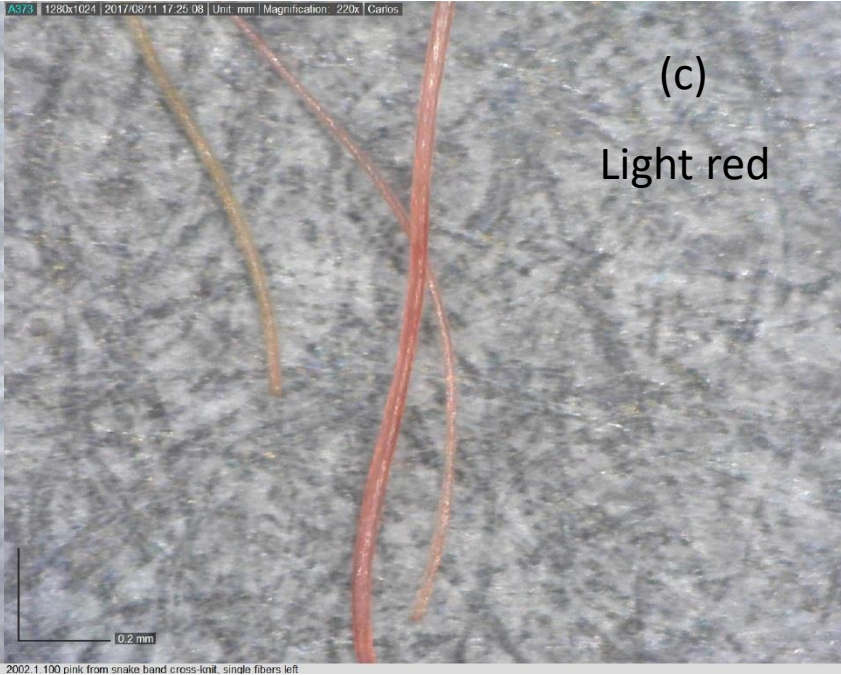
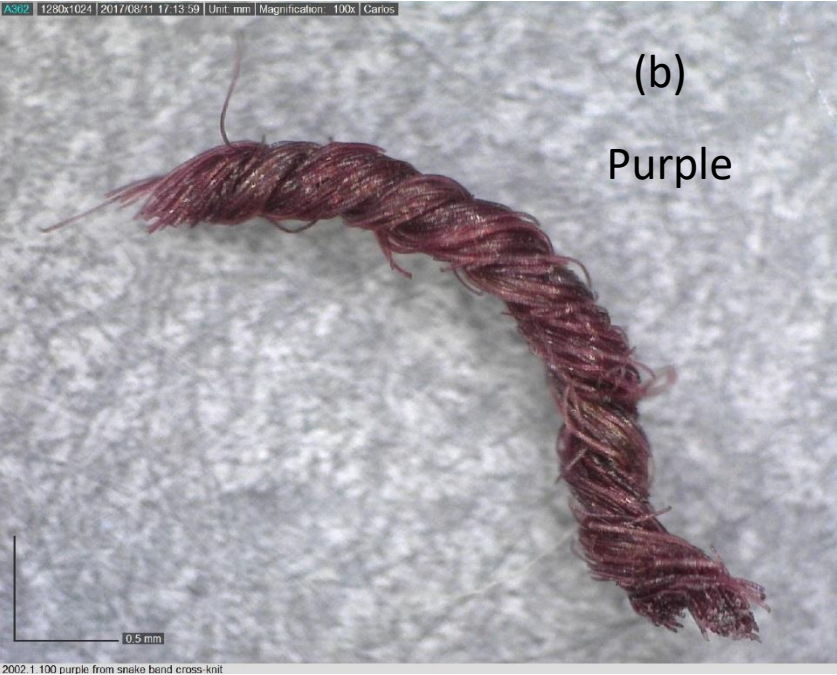
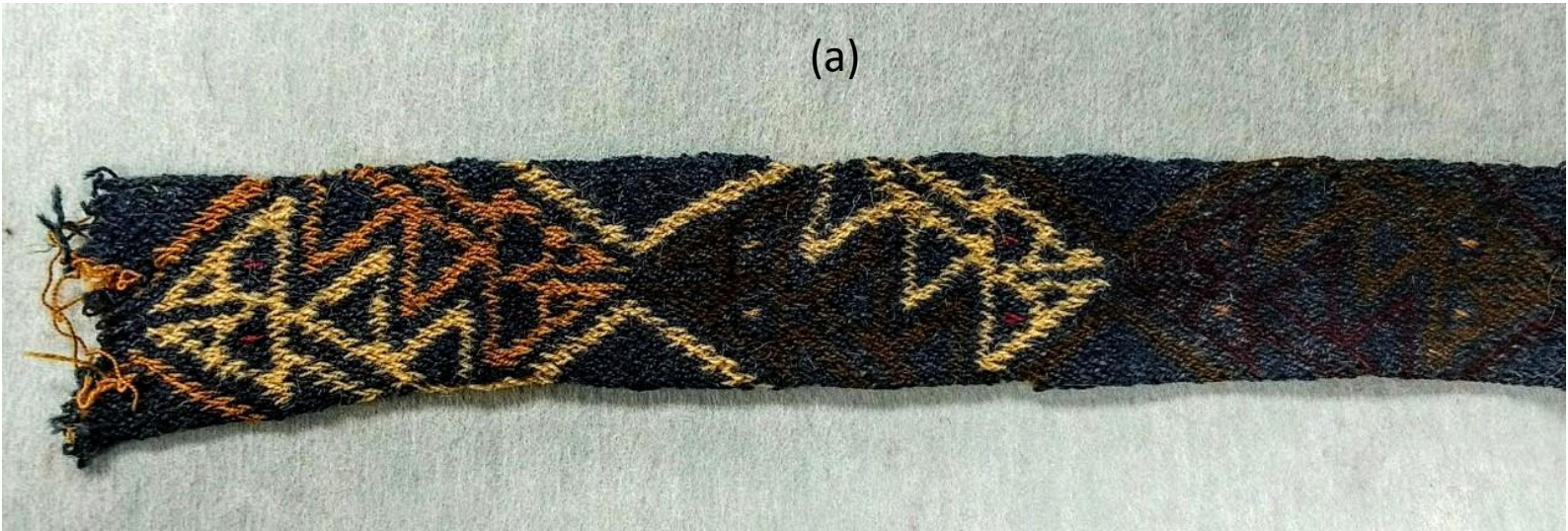


Supplementary Figures

Campos Ayala, J.; Mahan, S.; Wilson, B.; Antúnez de Mayolo, K.;
Jakes, K.; Stein, R.; Armitage, R.A.

