An experimental work project with STS orientation: Dyes and dyeing in a regional context

Maria de Fátima Paixão [1] ; Mariette M. Pereira [2] ; António F. Cachapuz [3]

[1] *Instituto Politécnico de Castelo Branco, Portugal, fatimapaixao@ese.ipcb.pt*

[2] Universidade de Coimbra, Portugal, mmp@ci.uc.pt

[3] *Universidade de Aveiro, Portugal, cachapuz@dte.ua.pt*

Castelo Branco is a small town in inland Portugal with a unique kind of embroidery of eastern inspiration. Dyed silk thread of different colours is used to embroider onto linen, and motifs, colours and techniques used make it easily identifiable. Today, this embroidery is considered a tradition of great cultural and economical value for the region and there is a training workshop in the town's Museum where the embroidery is the main focus. Also in the region, textile industries of great national importance were established more than two centuries ago, in which dye-works were an important feature. Although, for a long time, the silk thread was dyed with natural dyes obtained from plants and animals such as onion skin, madder, green walnut shell, purple and yellow lilies, cochineal... today, these have been almost completely replaced by synthetic equivalents.

This context was the starting point for the development of an innovative experimental work project ("Ciência Viva" / Living Science) with students from several lower and upper Secondary Schools of the Catelo Branco region.

The main aims of the project were:

To develop a better understanding of the Chemistry involved in the dyeing process including the use of the laboratory techniques of analysis and synthesis and how to extract dyes from the natural products and to synthesise chemical dyes.

To identify some of the colours used in the embroidery with extracted and/or synthetic dyes.

To acknowledge the embroidery of Castelo Branco as a cultural and historical heritage with economic potential, associated with a handicraft activity.

To establish links between education and research, e.g. secondary schools and a research center.

To establish links between the school and the community .

The project was developed throughout the academic year of 200/2001. Main activities carried out by the students were as follows:

A visit to the embroidery Museum (Tavares Proença of Castelo Branco)

Research on plants and animals used for dyeing purposes and collection of samples.

Extraction processes of natural dyes using the lily, onion skin, green tea...

Synthesis of chemical dyes which successfully replaced the natural products, namely the alizarin, juglon and also azodyes.

Dyeing processes with different dyes in particular using different mordants to obtain different colours and to fix the dye to the fibre.

Dyeing of natural fibres (silk, wool and cotton) with the obtained dyes and the study of their properties.

A visit to a textile factory in order to obtain a large scale view of the dyeing processes.

A visit to a research laboratory of chemical synthesis and how to use a V-UV spectroscopy to analyse samples previously prepared in their schools. To associate these analysis techniques with the detection of contamination of industrial effluents – environmental control perspective.

A visit to a textile Museum (University of Beira Interior - Covilhã) for better understanding of the historical perspective of industrial dyeing.

The Poster presents details of the development of the project throughout the academic year 2000/2001 together with results of internal evaluation carried out by teachers and students involved.

Financial support: "Programa Ciência Viva" / Living Science Programme. Project P-IV 1915. Coordinator: A.F. Cachapuz

<Previous Poster> <View Poster> <Next Poster>