21st IFATCC INTERNATIONAL CONGRESS BARCELONA 2008

2008 NEW HORIZONS OF TEXTILE FINISHING

Barcellona 7-9 maggio 2008

Presentazione atti del congresso

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Dipartimento di Ingegneria Industriale
Università di Bergamo

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aitex instituto tecnológico textil

made in Green by AITEX

BASF The Chemical Company

B·T·C BASF Group

Clariant Exactly your chemistry.

CSIC

DyStar Shaping success

amec amtex

arimtex

A tit Asociación de técnicos de la industria textil

CETEMMSA TECHNOLOGICAL CENTRE

MASSÓ

consejointertextilespañol

HUNTSMAN Enriching lives through innovation

Igcar

intexter

LEITAT Technological Center

OGT OSGOTEXT

1893 NOSEDA

Synthesia pigments & dyes

TANATEX CHEMICALS

textprint s.a.

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Conference

- Austria	3
- Belgio	2
- Francia	4
- Germania	6
- Giappone	2
- Italia	8
- Messico	1
- Polonia	1
- Portogallo	5
- R. Ceca	3
- Spagna	27
- Slovenia	3
- Svizzera	2
- Turchia	3
- Ungheria	3

Posters

- Austria	2
- Francia	1
- Giappone	4
- Grecia	1
- Italia	3
- Macedonia	1
- Polonia	1
- R. Ceca	5
- Russia	2
- Slovenia	5
- Spagna	15
- Turchia	1
- Ungheria	1

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	MIERCOLES/ *WEDNESDAY* 7			JUEVES/ *THURSDAY* 8			VIERNES/ *FRIDAY* 9		
	CONF. HA LL 1	*CONF. HA LL 2*	*CONF. HA LL 3*	*CONF. HA LL 1*	*CONF. HA LL 2*	*CONF. HA LL 3*	*CONF. HA LL 1*	*CONF. HALL 2*	*CONF. HALL 3*
9,00 9,30	***Chairm.: Dr. Canal*** OPENING SESSION: E.Cima			***Chairm.: Dr. Blanes*** **B3** Csiszár			***Chairm.: Dr. Naïk*** **A50** Canal		
9,30 10,00	**E41** Martí			**A4** Tolksdorf	***Chairm. Dr. Parra*** **E69** Cleyman	***Chairw: Dr. Canal*** **F70** Corbellini	**E5** Czajkowski		
10,00 10,30	**B2** Hori			**A16** Siemesmeyer	**G53** Islas	**E58** Vílchez	**D6** Sfiligoj-Smole		
10,30 11,00	**F65** INAUG. CONF. J. Casas- V. Fabregat			**A35** Santamaria	**A49** Sánchez	**E27** Bonet	**B24** Marek		
11,00 11,30	**COFFE BREAK**				**-**		**POSTER SESSION**		
11,30 12,00	***Chairm.: Dr. Naik*** **A10** Hook	***Chairw.: Dr. Riva*** **B40** Rombaldoni	***Chairm.: Dr. Navarro*** **C19** Bechtold	***Chairm.: Dr. Carrion*** **D28** Blanes	***Chairm.:Dr. Gacén*** **D29** Gisbert	***Chairm.:Dr. Sánchez*** **E59** Martinková	***Chairm.:Dr. Canal*** *P11* **D64** Naïk		
12,00 12,30	**A42** Valldeperas	**B31** Gomes	**C20** Bechtold	**A12** De Clerck	**D23** Pernica	**E48** Ovejero	*P12* **D1** Freddi		
12,30 13,00	**A32** András	**B11** Rabe	**C55** Perwuelz	**A61** López	**A33** Alves	**E25** Knaup	*P13* CLOSING CONF.		
13,00 15,00	**LUNCH**								
15,00 15,30	***Chairm.: Dr. Hook*** **A43** Bozic	***Chairw.: Dr. Maillo*** **B44** Hossain	***Chairm: Dr. Valldeperas*** **C57** Crespi	***Chairw.: Dr. Bonet*** **B17** Bautista	***Chairm.:Dr. Litty*** **A45**Jolly-Desodt	***Chairm.:Dr. Ovejero*** **E52** Lozano			
15,30 16,00	**A46** Periolatto	**B51** Donelli	**C54** Gutiérrez	**G37** Cayuela	**A21** van Wersch	**E13** Perincek			
16,00 16,30	**POSTER SESSION**								
16,30 17,00	***Chairw.: Dr. Martí*** **A47** Carrión	***Chairm.: Dr.Manich*** **B22** Gabouriau	***Chairw.: Dr. Cayuela*** **E8** Mignanelli	***Chairm.: Dr. De Clerck*** **G60** Manich	***Chairm.:Dr. Krayer*** A66 Bial	***Chairm.:Dr. Giggli*** **E15** Dural			
17,00 17,30	**A62** Vidal	**B26** Ricard	**E56** Riva	**G38** Maillo	A67 Berninger	**F63** Glawe			
17,30 18,00	**A18** Rosace	**B34** Miranda	**F36** Parisi	**G39** Tonetti	A68 Telegin	**F30** Carneiro			

A: Current development and research, in bleaching, coloration and finishing.

: Surface treatments of textiles: plasma, enzymes, and radiations.

C: Clean technologies & design.

D: Nanotechnology & textile finishing.

E: New finishes for technical textiles and new textile structures.

F: Developments in finishing textile machinery.

G: Developments in textile testing and instrumentation.

Research supporting creativity: new processing technologies for improved aesthetic and functional properties of textiles

Freddi - Gigli

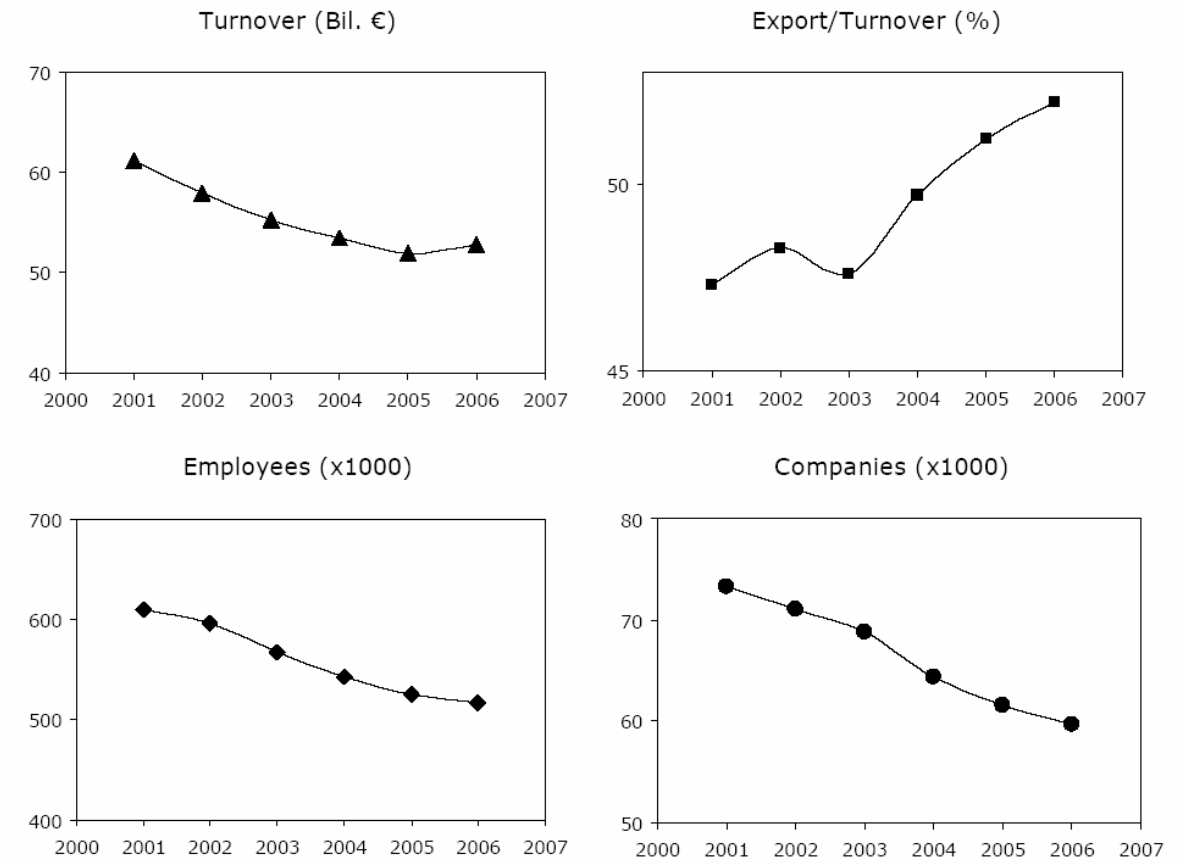

Figure 1. The Italian T/C sector in 2001-2006.

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Research supporting creativity: new processing technologies for improved aesthetic and functional properties of textiles

Freddi - Gigli

Table I. Classification of lectures given at the 3 latest AICTC national congresses (2005-2007)

Topics	Number of lectures		
	RES	IND	Total
Textile chemistry[1]	2	6	8
Nanotechnology			
• Plasma	4	4	8
• Other surface modification techniques[2]	8	7	15
Biotechnology[3]	2	1	3
Others[4]	8	3	11

[1]Topics: preparation, dyeing, printing. [2]Topics: nanoparticles, nanocapsules, cyclodextrins, nanoem antimicrobials, nanotubes, ultrasound, sol-gel treatments, etc. [3]Topics: enzyme treatment of textiles. polymers, nanofibres, energy and waste management, marketing, quality/safety/ environment.

Table III. Industrial Enzymes.