“Characterizing the Dyes of Pre-Columbian Andean Textiles: Comparison
of Ambient Ionization Mass Spectrometry and HPLC-DAD”

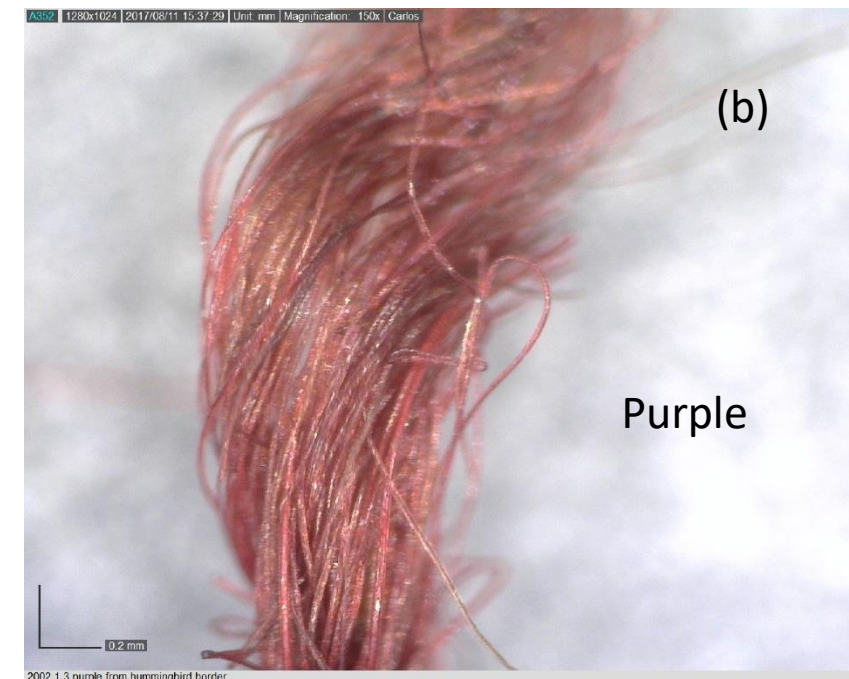
Supplementary Figure S1. (a) Tapestry fragment with fish and snake designs (MCCM accession number 2002.1.100), made of camelid fiber; attributed to the Nazca, Early Intermediate Period. (b-d) Samples from (a).





(a)

Supplementary Figure S2. (a) Mantle fragment with cross-loop knit stitch embroidered border of hummingbird motifs (MCCM accession number 2002.1.3), made of camelid fiber; attributed to the Nazca, Early Intermediate Period. (b-d) Samples from (a).



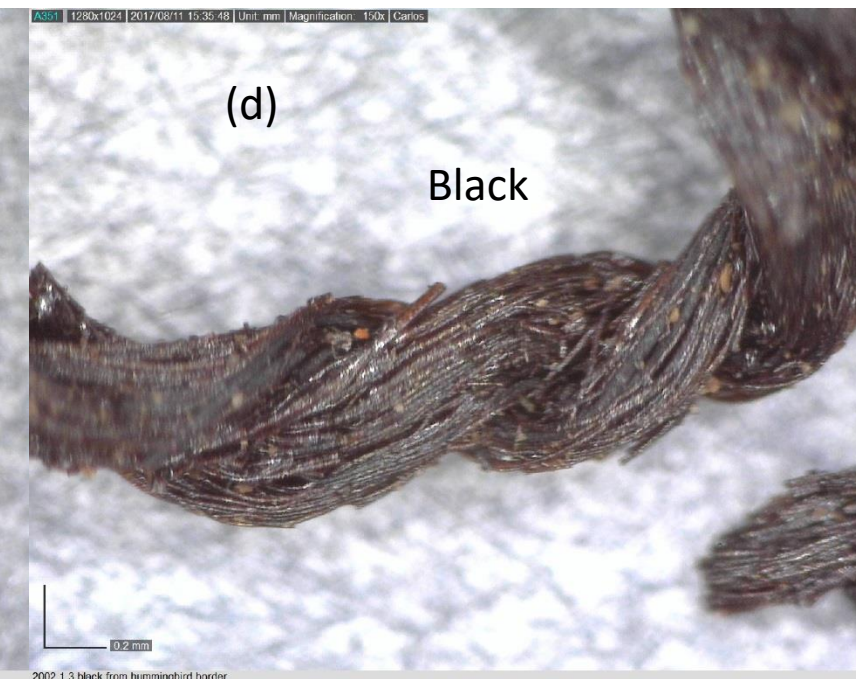
(b)

Purple



(c)

Green



(d)

Black

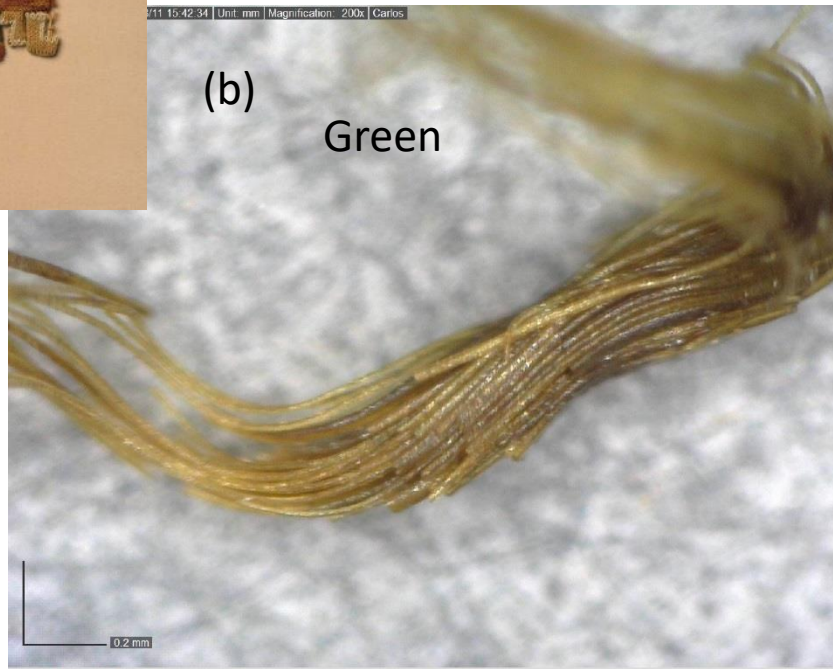
(a)



Supplementary Figure S3. (a) Fragments of a mantle border (MCCM accession number 2002.40.4 A-C), made of camelid fiber; attributed to the Nazca, Early Intermediate Period. (b-c) Samples from (a).

