Allergic Contact Dermatitis to Pure Indigo Powder Hair Dye
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**Background**
- While hair dyes are common causes of allergic contact dermatitis (ACD), contact allergy to natural indigo powder has rarely been described.
- We present this case to raise awareness of indigo powder as a potential contact allergen and to reiterate the importance of patch testing to personal products.

**Case Presentation**

**Hyperpigmented macules/patches on the posterior neck**
- **HPI:** A 50-year-old female presented with a 10-month history of intermittent dermatitis affecting the posterior neck and earlobes (Fig. 1).
  - Symptoms began after coloring her hair using natural henna powder (Fig. 2a, b).
  - She had previously been using natural henna hair dye for many years without complication.

**Indigo Powder Analyses**
- **TLC analysis was negative for undisclosed PPD (Fig. 5)**
- **No PPD was detected by high-resolution liquid chromatography-mass spectrometry (LC-MS)**
- **5 controls tested negative to indigo powder dilution series**
  - 30%, 10%, 3%, 1%

**Patch Tested To:**
- **2019 – 2020 North American Contact Dermatitis Group screening series**
- Hairstyling series
- Textile dye series
- Home products, including natural henna and natural indigo powders

**Relevant Final Reactions:**
- **+:**
  - 2-nitro-PPD
- **++:**
  - Para-toluenediamine sulfate
  - Natural indigo powder (Fig. 4a)
  - 3-amino phenol, 4-amino phenol
- **++++:**
  - Para-phenylenediamine (PPD)
  - Disperse orange 3
  - 4-aminoazobenzene
- **Negative:**
  - Natural henna powder (Fig. 4b)

**Patch Testing**

**Figure 3a-d. Positive reactions to 3-amino phenol (a), 2-nitro-PPD (b), Disperse orange 3 (c), and 4-aminoazobenzene (d)**

**Figure 4a, b. ++ reaction to natural indigo powder (4a). Negative reaction to henna (4b)**

**Discussion**
- **Natural indigo dye is derived from Indigofera tinctoria and Isatis tinctoria (Fig. 6); its associated powder consists technically of 100% pure indigo**

**Only one prior case of ACD to pure indigo powder hair dye has been reported**
- **PPD has been described as an additive and contaminant in henna preparations to intensify coloration**
  - TLC and LC-MS analyses were negative for PPD; we concluded that indigo powder itself was the likely contact sensitizer (rather than PPD contaminant)
- **Our patient was advised to use only 100% pure henna and/or mineral-based hair dyes**
  - 3 months later, she endorsed persistent pigmentation of the posterior neck but denied any recurrent dermatitis.

**References**