Target fibre	Process stage	Main enzyme
Cotton	Scour	Pectinase
	Bleach	Glucose oxidase b
	Depilling and softening	Cellulase
	Denim abrasion	Cellulase
Lyocell	Defibrillation	Cellulase
Flax	Retting	Pectinase[a]
Ramie	Preparation/degumming	Pectinase/xylanase
Wool	Scour	Lipase
	Softening	Protease
Silk	Degumming	Protease
Polyester	Oligomer removal	Cutinase[a]
	Surface modification	
Target auxiliary	Process stage	Main enzyme
Starch	Desize	Amylase
Tallow	Desize	Lipase
Peroxide	Bleach clean-up	Catalase
Dye	Reactive dye rinse	Peroxidase
	Denim decolorization	Laccase

[a]Some evidence of (pre-)commercial application

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Ricerca di Base

- **Variation in dyeing characteristics for PET-fibres: the effect of dye-fibre interactions**
- **Ozone: New Tendency in textile finishing**
- **Composite materials with anorganic nanofibres disposed in the form of geopolymer matrix**
- **Different Strategies to Modify Cotton Properties**
- **Textile modification using supercritical fluid and/or electron beam irradiation techniques (tentative)**
- **Extractable heavy metals in dyed textiles:verification of the test method**
- **Application of HMDSO Plasma Polymerization as a Novel Textile Finishing Process**
- **Surface modification of poly-(ethylene terephthalate) by lipolytic enzymes**
- **Modelización de los efectos del color en la protección UV ejercida por tejidos de algodón**

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2008 NEW HORIZONS OF TEXTILE FINISHING

Ricerca pre industrializzazione

- **Dendrimers finishing influence on color assessment of CO/PES blend fabrics**

- **Electrochemical Processes in Textile dyeing-State of the research and development activities**

- **A DBD plasma machine in textile wet processing**

- **Application of enzymes in wool dyeing**

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2008 NEW HORIZONS OF TEXTILE FINISHING

Applicazioni industriali

- **New Fluorocarbon Resin Development**

- **New developments in fluorocarbon finishing of textiles**

- **New developement in Continuous Dyeing of Polyester/Cotton Blends**

- **Industrial Atmospheric Pressure Plasma (APP) treatments-Grinp Technology**

- **Formaldehyde-an unavoidable or avoidable risk in pigment printing**

- **Solutions for digital textile printing chanllenges**

- **Acqua zero – an enviromental-friedly and cost-effective innovation**

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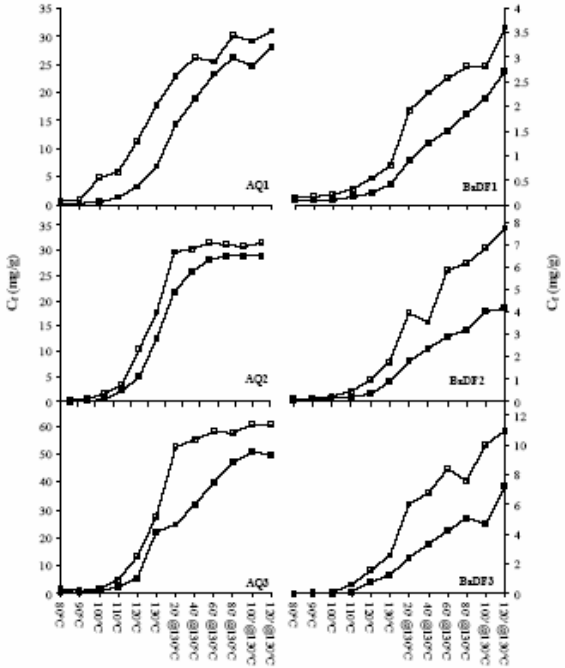
Ricerca di Base

2008 NEW HORIZONS OF TEXTILE FINISHING

Variazione delle caratteristiche di tintura delle fibre PES: interazione fibra colorante

De Clerck (Ghent University -Belgio) A12

Il presente lavoro permette di avere una panoramica generale dei vari metodi che possono essere utilizzati per valutare l'interazione fibra colorante. Nel caso specifico si evidenzia l'interazione tra PES e colorante disperso.



Amount of pure dye absorbed by the fibre as a function of temperature and time in the dyebath.

Coloranti antrachinonici (AQ) e benzodifuranone (BzDF)

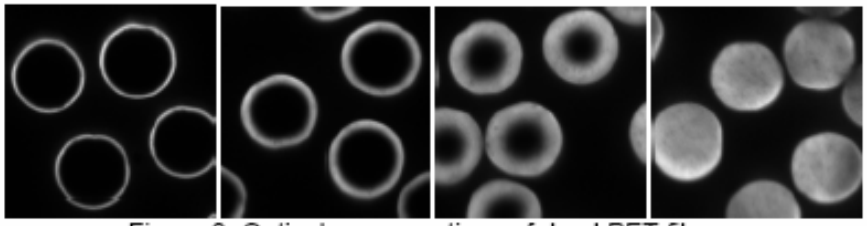


Figure 3. Optical cross-sections of dyed PET fibres.

Microscopio elettronico a scansione

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Ricerca di Base

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Ozono: nuova tendenza del finissaggio tessile
Perincek (Ege University - Turchia) E13

L'ozono può essere applicato in svariati ambiti tessili:
- riducente chimico;
- disinfettante;
- facilita i processi di lavaggio;
- decolorazione dei coloranti;
- processi denim;
- aumento tingibilità e stampa della lana;
- candeggio.

Table I. Physical properties of ozone [4]

Physical Property	Value	Physical Property	Value
Molecular weight	48.0 g/mol	Density, gas (0^0C, 101 kPa)	2.144 $kg.m^{-3}$
Boiling point (101 kPa)	-111.9^{0}C	Density, liquid (-112^{0}C)	1358 $kg.\ m^{-3}$
Melting point	-192.7^{0}C	Viscosity, liquid (-183^{0}C)	$1.57*10^{-3}$ Pa.s
Critical temperature	-12.1^{0}C	Heat of vaporization	15.2 $kJ.mol^{-1}$
Critical pressure	5.53 Mpa		

Vantaggi:
- Grado di bianco maggiore rispetto al processo tradizionale (20%-30%);
- Minor tempo di esercizio (tempi trattamento 1-5 min);
- Minor consumo di acqua e prodotti chimici;
- No utilizzo prodotti organici alogenati (AOX).

Svantaggi:
- Elevata perdita di resistenza;
- Ingiallimento del materiale;
- Azione corrosiva sui macchinari.

Risultati sperimentazione:

Grado di bianco incrementato tra il 20-34%
Lignine (juta) eliminate per il 70%

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Ricerca di Base

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Materiali compositi con fibre inorganiche disposti sotto forma di matrice geopolimerica (allumino silicati -Si-O-Al-O-) Pernica (Liberec University – Czech R.) D23

Obiettivo: valutare la differenza tra un materiale composito (matrice geopolimero) in presenza e assenza di fibre di rinforzo (vetro, carbonio)

Proprietà:
- Insolubili in acqua;
- Fire-resistent non produce combustione
- **Resiste a temperature > 1000°C**
- Bassa conducibilità termica.

Resina geopolimerica High-Termal Silica.

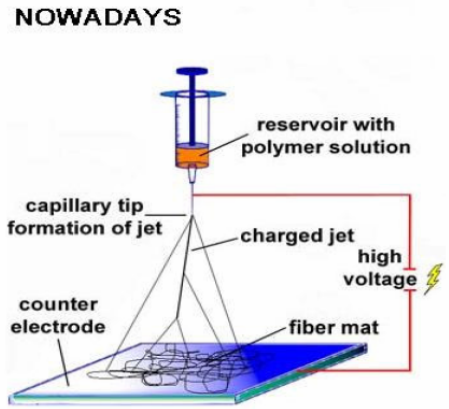
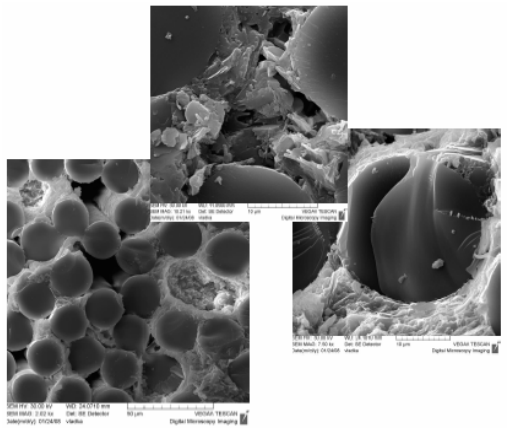
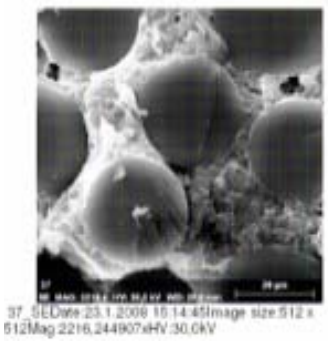
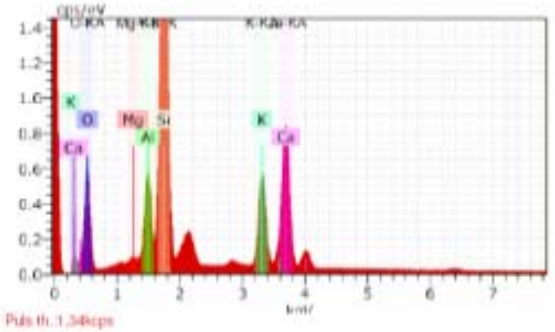


Figure 1. : Basic Principle of Electrospinning [3]







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Ricerca di Base

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Differenti strategie per la modificazione delle proprietà del cotone

Miranda (Minho University - Portogallo) B34

Obiettivo: modificare la superficie del cotone (CO) per renderla tingibile in assenza di Sali.

Conclusioni:

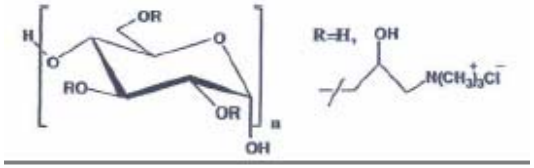
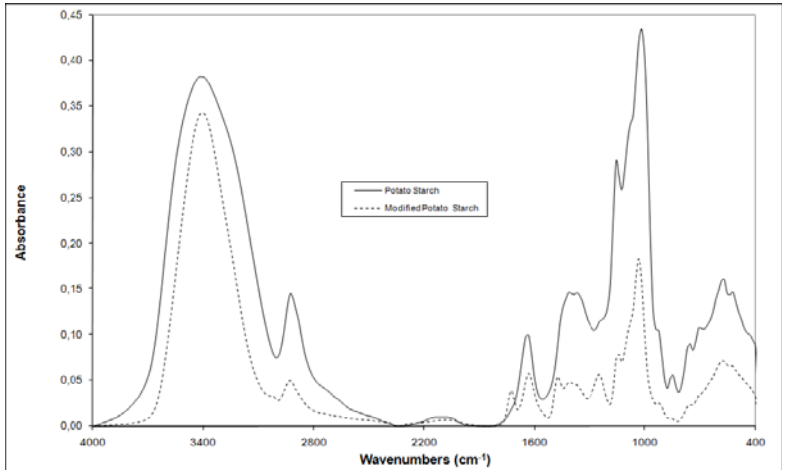


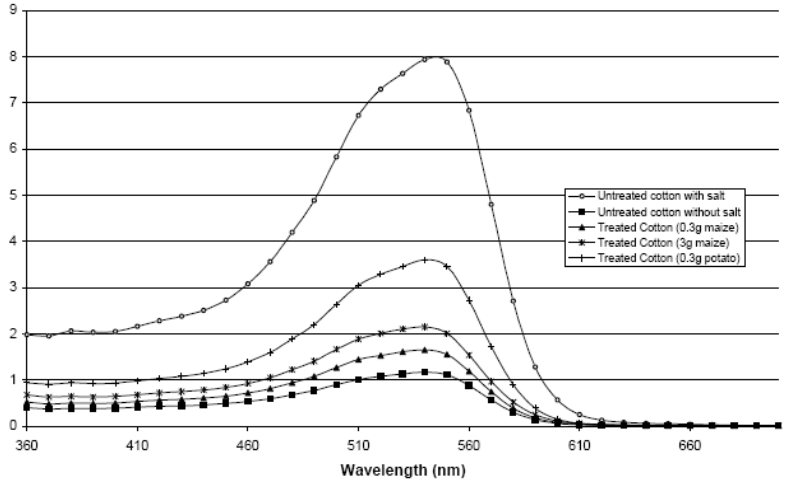
Figure 2 – Structure of cationic hydrolyzed starch.

