ASSESSMENT OF DYEING PROPERTIES OF PIGMENTS PRODUCED BY *Penicillium purpurogenum* GH2

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Introduction. Many natural dyes are obtained from plant and animal sources and are used in dyeing of different textile materials like cotton, jute, wool, synthetic fibers, or silk (1). However the main disadvantage of these natural dyes lies in the order of magnitude of their extraction yield factors (a few grams of pigment per kg of dried raw material). Recently the possibility to exploit other biological sources such as microorganisms has been recommended. Some studies have reported about the production of natural fungal pigments and its application in textile dyeing (2). The present study aimed to assess the potentiality of red pigments produced by *Penicillium purpurogenum* GH2 for dyeing on wool.

Methods. *Penicillium purpurogenum* GH2 (DIA-UAdeC collection) was used for the pigment production in this study. Production and recovery of pigments were made according to the methodology reported by Morales-Oyervides et at. 2011. Wool fabric was bought at a local textile company. The dyeing process consisted of three stages: washing (4), mordanting and dyeing (2). To assess the most appropriate mordant for *Penicillium purpurogenum* GH2 pigments, two different mordants (alum, A; ferric chloride, FC) were tested at different concentrations on weight of fabric (A: 5, 10, 15 %; FC: 10, 20, 30 %) Pigment uptake was determined following the methodology reported by Velmurugan et al. 2010. The colour of specimens after dyeing was determinate by CIELAB color coordinates using ColorEye XTS GretagMacbeth, USA.

Results. The effect of the mordant used on L*, a* and b* parameters, are given in Table 1. L* represents a lightness value, where a higher lightness value represents a lower color yield. a* and b* represent the tone of the color, where positive values of a* and b* represent redder and yellowish tones. Independently of the mordant used (A and FC), the specimens dyed with the red pigment extract showed a red colour tending to brown.

Table 1. L*, a*, b* values of dyed wool.

Concentration	Color coordinates					
	A			FC		
	L*	a*	b*	L*	a*	b*
C1	44.14	17.37	28.73	31.92	21.02	21.53
C2	41.76	17.70	27.97	28.05	20.54	16.98
C3	37.06	17.68	24.58	27.85	21.96	17.07

It can be seen that FC presented higher values of pigment uptake (49-80%) than mordant A (35-36%) (Figure 1). When mordant FC was used, a remarkable effect of mordant concentration was observed. Pigment uptake increased as mordant concentration increased. Mordant concentration of A did not present any effect on the maximum values of pigment uptake. However the velocity of pigment uptake was 85.31% higher when the maximum level of mordant concentration of A was used.

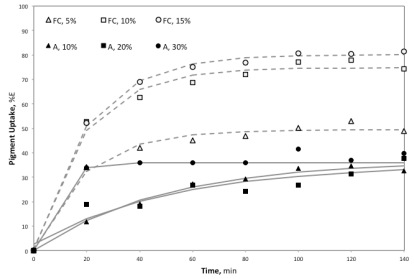

Figure 1. Effect of dyeing time on the pigment uptake of dyed wool.

Conclusions. The pigment produce by *Penicillium purpurogenum* GH2 serves as useful alternative source for natural dyeing for wool textiles. It was found that mordant FC presented higher pigment uptake in wool.

References.

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