(b)

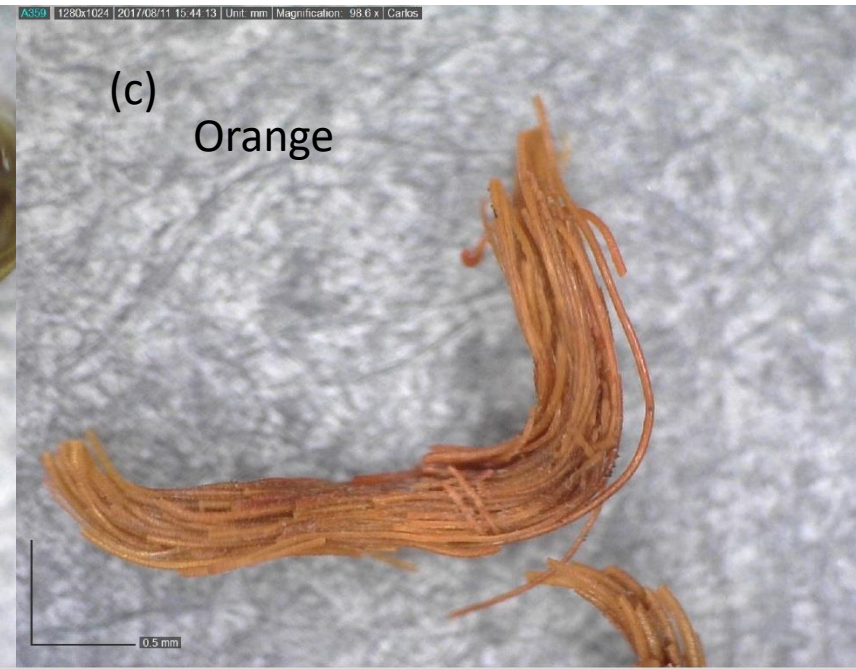
Green



2002.40.4 green from people beans

(c)

Orange



2002.40.4 orange from people beans



Supplementary Figure S4. (a) Tie-dye textile fragment (MCCM accession number 2002.1.148), made of camelid and cotton fibers; Wari related, Middle Horizon. (b-h) Samples from (a).

(a)

(b)

(c)

(d)

Purple

Green

Purple 2

White
(e)

Yellow

(f)

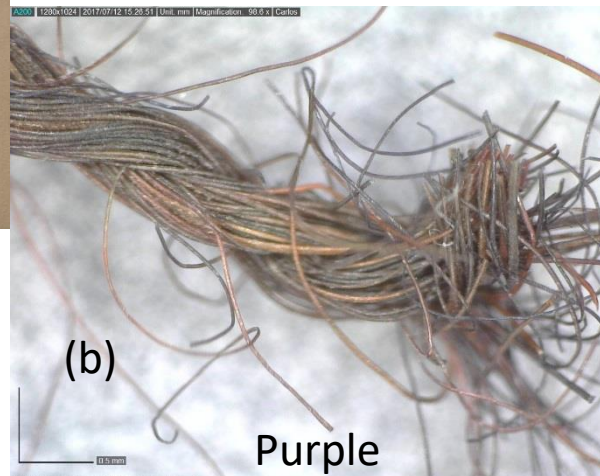
Yellow 2
(g)

Red
(h)



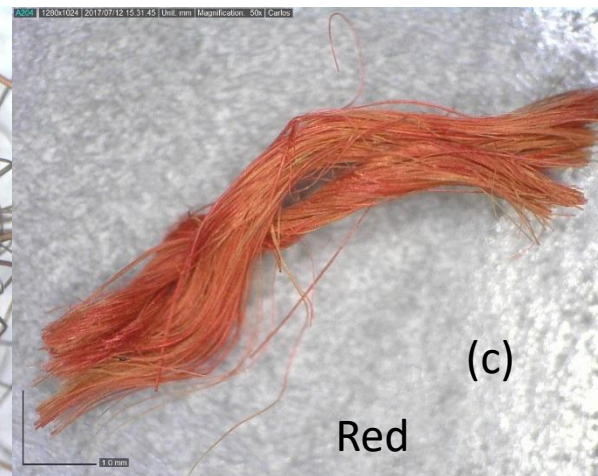
(a)

Supplementary Figure S5. (a) Tie-dye textile fragment (MCCM accession number 2002.1.1), made of camelid fiber; Wari related, Middle Horizon. (b-h) Samples from (a).



(b)

Purple



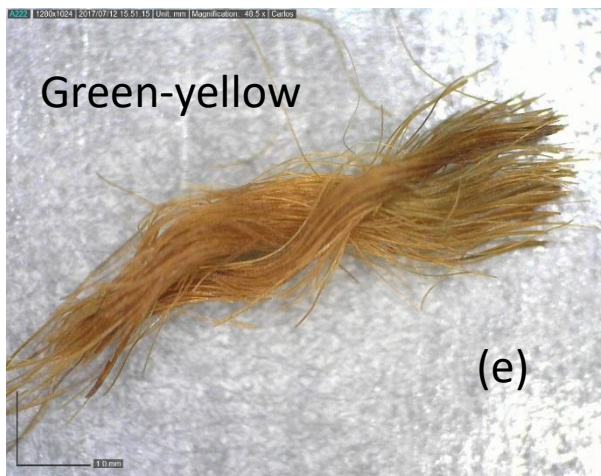
(c)

Red



(d)

Green



(e)

Green-yellow



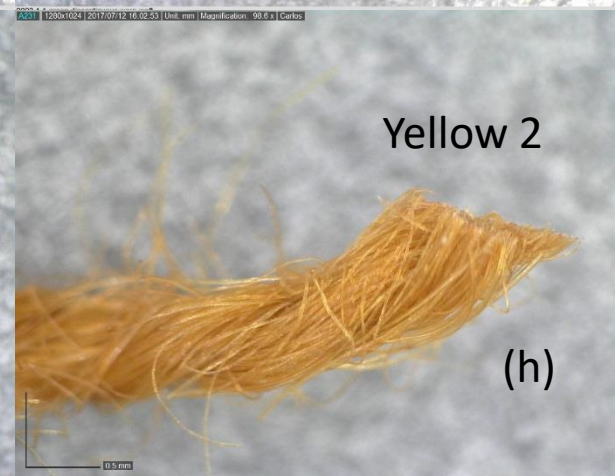
(f)

