

THE PASTEL PROJECT: PIGMENTED MAIZE COBS WASTE AS AN ENVIRONMENTAL FRIENDLY SOLUTION TO DYE NATURAL FIBERS

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anthocyanins, maize cobs, natural dye

Textile industry consumes a significant amount of water in its manufacturing processes, mainly during dyeing and finishing dyeing operations. Wastewater from textile plants is classified as the most polluted streams among different industrial sectors. In addition, the increased demand for textile products and the related increase in their production, as well as the use of synthetic dyes, contributed to make dye wastewater one of the main responsible of the severe pollution problems in current times. The aim of the PASTEL project (Granted by Cariplo Foundation) is to develop a new natural dyeing process of natural fibers based on the use of anthocyanins (dyes) extracted from maize cobs, i.e. the residual waste coming from the cultivation of red corn. At present, anthocyanins are mainly extracted from red grape skin and other red berries, but since the cultivation of pigmented corn is growing in Lombardy, because of beneficial properties of contained anthocyanins, cobs-waste could become a cheaper source of natural dye. With this purpose we studied new materials and traditional varieties to find the best candidates for anthocyanins production. Anthocyanins belong to the class of flavonoids, secondary metabolites synthesized by a complex metabolic pathway consisting of about 20 biosynthetic genes and regulated by two types of transcription factors encoded by the bHLH and MYB gene families. The varieties selected for anthocyanins production carry the two strong regulatory genes involved in flavonoids synthesis P1 (purple plant 1) and P1 (pericarp color 1), leading respectively anthocyanins and phlobaphene synthesis in pericarp. We set up a quick and cheap extraction method starting from dried cobs to obtain the flavonoid pigments used to stain different natural fibers (wool, silk, cotton and flax). HPLC-MS analyses have been performed on the different repartitions water/ethanol extracts to individuate the best composition for the staining process. In this poster we'll present preliminary data regarding the entire process, from the selection of the best genotypes for colored cobs production, to pigment extraction and natural fiber staining.