

Effect of Media Pretreatment on Nylon/Cotton and Polyester/Cotton Fabrics in Digital Textile Printing

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1. INTRODUCTION

The preparation of media for the pre-treatment depend on the different ink classes that are used for those various textile substrates. The ink printed on the fabrics through DTP printer can be absorbed and fixed into textile without any blots by pre-treatment using suitable media solution for fabrics types. The chemical formulation of media solution used in the pre-treatment process varies according to the types of textiles and inks for DTP products. This study investigated the effects of various media solution and their pre-treatment conditions, focused on the improvement of the shapeness and color yield of the printed image on the nylon/cotton blend fabrics and polyester/cotton blend fabrics.

2. EXPERIMENTAL

2.1 Materials

The fabrics used in this study were N/C(nylon/cotton=30/70) and P/C(polyester/cotton = 45/55) which was scoured and bleached.

2.2 Pre-treatment process

- Padding method : The fabrics were pre-treated using padding mangle (Mathis, 2-roll padder, HVF Type) at the conditions of 2bar and 2m/min.

- Drying : Dried at 120°C after pre-treatment.

2.3 Printing and post-treatment

Image of 720×720 dpi was printed on pre-treated polyester and nylon fabrics using digital ink jet printer (Epson Stylus 7500) with Piezo Head equipped of each inks of 4colors(Cyan, magenta, yellow, black).

The inks used in this work were pigment inks, blend inks of disperse inks and reactive inks(Yuhan-kimberly, Ujet series) for P/C fabrics and blend inks of acid inks and reactive inks(Dupont, Artrist series) for N/C fabrics of 4 colors(cyan, magenta, yellow, black)

Output image was printed out in 4 colors of cyan, magenta, yellow, and black with 100% concentration within S/W and mixture color image of CMYK with each 40% concentration. Steaming (N/C-15minutes at

103°C, P/C-8minutes at 175°C), soaping and washing process were carried out after printing.

2.4 Sharpness and color yield test

After printing line image (each 40% of c,m,y,k mixture color) with each 0.3, 0.9, 1.5mm thickness per each condition, level of sharpness was judged by measuring thickness of lines printed on actual fabrics using toolmaker's microscope (Mitsutoyo, TM-510) and automatic video images analysis device (EZ Capture) on pre-treated nylon fabrics.

Color yield was evaluated by calculating a total K/S value of 4colors of CMYK printed on pre-treated fabrics using Data color SF600 PLUS.

3. RESULTS AND DISCUSSIONS

The media solution suitable for the type of P/C and N/C blend fabrics, blend inks of disperse/reactive inks and blend inks of acid/reactive inks was developed. The P/C and N/C blend fabrics pre-treated using each optimum pre-treatment agent showed increase of color strength of images printed per blend inks color than pigment inks or each single inks printed fabrics.

It showed that the performance of the digital printing on the nylon/cotton and polyester/cotton blend fabrics treated by the media solution developed in this study was better than the one treated by the previous media solution for each single inks.

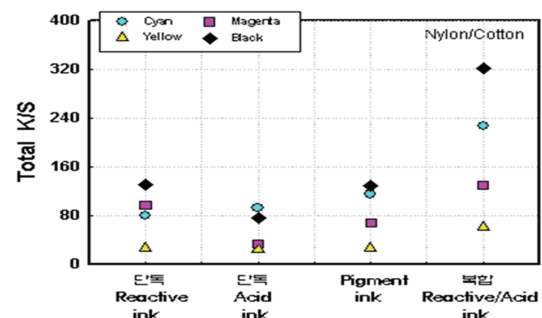


Fig. 1. Effect of digital textile printing on the pigment inks, reactive inks, acid inks and reactive/acid blend inks printed N/C blend fabrics.