- E' possibile sintetizzare l'amido cationico dalle patate, ma non da quello di mais.

- CO modificato in assenza di sali si presenta più tingibile rispetto al CO non modificato nelle analoghe condizioni.

- CO non modificato tinto con processo tradizionale presenta comunque lesaurimento migliore





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Estrazione di metalli pesanti da tessuti tinti: verifica del metodo di analisi

Tonetti (CNR-ISMAC – Italia) G39

Valutazione del cromo totale e del cromo esavalente tramite assorbimento atomico e spettrofotometria UV Vis
Substrato: lana tinta con colorante nero (cromo: non è indicato C.I.)

Risultati:

- Le condizioni operative influenzano i risultati del test (temperatura, rapporto bagno, tempo);
- Bassa riproducibilità.

Table 2: *Mean value of total chromium concentration*

TEST	T (℃)	Liquor ratio	Concentration (mg/kg)			
			1 h	CV%	2 h	CV%
1	30℃	1:50	102.08	5.8	108.62	2.3
2	30℃	1:100	103.04	6.7	120.00	0.2
3	40℃	1:50	119.20	0.2	130.18	1.2
4	40℃	1:100	132.96	0.8	132.78	3.2
5	50℃	1:50	121.18	3.2	97.80	0.2
6	50℃	1:100	134.32	4.6	133.16	8.9

Table 3: *Mean value of Cr^{VI} concentration*

TEST	T (℃)	Liquor ratio	Concentration (mg/kg)			
			1 h	CV%	2 h	CV%
1	30℃	1:50	93.28	0.5	94.24	0.2
2	30℃	1:100	96.34	0.1	110.04	11.9
3	40℃	1:50	100.78	10.2	102.44	3.6
4	40℃	1:100	113.25	0.8	114.68	1.2
5	50℃	1:50	102.00	4.3	77.84	0.1
6	50℃	1:100	124.44	2.1	115.12	6.2

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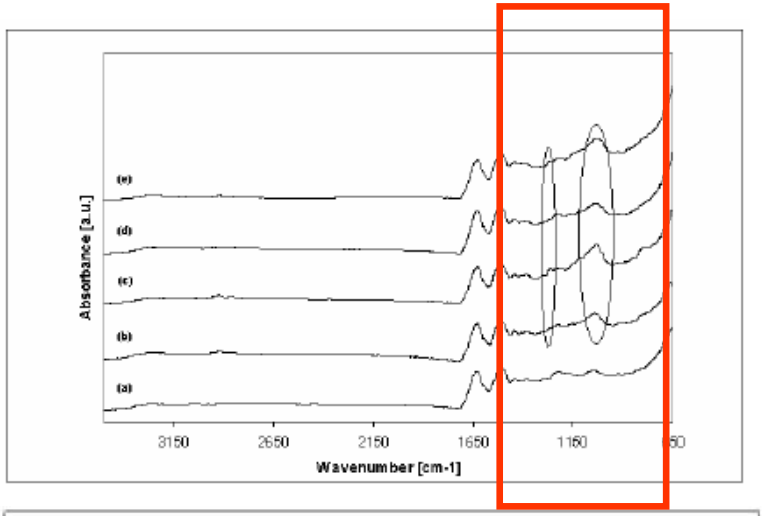
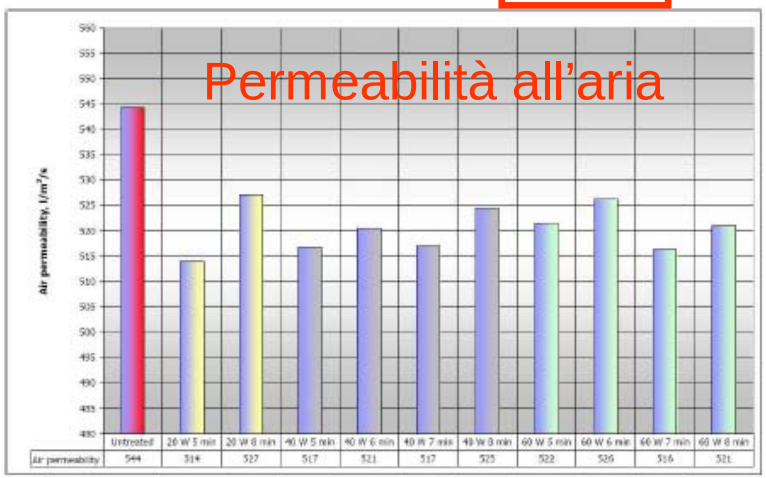
Polimerizzazione dell'HMDSO con plasma come nuovo finissaggio tessile

Rombaldoni (CNR -Italia) B40

Precursore: esametil disilossano HMDSO

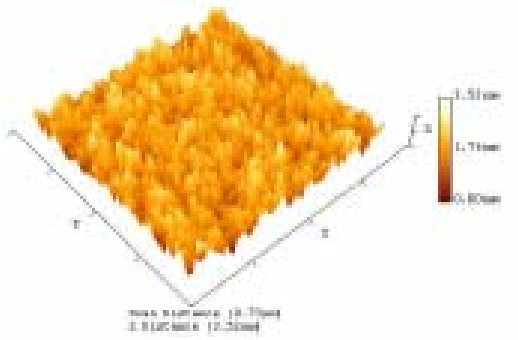




Assessment stage	Number of rubs	Untreated	Deposition 40 W 5 min 2 Pa	Deposition 40 W 9 min 2 Pa	Deposition 40 W 5 min 20 Pa	Deposition 40 W 9 min 20 Pa
1	125	3-4	4-5	4-5	4-5	4-5
2	500	3	4	4	4	4
3	1000	1-2	3-4	3-4	3	3-4
4	2000	1	3	3	2-3	3
5	5000	1	2-3	2-3	2	2-3
6	7000	1	2	1-2	2	2

Table 1. Surface fuzzing and pilling of knitted wool fabrics.

Figure 6. Knitted wool fabrics untreated (left, grade 1) and plasma coated (right, grade 2) at 5000 rubs.



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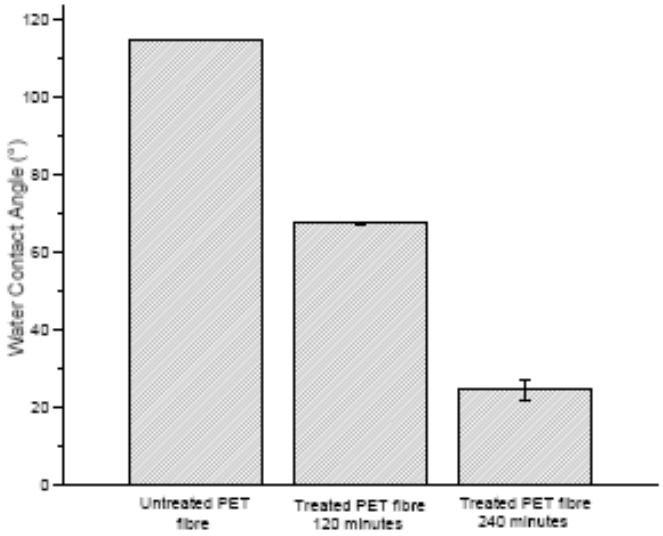
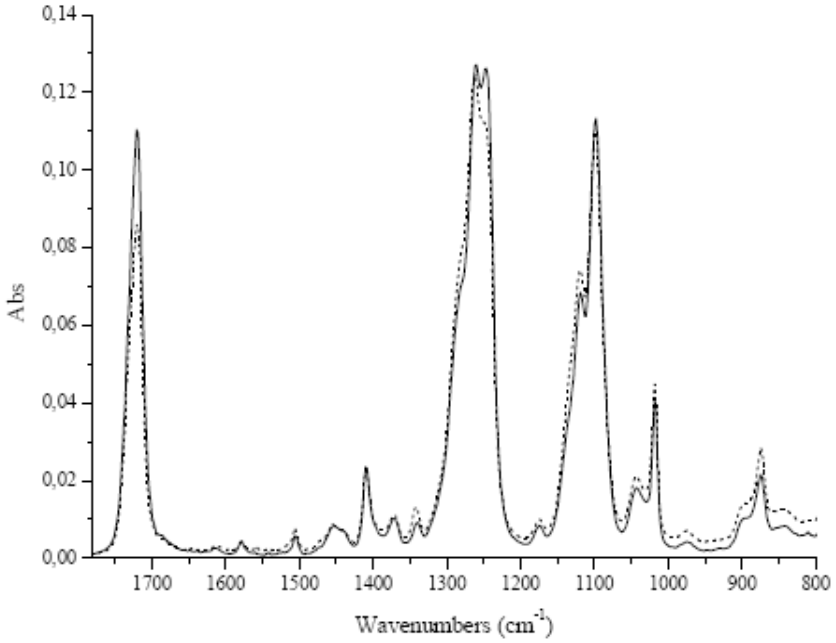
Modificazione superficiale del PES attraverso enzimi lipolitici

Freddi (SSS -Italia) B51



2: Water contact angle values of PET fibres after enzymatic treatment.



