions



Industrial partners