White



(g)

Yellow

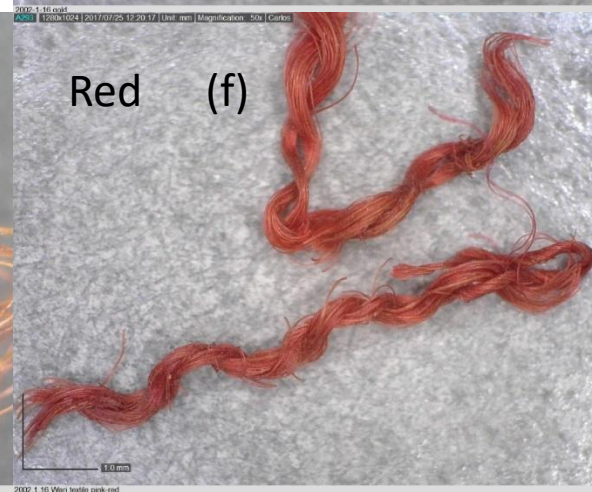
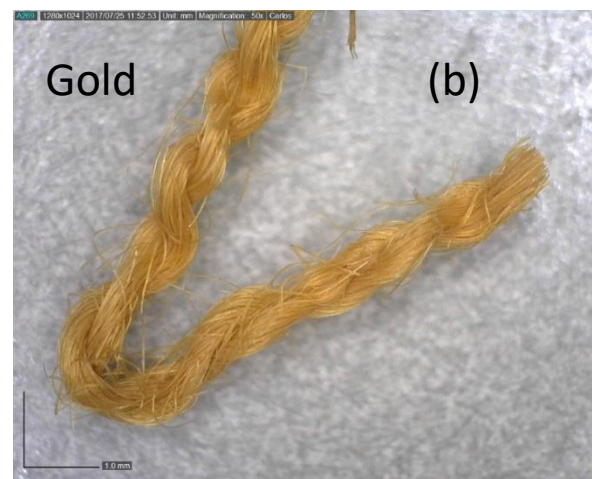


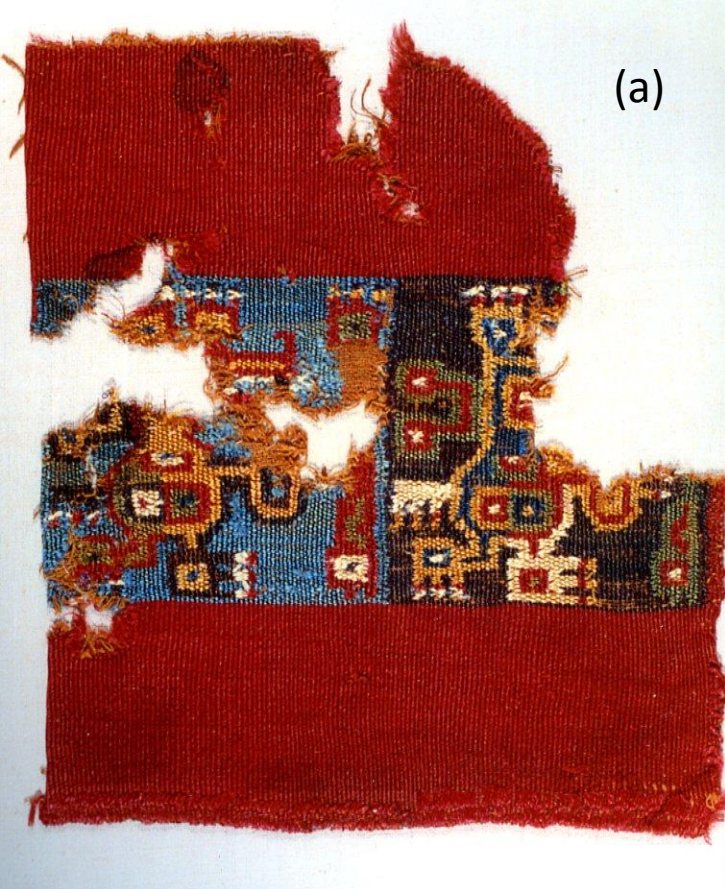
(h)

Yellow 2



Supplementary Figure S6. (a) Single interlocked tapestry administrator's tunic (MCCM accession number 2002.1.16), made from cotton and camelid fibers, Wari Middle Horizon. (b-g) Samples from (a).





(a)

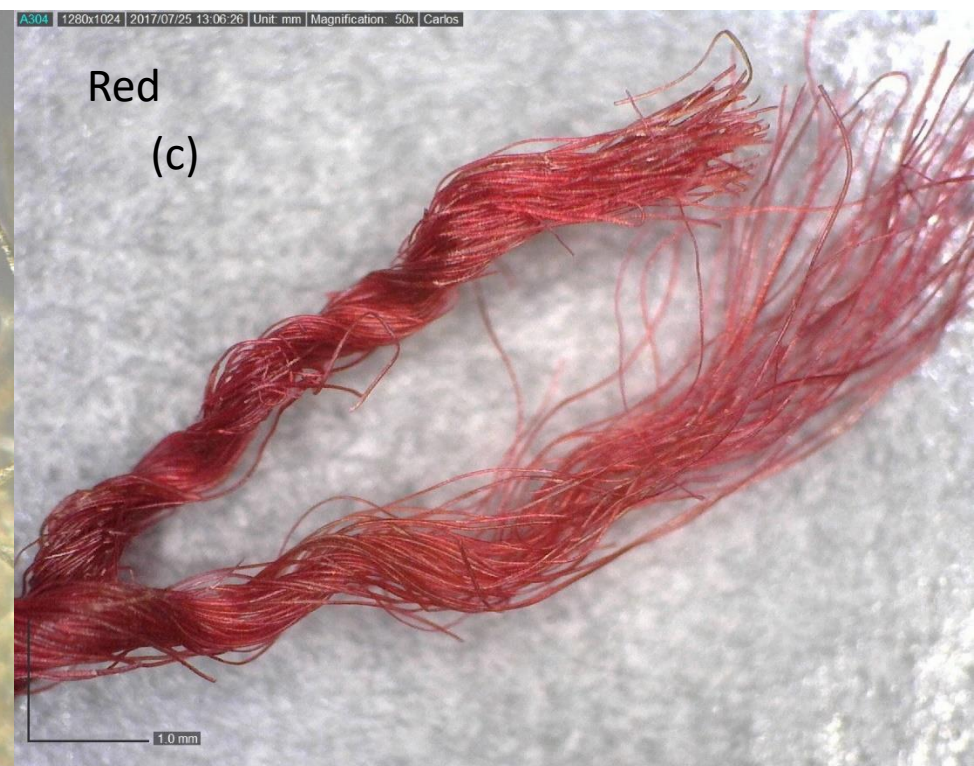
Supplementary Figure S7. (a) Brocade textile fragment with winged staff-bearer figures in headdresses (MCCM accession number 2002.1.83), made from cotton and camelid fibers, Wari Middle Horizon. (b-c) Samples from (a).