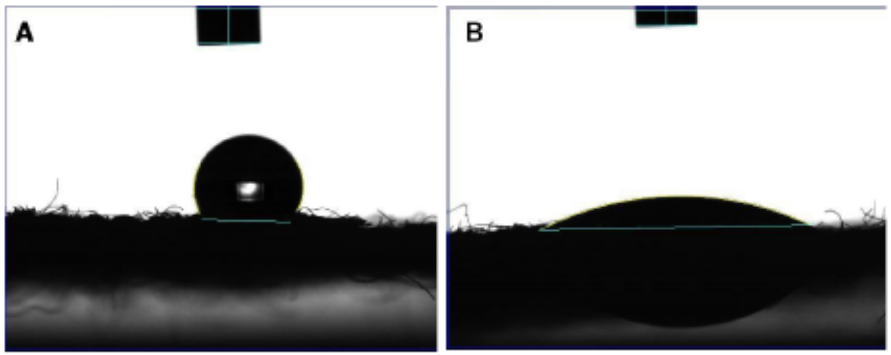


Figure 3: Water contact angle: untreated (A) and enzyme treated PET fabric (B).

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Ricerca di Base

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Modellizzazione dell'effetto del colore sulla protezione UV di un tessuto di cotone

Riva (Instituto de Investigación Textil de Terrassa (INTEXTER)) E56

Modello matematico per relazionare l'UPF finale con parametri di applicazione

La maggior parte dei tessuti per abbigliamento intimo e sport non protegge a sufficienza dalle radiazioni UV.

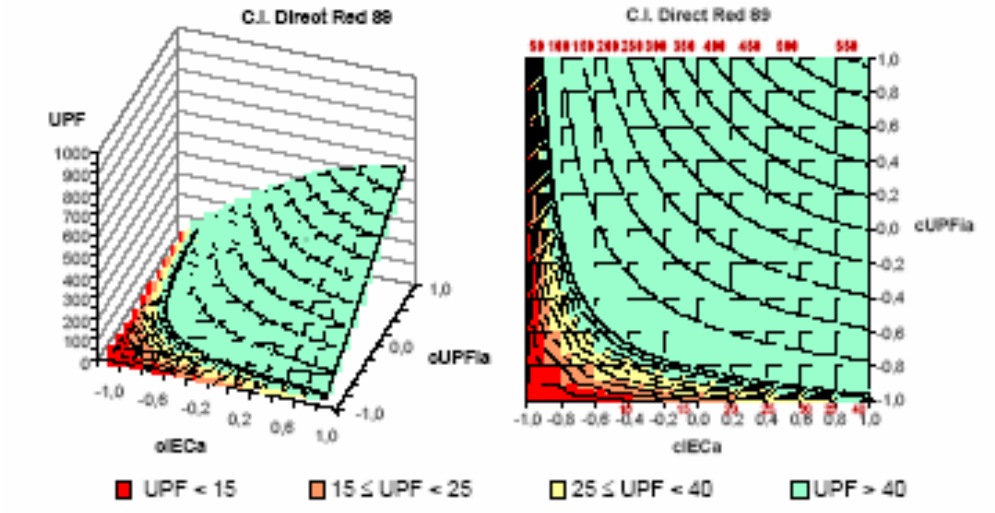
Una variabile importante è il colore del substrato che influenza l'assorbimento delle radiazioni solari.

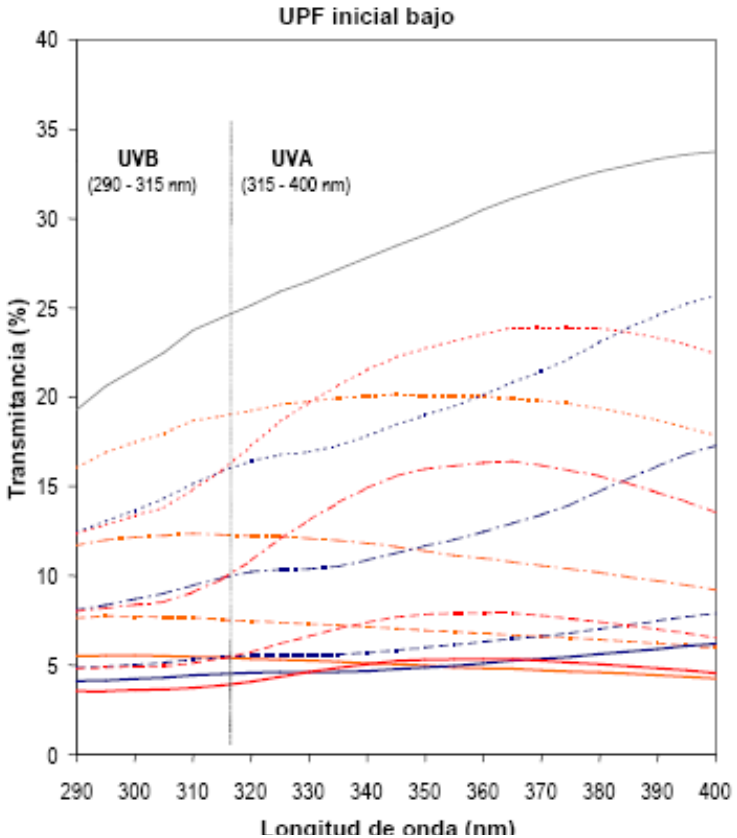
Si valuta l'assorbimento a differenti intensità di tre diversi coloranti azoici

Direct Blu 77

Direct Yellow 98

Direct Red 89





Relazione quantitativa per la creazione di coloranti dispersi ad alte proprietà tecniche

Telegin (Ivanovo University - Russia) A68

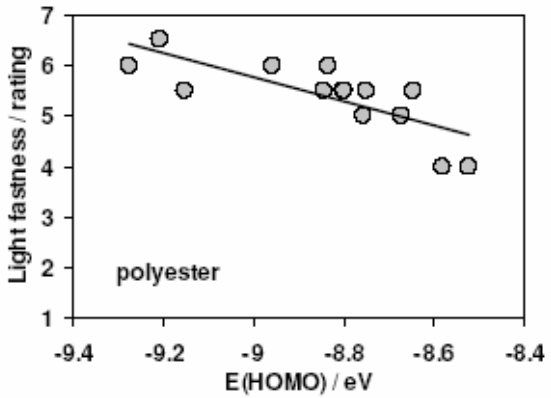


Fig.5. Relationship between HOMO energy and light fastness of disperse dyes on polyester

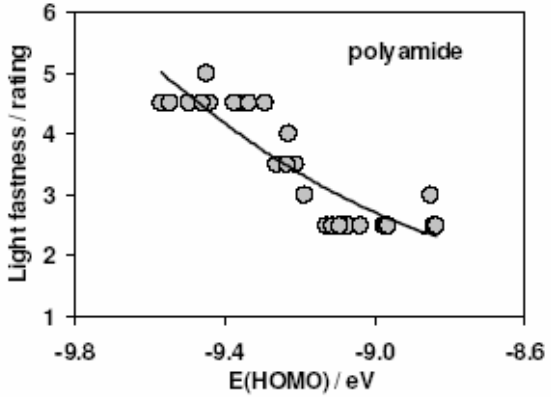


Fig.6. Relationship between HOMO energy and light fastness of disperse dyes on nylon

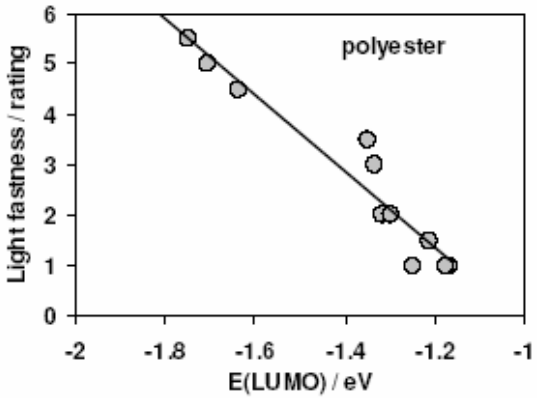


Fig.7. Relationship between LUMO energy and light fastness of disperse dyes on polyester

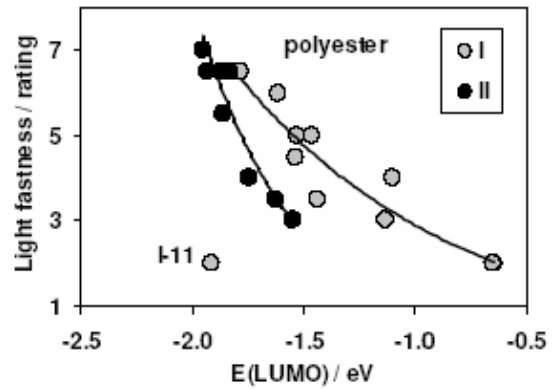


Fig.8. Relationship of LUMO energy on light fastness of disperse dyes on polyester

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Ricerca di Base

2008 NEW HORIZONS OF TEXTILE FINISHING

Modificazione del tessuto tramite fluido supercritico e/o electron beam irradiation
Hori (Fukui University -Giappone) A68

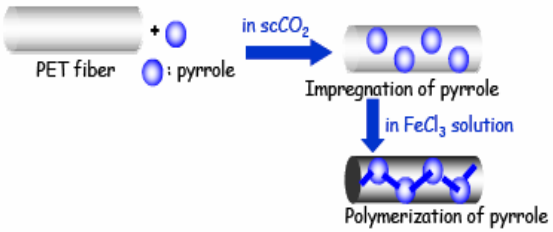


Fig.2 Preparation of conductive PET fabric by immersing of pyrrol and its polymerization.

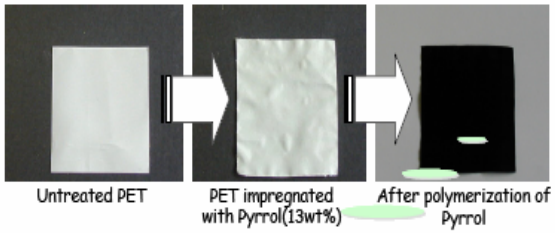


Fig.12 Practical supercritical fluid plant having 350 litter treating bath for fiber and textile treatments.

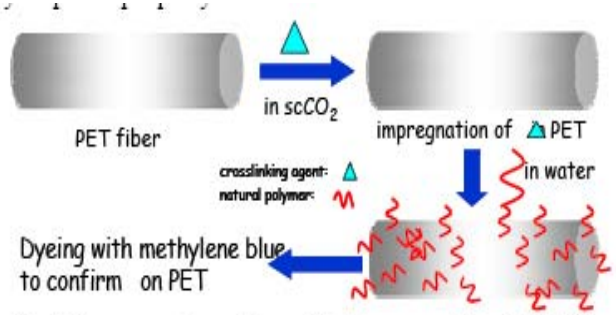


Fig.4 Impregnation of crosslinking agent into PET fiber and surface modification with natural polymers.

