



Practical investigations of  
pH changes when dyeing silk  
in indigo vats

European Textile Forum 2017

# Practical investigations of pH changes when dyeing silk in indigo vats

## **Situation:**

Practical experience has shown on a regular basis that pH-levels drop significantly when dyeing silk in hydrogen sulphite indigo-vats (from pH 9 down to 7 within one dip). Thus resulting in instable indigo vats. This phenomenon does not appear in literature on indigo dyeing.

## **Proceedings:**

Hydrogen sulphite vat is set up. Indigo is added via an indigo-solution to control indigo-amount in vat. Dips of 5x 100g hanks of 100% mulberry silk are dyed. Afterwards hanks are dipped into 11% hydrogen peroxide before airing to increase rub-fastness.

**Dye 1:** Starting with small amounts of indigo-solution and no movement of silk. Resulted in very light blue and significant drop of pH level.

**Dye 2:** Significant increase in indigo-solution, no movement of silk. Darker blue, little to no drop in pH level.

**Dye 3:** More indigo solution added, silk hanks got worked throughout the dye-process to increase indigo-takeup and rub-fastness. Darker blue, no drop in pH level.

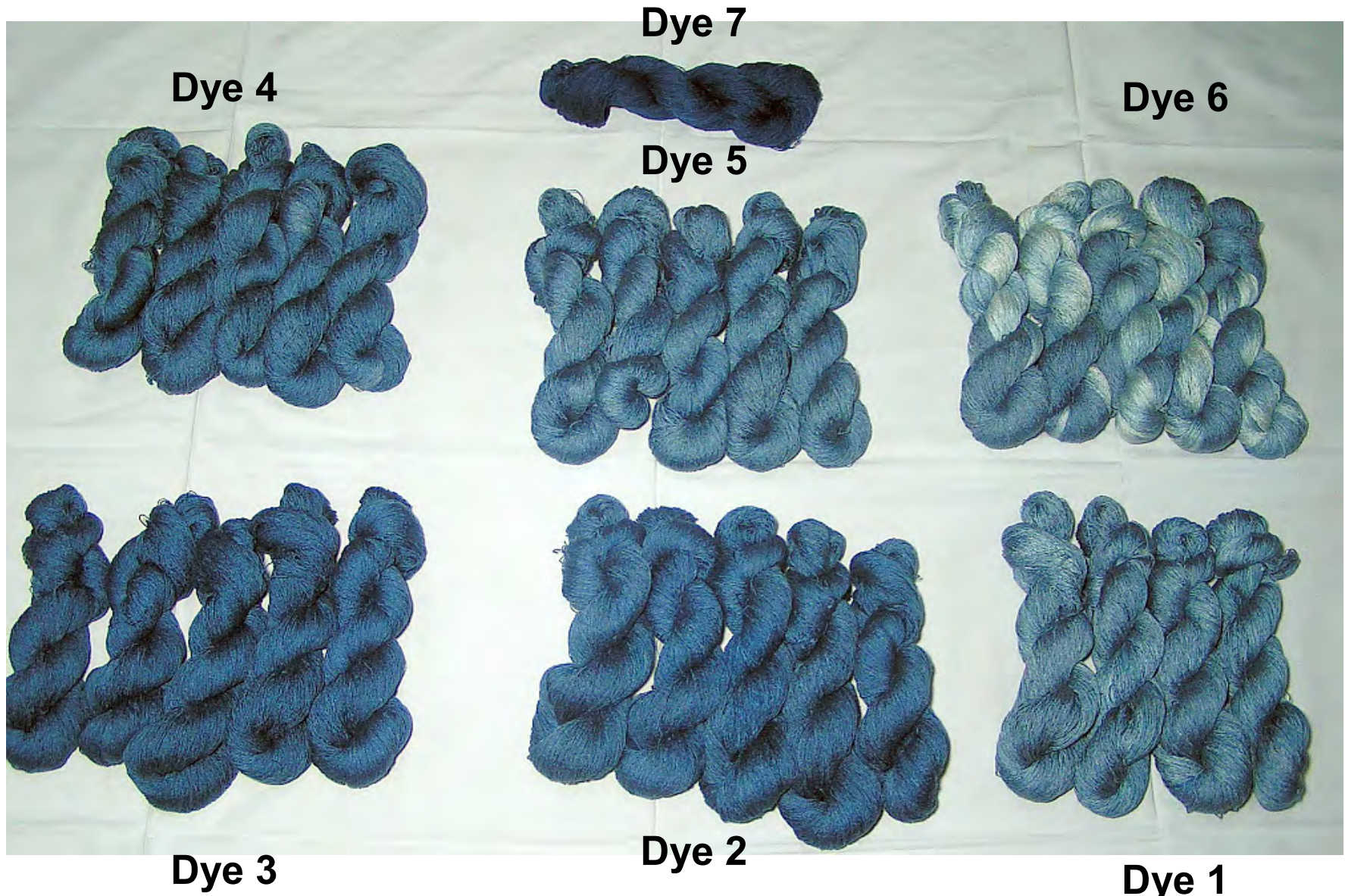
**Dye 4:** Same as no. 3 but no movement. 2 consecutive dips 10 min each followed by 5 min in hydrogen peroxide solution (washed out with water before 2<sup>nd</sup> dip in order not to bring oxygen into the vat)

**Dye 5:** no movement, after first dip and airing a second dip with hanks only partially immersed.

**Dye 6:** Lemniskate knots added for batic effects. Done between 1<sup>st</sup> and 2<sup>nd</sup> dip of Dye 5.

**Dye 7:** 1 hank from Dye 1: 10 dips in the vat to reach a blue as dark as possible. No hydrogen peroxide dip until the very last dip

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## Results:

### On site:

- Ph level instabiliy also experienced by other dyers at the conference, especially for hydrogen sulfite vats
- significant increase in indigo solution resulted in more stable ph-levels of vat
- Fermentation vats are supposed to be less prone to ph-level changes

### After washing:

- Very little variation in colour between Dyes no 2 & 3 and Dyes no 4 & 5.
- Dye no 5: 2<sup>nd</sup> partial dip did not result in visible increase of color. Suggestion: partial over-dyes with darker shades necessary
- Signifiant rub-off on all darker shades of blue, no discernable difference if hanks had been worked on or not.

### Possible fields of further investigation:

- Rub-off behaviour to be checked when yarn is actually used, if there are differences between dye-lots
- Practical investigation of ph level stability in fermentation vats