Green

(b)

2002.1.83 Wari textile green fibers



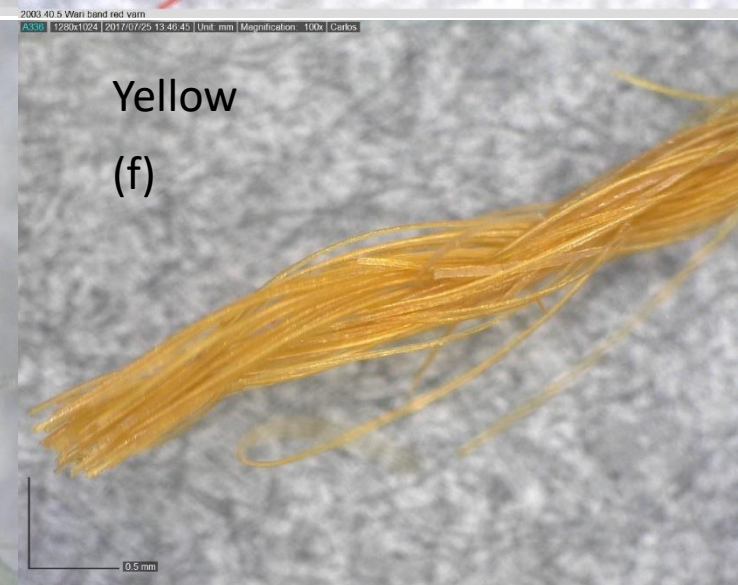
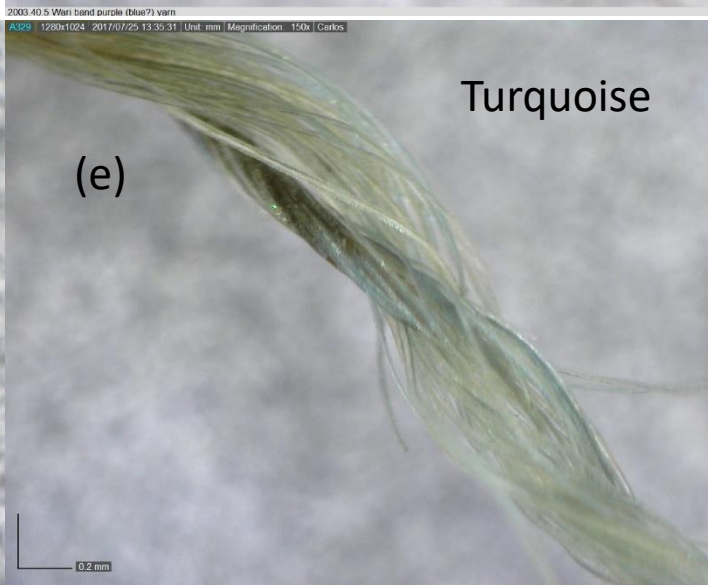
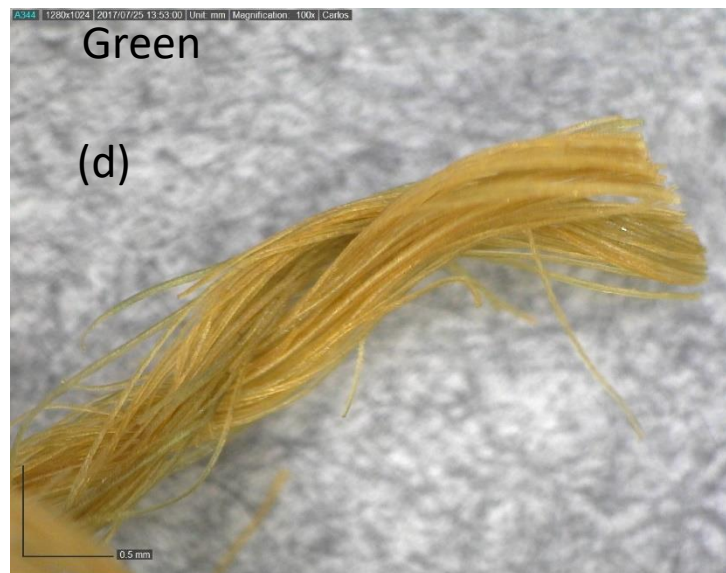
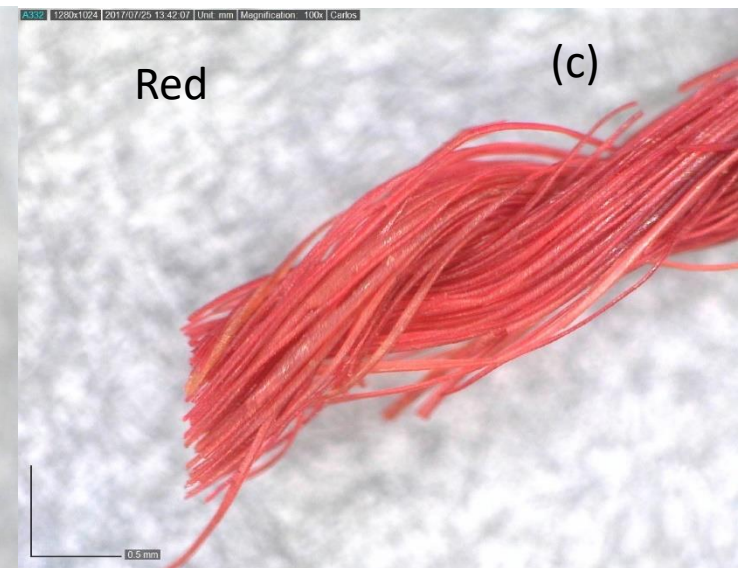
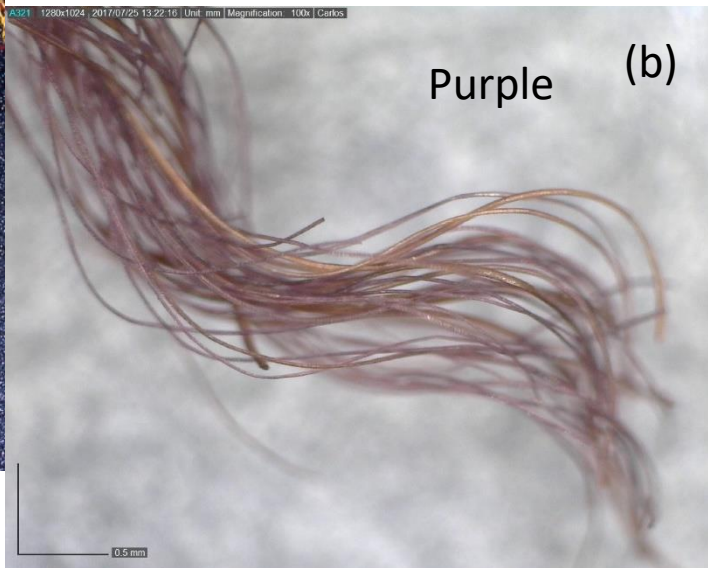
Red