Processi elettrochimici per la tintura tessile -stato della ricerca e sviluppi

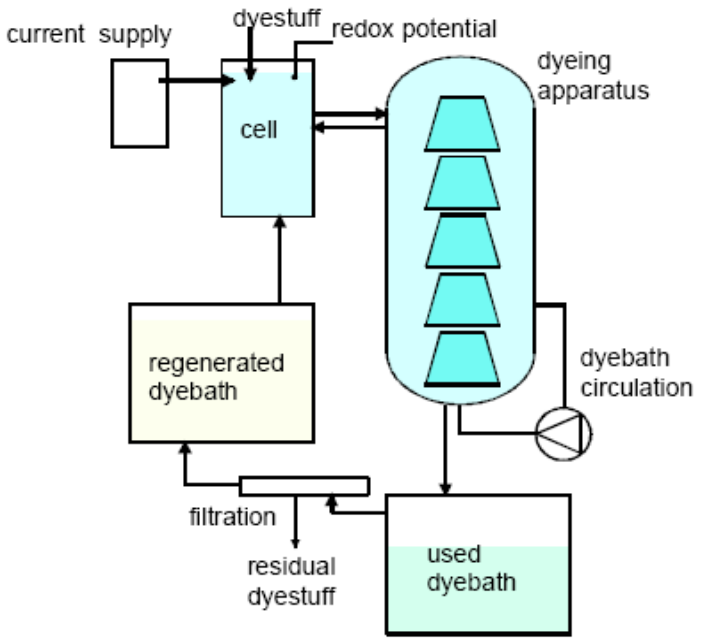
Bechtold (Innsbruck University -Austria) C19

Possibili utilizzi:

- Per la tintura di coloranti a riduzione (indigo, zolfo);
- Decolorazione effluenti
- Candeggio

Vantaggi:

- Semplice controllo delle condizioni di tintura e di misura dei potenziali;
- Buona riproducibilità;
- Stabilità della concentrazione del colorante;
- Minor prodotti chimici (riduzione 80%), acqua, energia;
- Enviromental Friendly;
- Minor impatto sui reflui.



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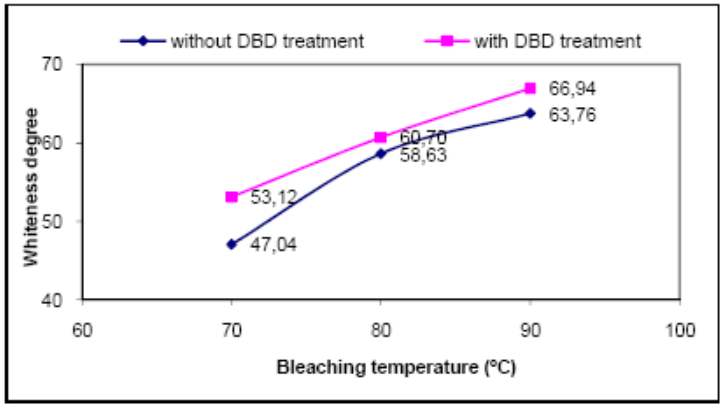
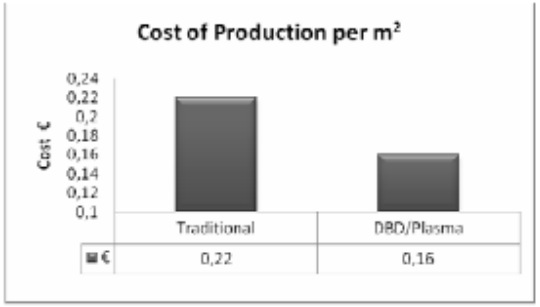
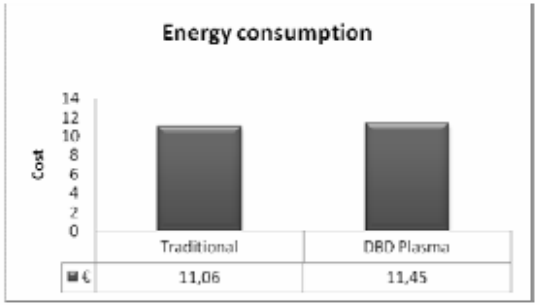
Ricerca pre industrializzazione

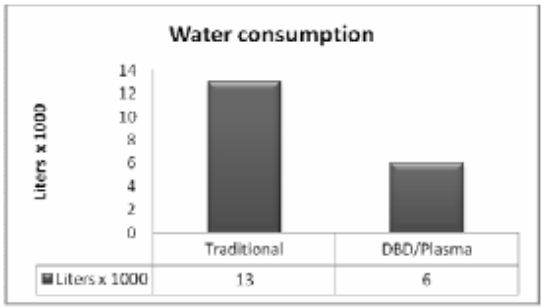
2008 NEW HORIZONS OF TEXTILE FINISHING

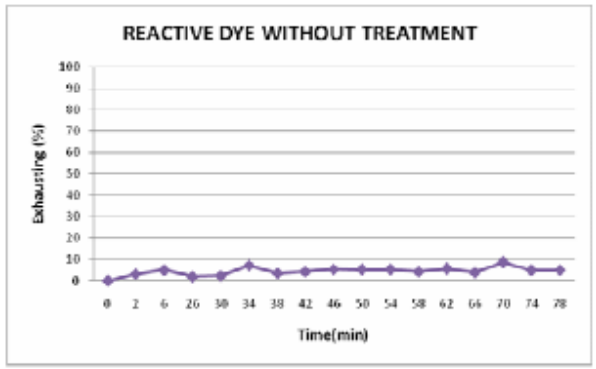
DBD plasma per processi tessili
Carneiro (Minho University –Portogallo) F30

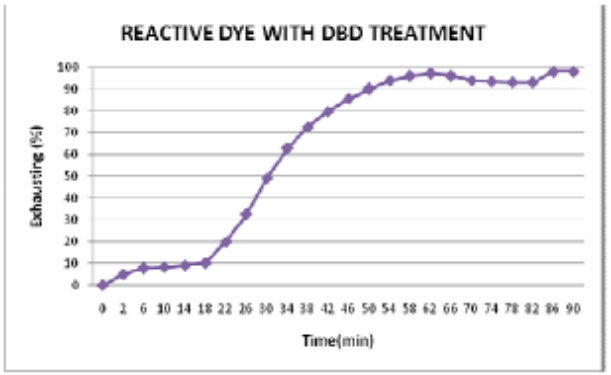












Esaurimento bagno i tintura di un substrato laniero con coloranti reattivi

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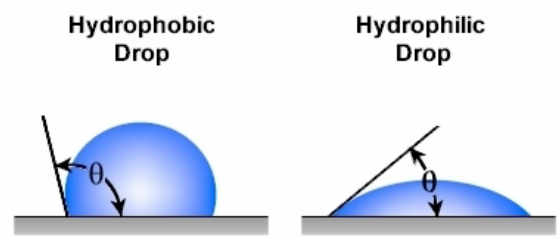
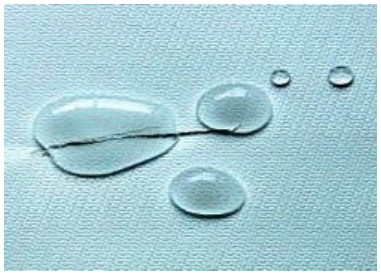
Ricerca pre industrializzazione

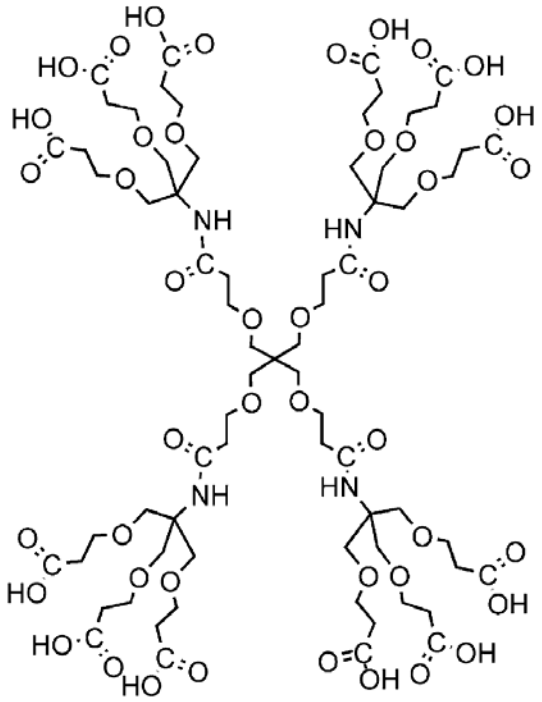
2008 NEW HORIZONS OF TEXTILE FINISHING

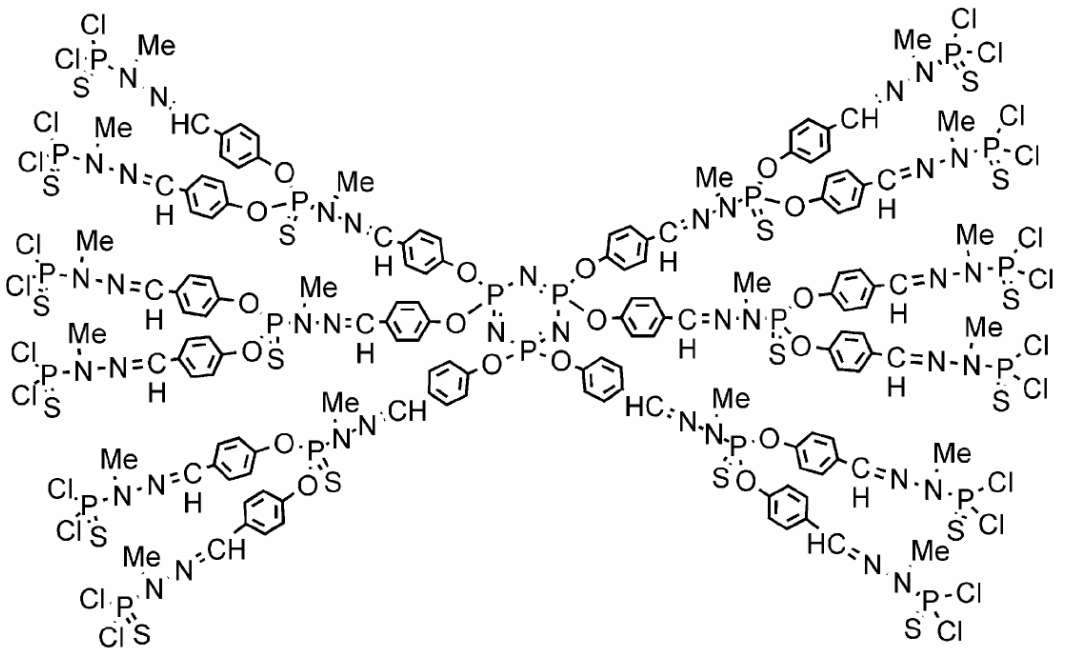
Influenza del finissaggio con dendrimeri sul colore di un tessuto di cotone/PES

