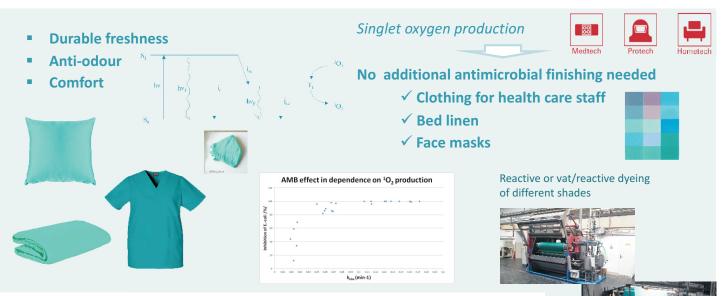
Functional Dyeing of Cotton and Co/PES blends for health-care sector

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An innovative photoactive phthalocyanine based antimicrobial system used for textile barrier finishing was studied and optimized as a new tool for photoinitiated antimicrobial functionality of textiles. Photoactivity of Zn, Al-PTCs is based on production of singlet σ_2 when exposed to light. This highly reactive form of oxygen is able to kill majority of microorganisms and to destroy some pollutants. The lifetime of the singlet oxygen is only several microseconds and therefore its effect is limited to max 200 nm distance from the dyed fabric surface.



The synthesis and of the best photoactive phthalocyanine dye has been optimized in pilot-plant scale. Its application for dyeing of mercerized cotton 120 g/m^2 and 50/50 cotton/PES blend 140 g/m^2 (plain weave shirting and bedlinen textiles) was verified in lab and pilot-plant scale. For improvement of colour-fastnesses and different colour-shades at reduced costs, combination of the photoactive phthalocyanine dyeing with vat dyeing (two-steps dyeing) or with reactive dyeing (one-bath) has been optimized in industrial scale (jigger dyeing).

- Effect stable in repeated washing (60°C + chemo-thermodisinfection)
- Compatible with washpermanent FR, DWOR and top finishing

Testing of photoactivity (velocity of the singlet oxygen production) of the finished textiles was conducted by means of an iodide method. Antimicrobial activity of the finished textiles was evaluated according to the modified standard EN ISO 20743 (proper illumination needed) after dyeing and repeated maintenance cycles prescribed for health care sector: washing at 60 °C + chemo-thermo-disinfection. The antimicrobial activity of the dyed fabric is stable min in 50 maintenance cycles. According to EN ISO 10933-10 the dyed textiles have no skin sensitizing or irritation potential. Good mechanical-physical and physiological parameters (moisture management).

50/50 Co/PES

4,1

2,6

100% Cotton

3,5

100% Cotton shirting - Colourfastness

washing 60°C C1s

persp. alkaline

persp. acid rubbing dry

rubbing wet light Q-SUN EN ISO 105-E01

EN ISO 105-COE

EN ISO 105-E04

EN ISO 105-E04

EN ISO 105-X12 EN ISO 105-X12 EN ISO 105 B02

EN ISO 105-E03

4/4/4

3-4/4/4-5

4/4/4

4/4-5/4-5

Shado

10⁻² [min⁻¹] / [J⁻¹]

0.1128

Antimicrobial effect

99.8%

E.-coli inhibitio