(c)

2002.1.16 Wari textile red yarn

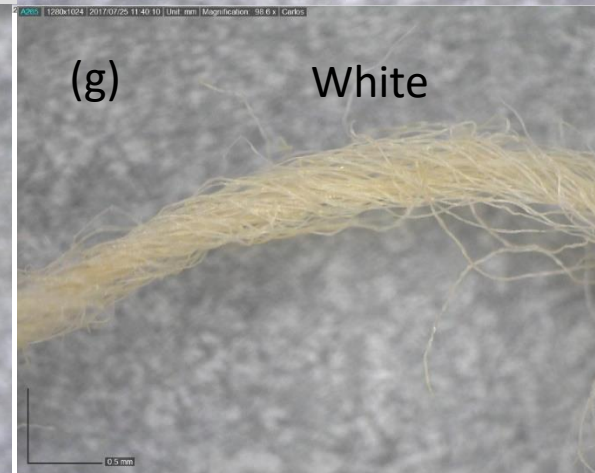
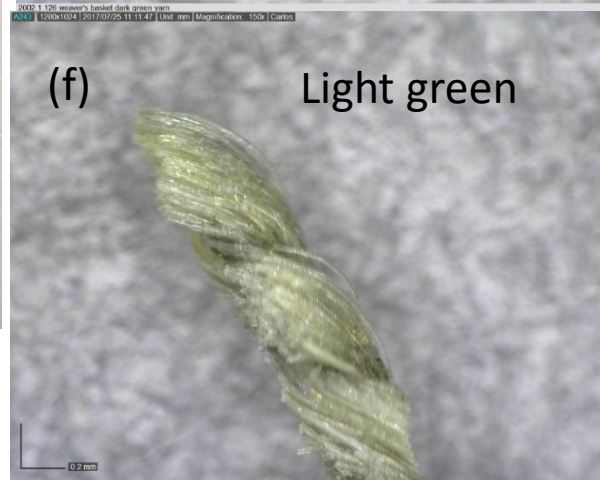
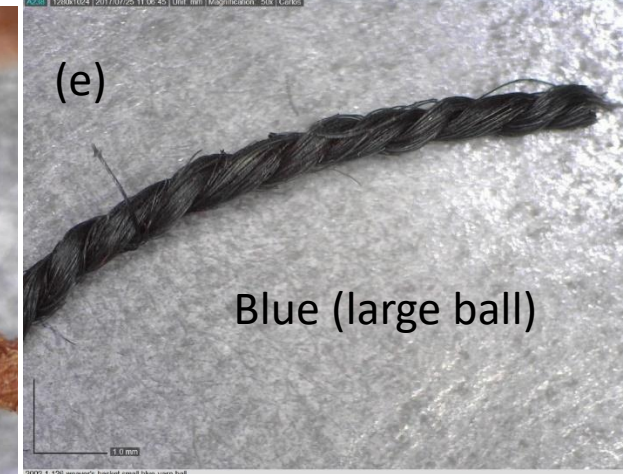
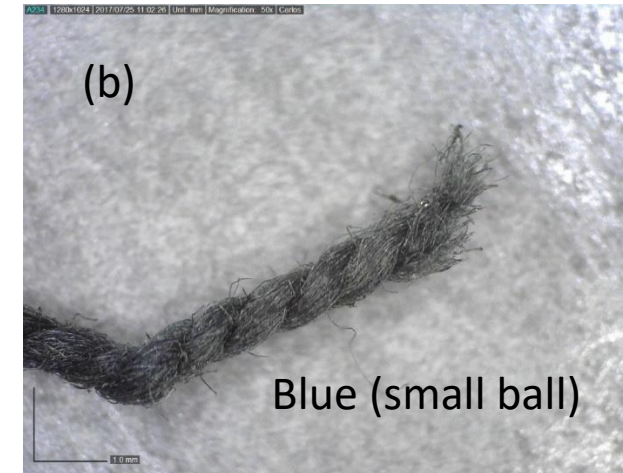
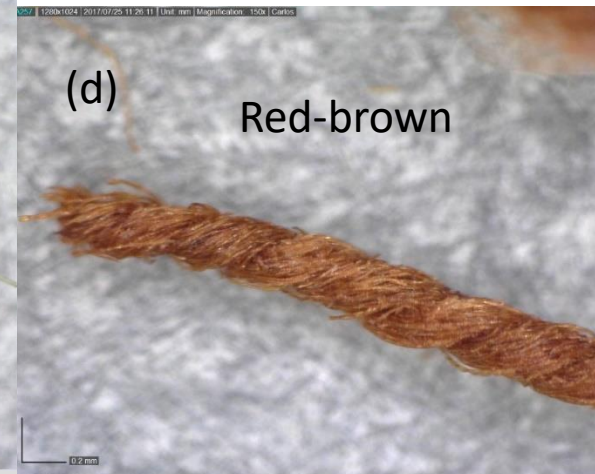
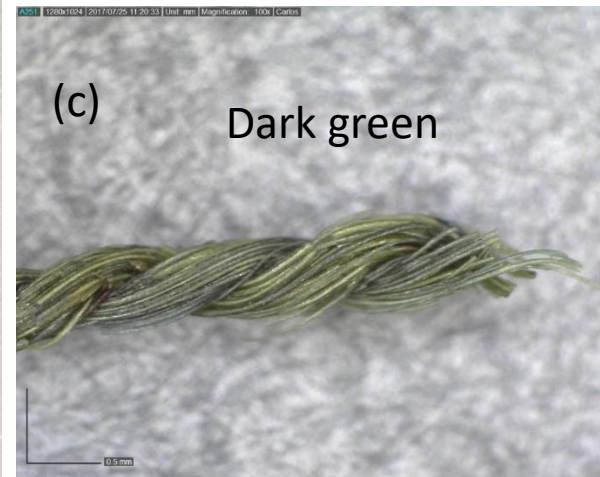
Supplementary Figure S8. (a) Woven band (MCCM accession number 2003.40.5), no additional information available, attributed to Wari. (b-f) Samples from (a).