Rosace (Università di Bergamo -Italia) A18









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Ricerca pre industrializzazione

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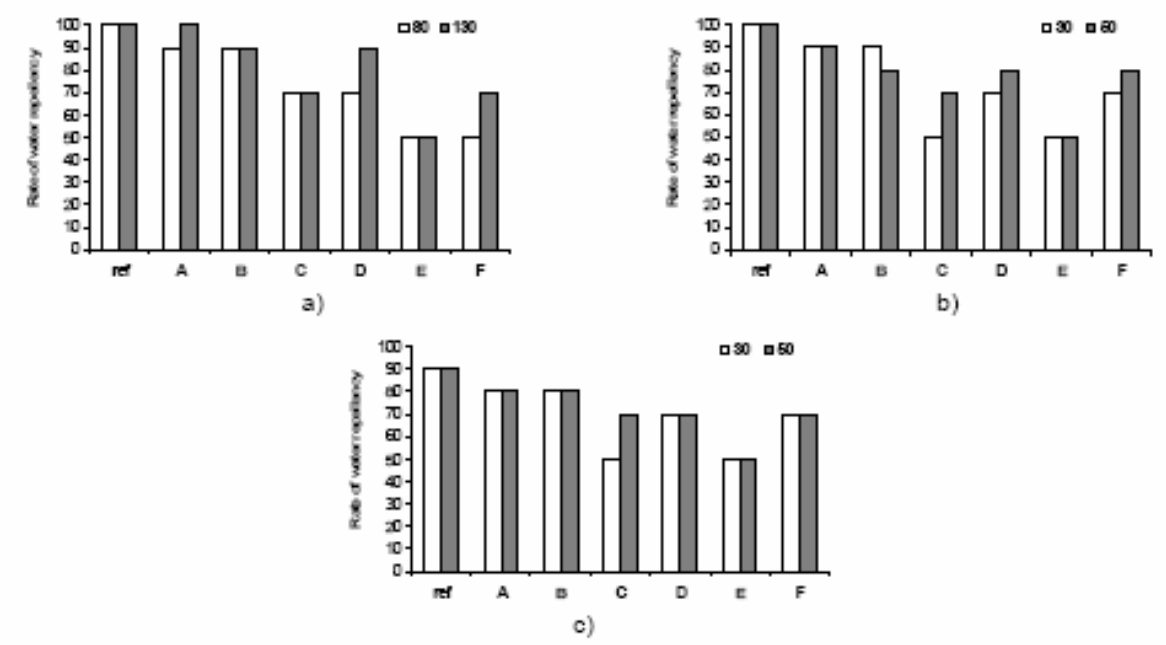

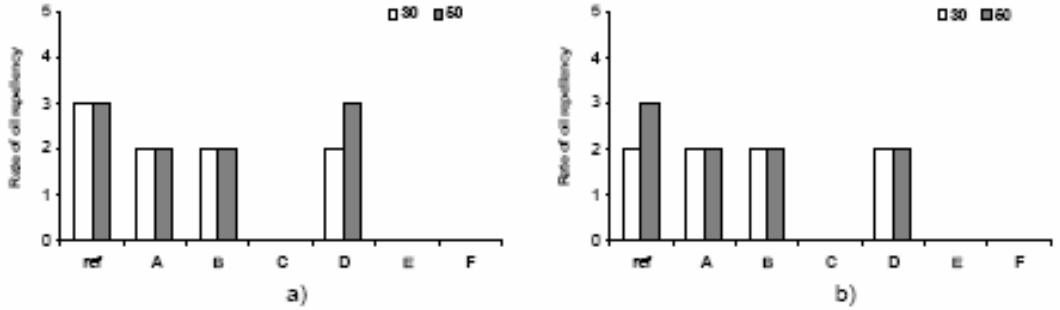

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Ricerca pre industrializzazione

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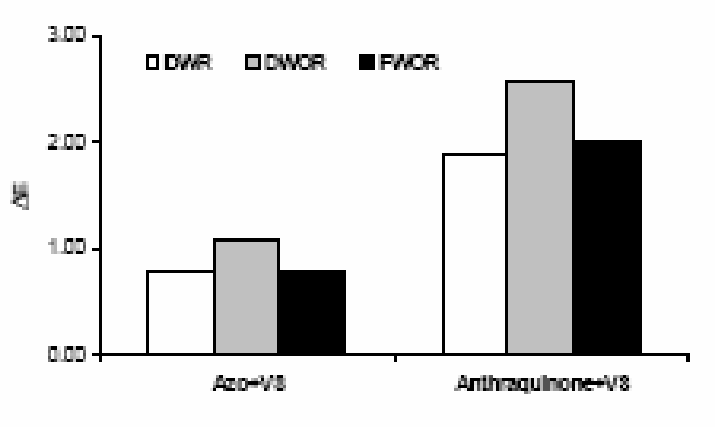

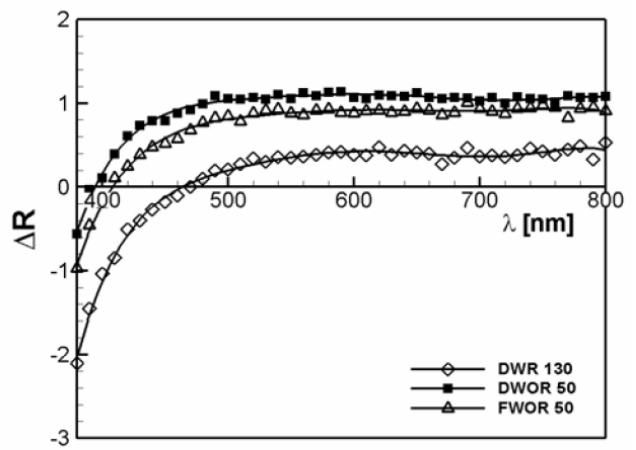

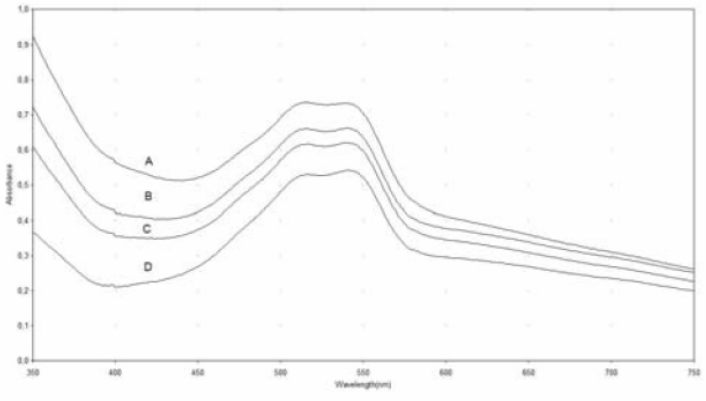

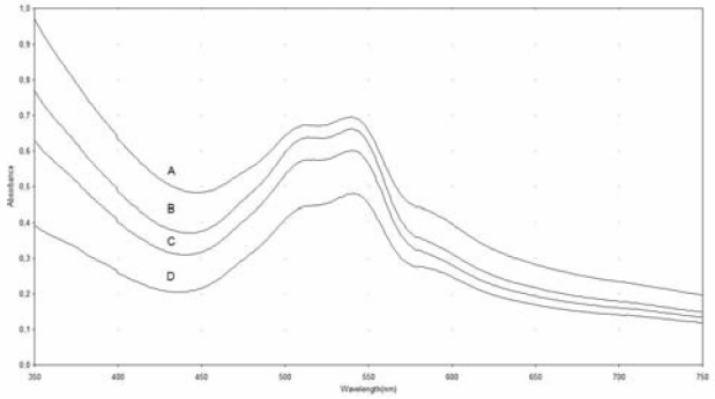

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Ricerca pre industrializzazione

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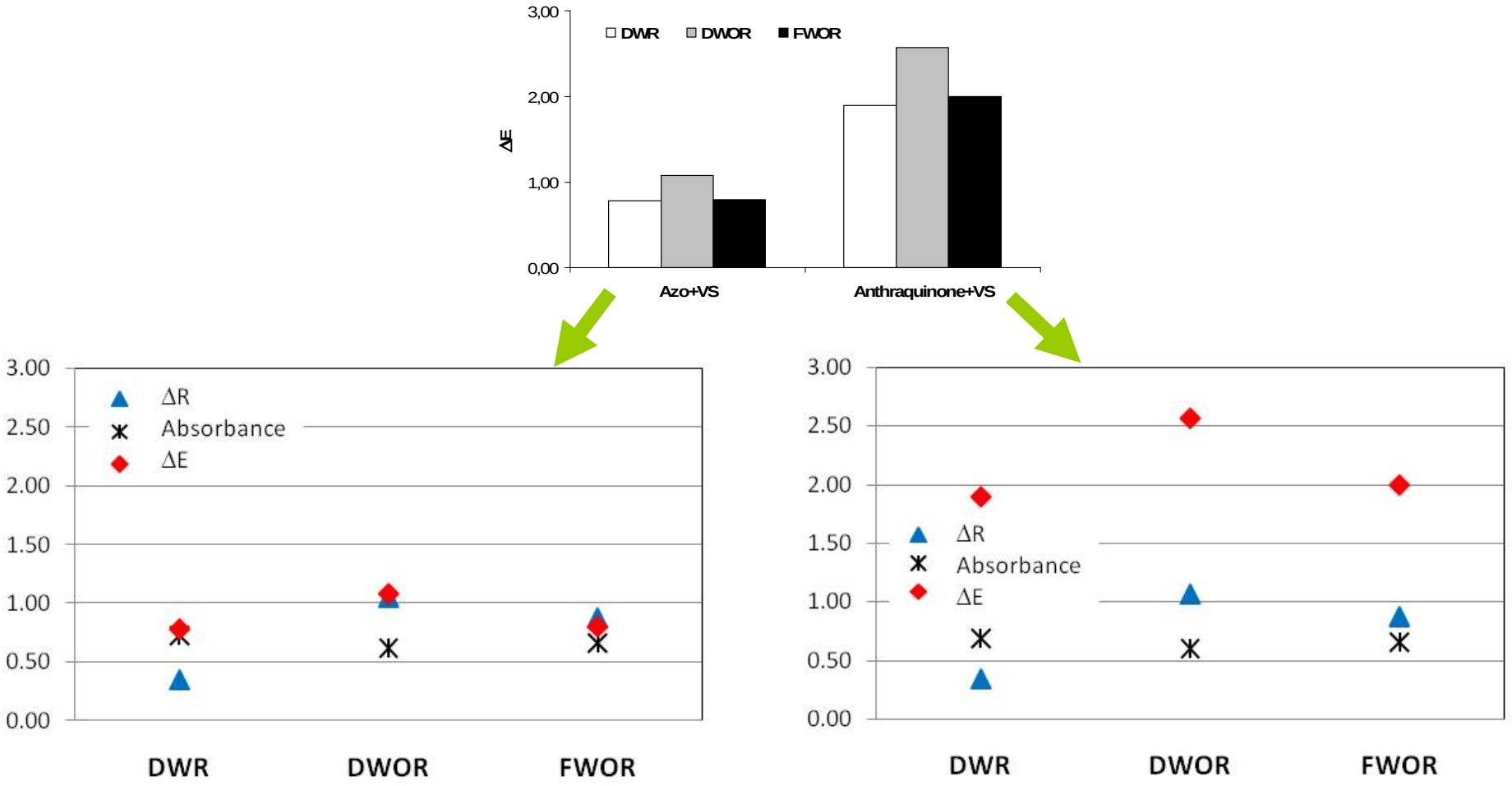
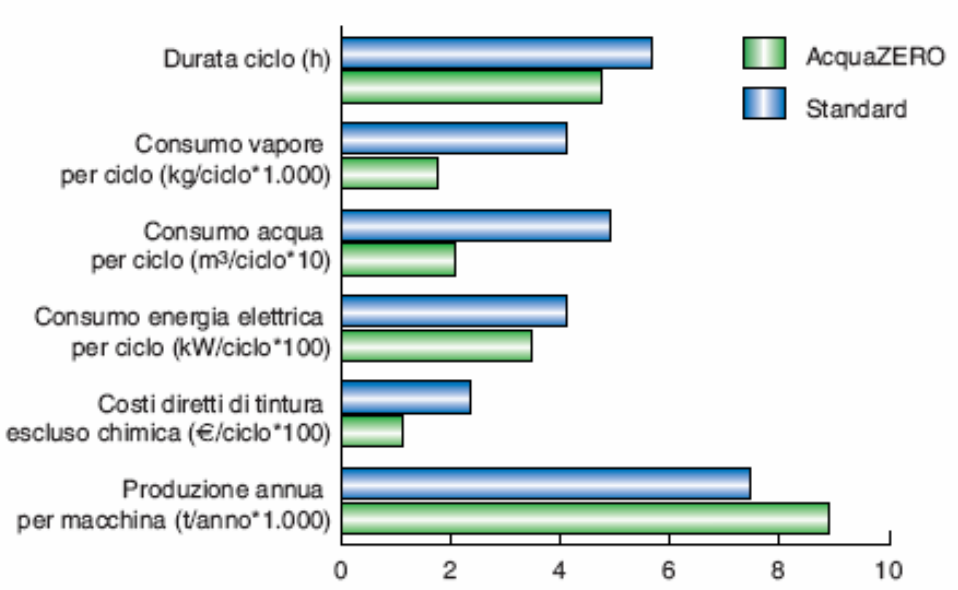


Acquazero – Innovazione per l'ambiente e per la riduzione dei costi
Corbellini (Noseda -Italia) F70

Obiettivo: Tempi, costi, qualità.

Realizzazione di una macchine per la tintura di filati su rocca che:
- Minimizza il rapporto di bagno mantenendolo costante (es 1:4 col reattivi);
- Flessibile (da una rocca fino al carico massimo)



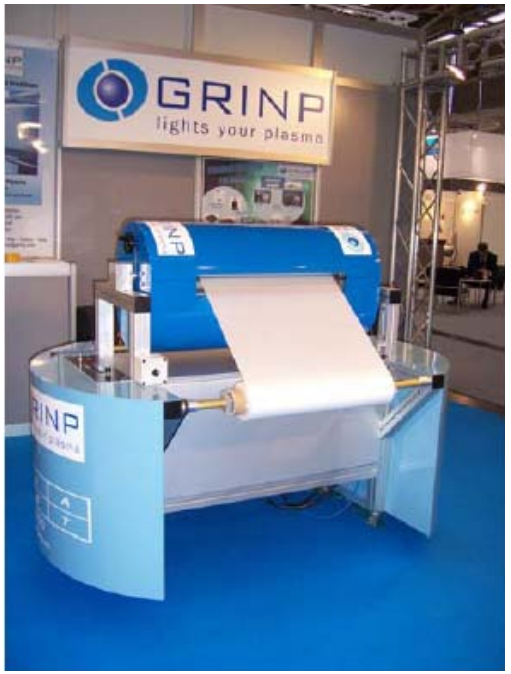
Macchina per il Plasma atmosferico (APP), Grinp Technology Pavan (Grinp -Italia) F36

Grinp ha sviluppato una macchina APP in continuo.

L'altezza del tessuto lavorato può variare da 60 a 400 cm.

Vantaggi:

- Aumento dell'idrofilia di fibre sintetiche quali PET, Kevlor, Nomex.
- Aumento della tangibilità della lana 60%.
- Antinfeltrimento.



Sviluppo di nuove resine fluorocarboniche
Mignanelli (Bozzetto spa) E8

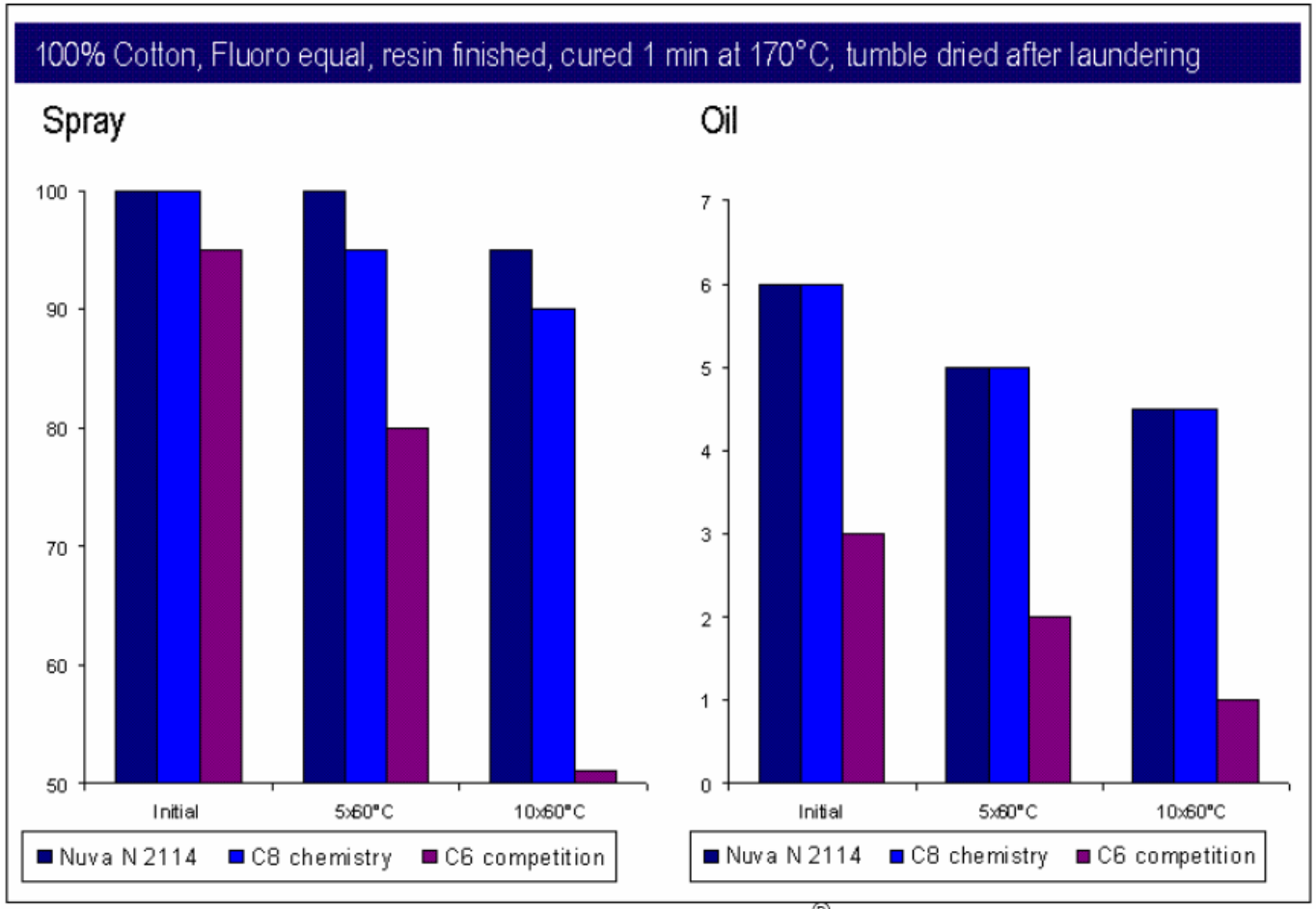
Bozzetto e 3M hanno sviluppato una nuova generazione di prodotti fluorocarbonici con proprietà repellenti, stain release e azione combinata.

Questi nuovi composti si basano su catene C4 anziché sulle tradizionali C8.

Tali prodotti garantiscono un comportamento migliore verso l'ambiente e sotto il profilo della salute umana.

Nuovi sviluppi sui finissaggi con fluorocarboniche
Knaup (Clariant -svizzera) E8

PFOS assenti
PFOA non rintracciabili con gli attuali metodi analitici



Performance Profile of Nuva® N 2114

Formaldeide rischio evitabile o non evitabile nei pigmenti da stampa Siemensmeyer (BASF SE -Germania) A16

I composti che rilasciano formaldeide sono largamente utilizzati in ambito industriale.

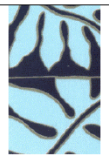
Comunque sono sempre maggiori i limiti imposti dal legislatore, in considerazione della pericolosità del prodotto.

Basf ha creato una serie di prodotti per stampa liberi da formaldeide e isocianati.