(a)





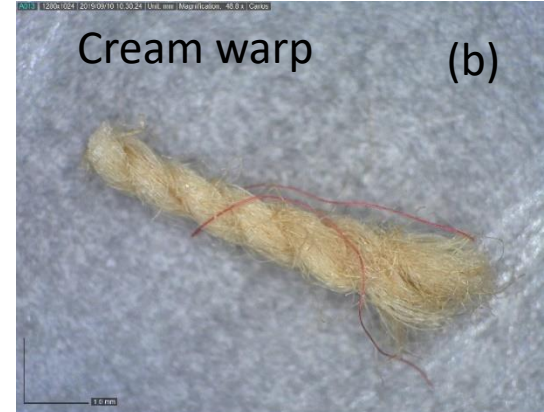
Supplementary Figure S9. (a) Weaver's work basket yarns (MCCM accession number 2002.1.126 A-U), cotton and camelid fibers, Late Intermediate Period Chancay. (b-h) Samples from (a).



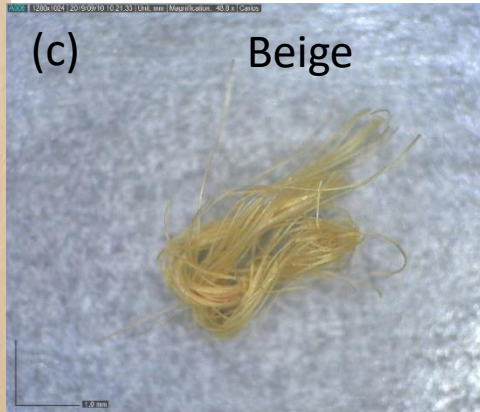
(a)



Supplementary Figure S10. (a) Red tasseled tunic fragments (MCCM accession number 2004.64.1), cotton and camelid fibers, Late Intermediate Period Pacatnamú. (b-k) Samples from (a), brown warp shown in Figure 2b.

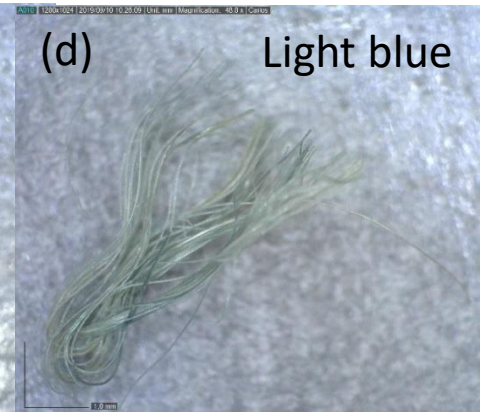


(b)



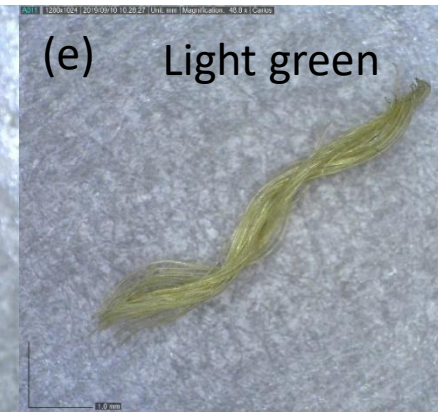
(c)

Beige



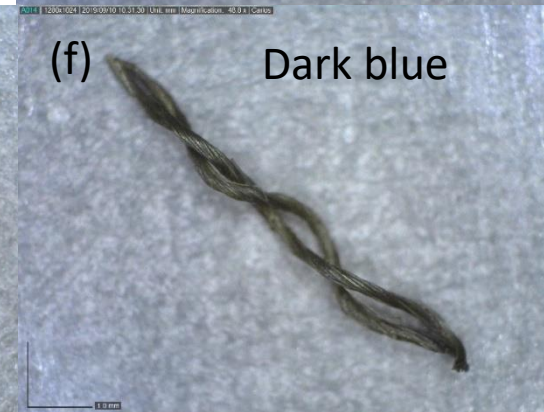
(d)

Light blue



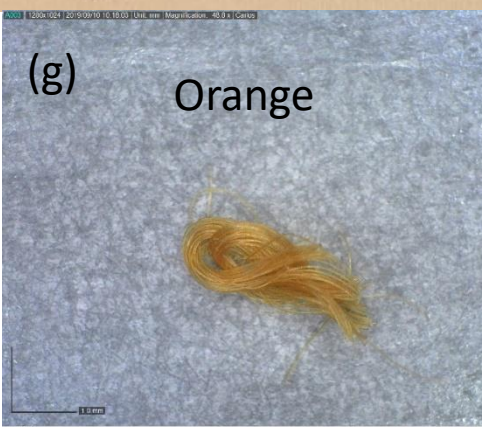
(e)

Light green



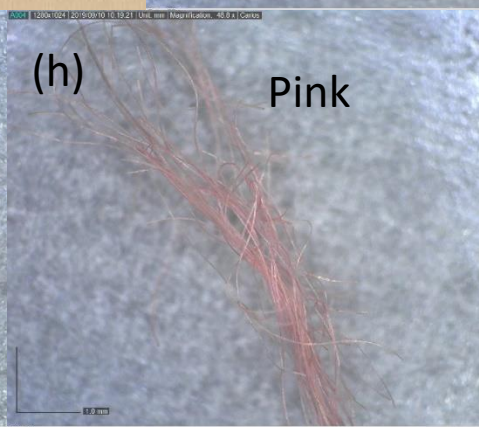
(f)