Table 9: Comparison of measured formaldehyde values (ppm)

	Knitted fabric	Woven fabric
Formaldehyde-free Helizarin® pigment printing system	4	4
Standard pigment printing system	89	96
Unprinted cotton	4	4

Table 8: Comparison of prints and fastness properties

	Formaldehyde-free Helizarin® pigment printing system		Standard printing system	
	Knitted fabric	Woven fabric	Knitted fabric	Woven fabric
Original print				
	Household wash 60 °C			
5 x household wash 60 °C (evaluated according to DIN EN ISO 105 A02)	 4 – 5	 4	 4	 4
Rub fastness, dry (DIN EN ISO 105-X12)	4 – 5	4 – 5	4 - 5	4 – 5
Rub fastness, wet (DIN EN ISO 105-X12)	3 – 4	3	3	3
Fastness to dry cleaning (DIN EN ISO 105-D01)	4	4	4	4

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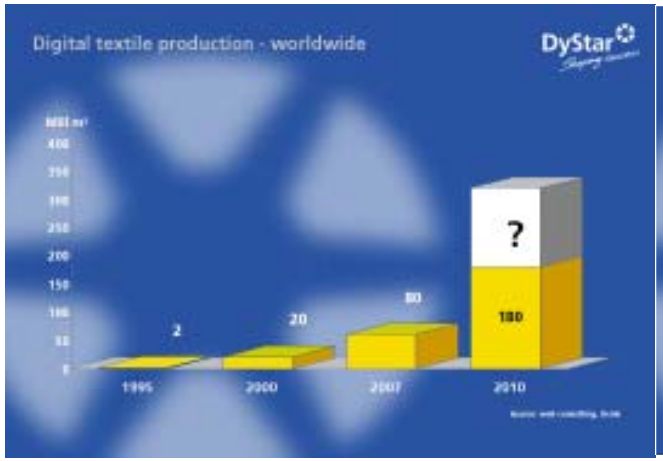
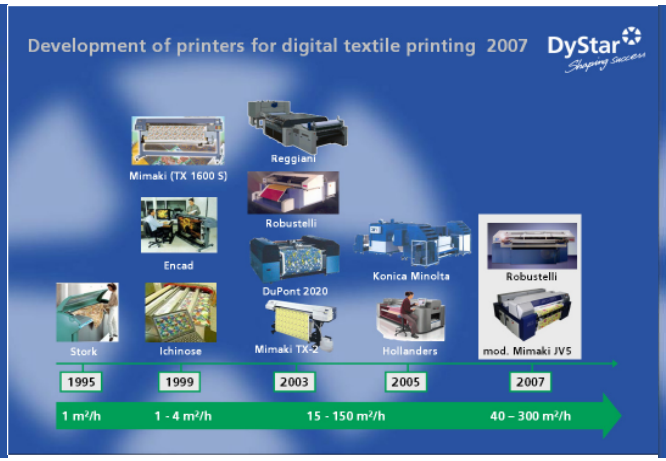
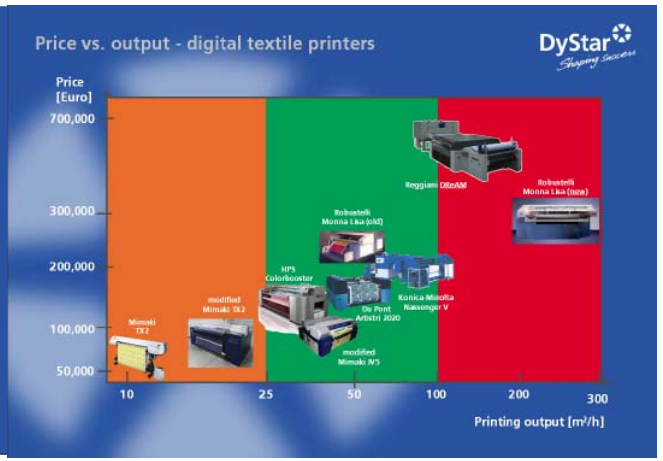
2008 NEW HORIZONS OF TEXTILE FINISHING

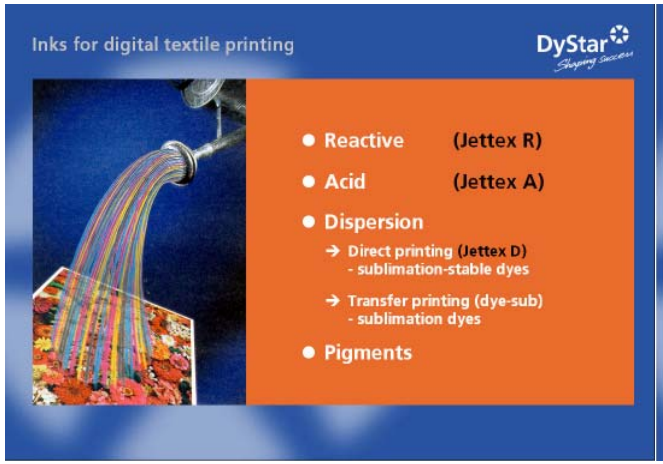
Applicazioni industriali

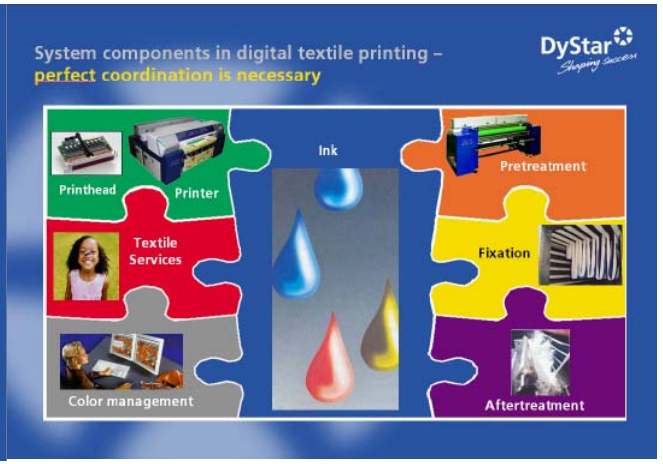
Soluzioni per la stampa tessile digitale
Berninger (Dystar -Germania) A67



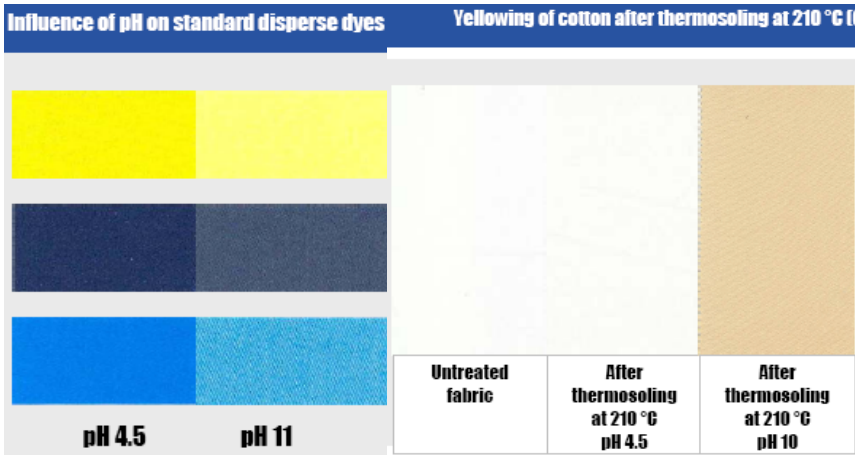








Nuovo sviluppo per la tintura in continuo di una mista PES/CO Tolksdorf (Dystar -Germania) A4



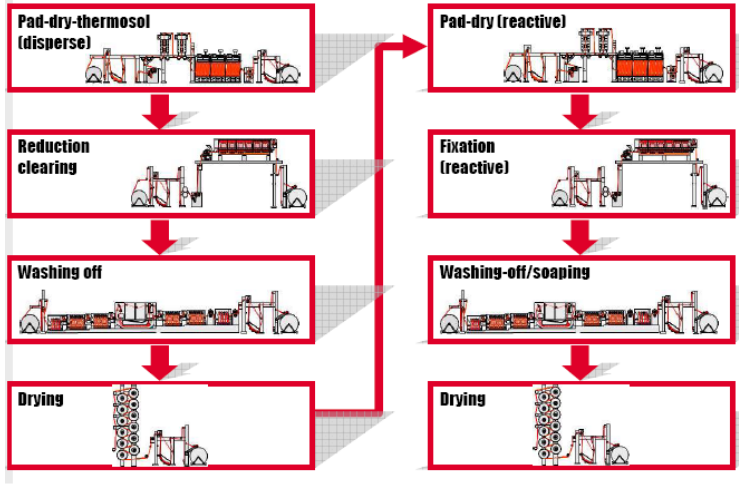
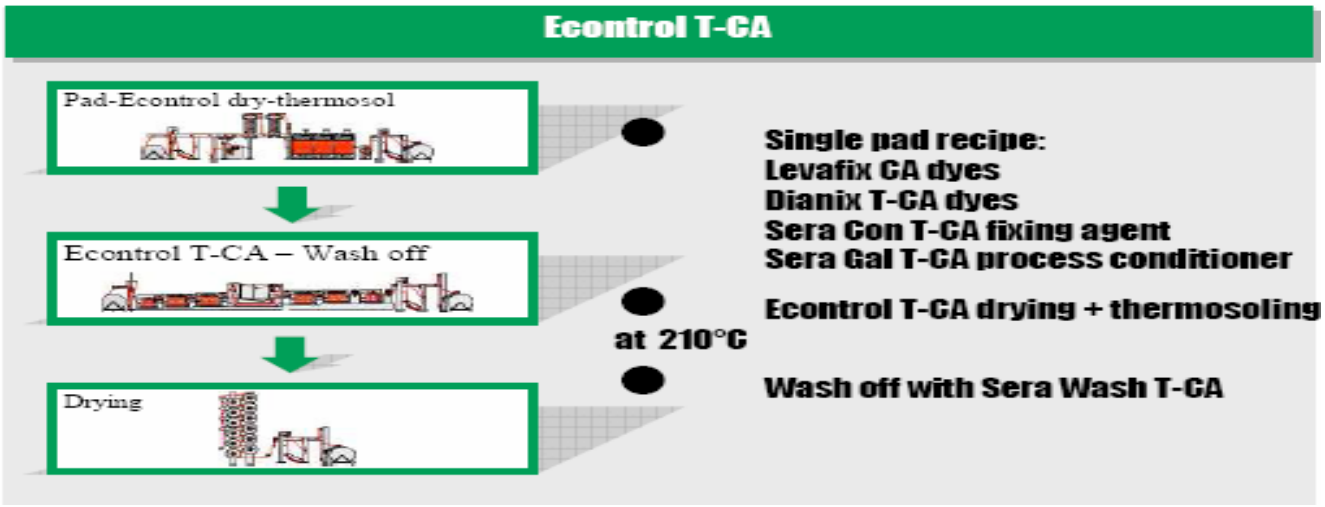


Fig 3. Process scheme PDTPS with reactive/disperse dyes



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2008 NEW HORIZONS OF TEXTILE FINISHING

GRAZIE PER L'ATTENZIONE