Dark blue



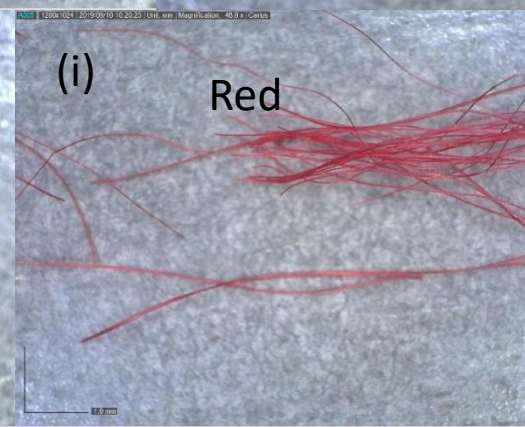
(g)

Orange



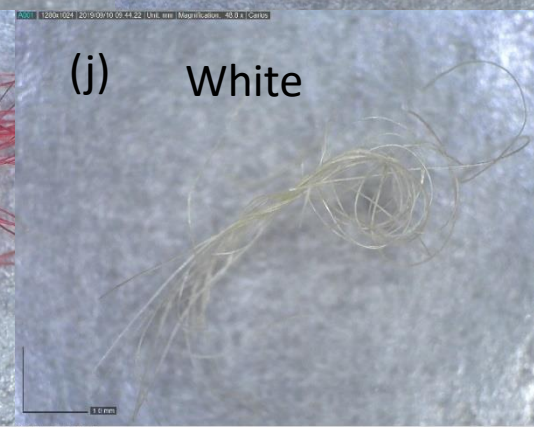
(h)

Pink



(i)

Red



(j)

White



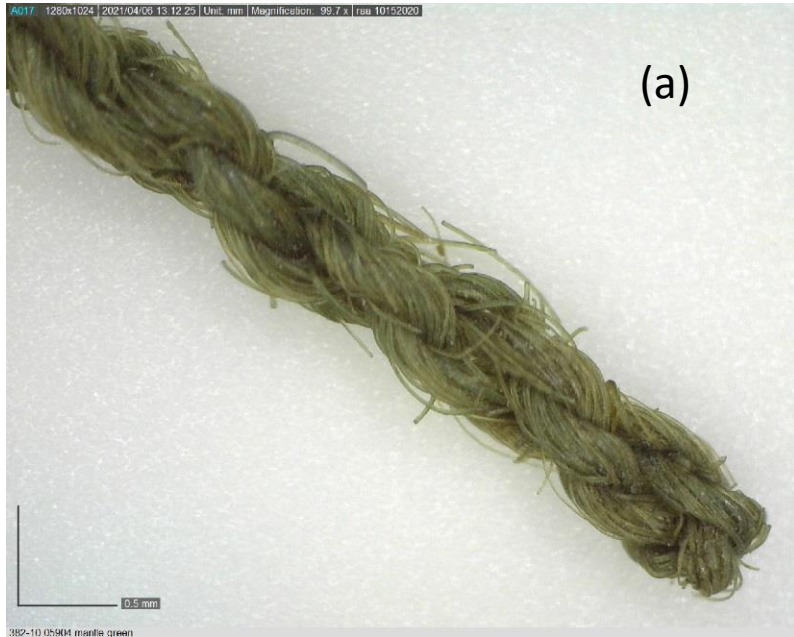
(k)

Golden brown

Supplementary Figure S11. Paracas Necropolis yarn fragment samples collected by Anne Paul in 1985 from the Museo Nacional de Arqueología, Antropología, e Historia del Perú (MNAAHP). (a) Orange yarn from mummy bundle textile designated 310-58c 02912; (b) yellow yarn from mummy bundle textile designated Cave #5 12-5236 0093, cloth (oldest).



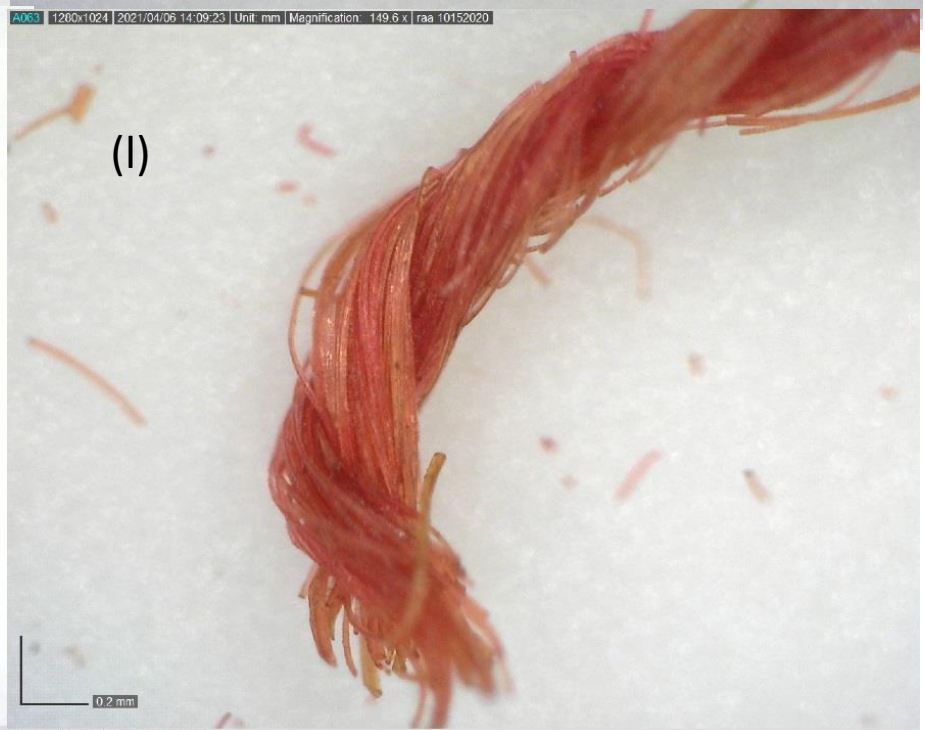
Supplementary Figure S12. Paracas Necropolis yarn fragment samples collected by Anne Paul in 1985 from the Museo Nacional de Arqueología, Antropología, e Historia del Perú (MNAHP), mummy bundle 382. (a) Specimen 10, subspecimen 05904, green yarn from mantle; (b) specimen 45, subspecimen 02763, orange loose threads from skirt; Specimen 48, subspecimen 01017, (c) skirt fringe blue and (d) black/purple (continued next page).



Supplementary Figure S12, continued. Specimen 49, subspecimen (23808) 03174, (e) orange from skirt ground cloth; Specimen 54 subspecimen 02846, (f) gold embroidery threads; (g) blue fibers from turban ground cloth; (h) green threads from turban.



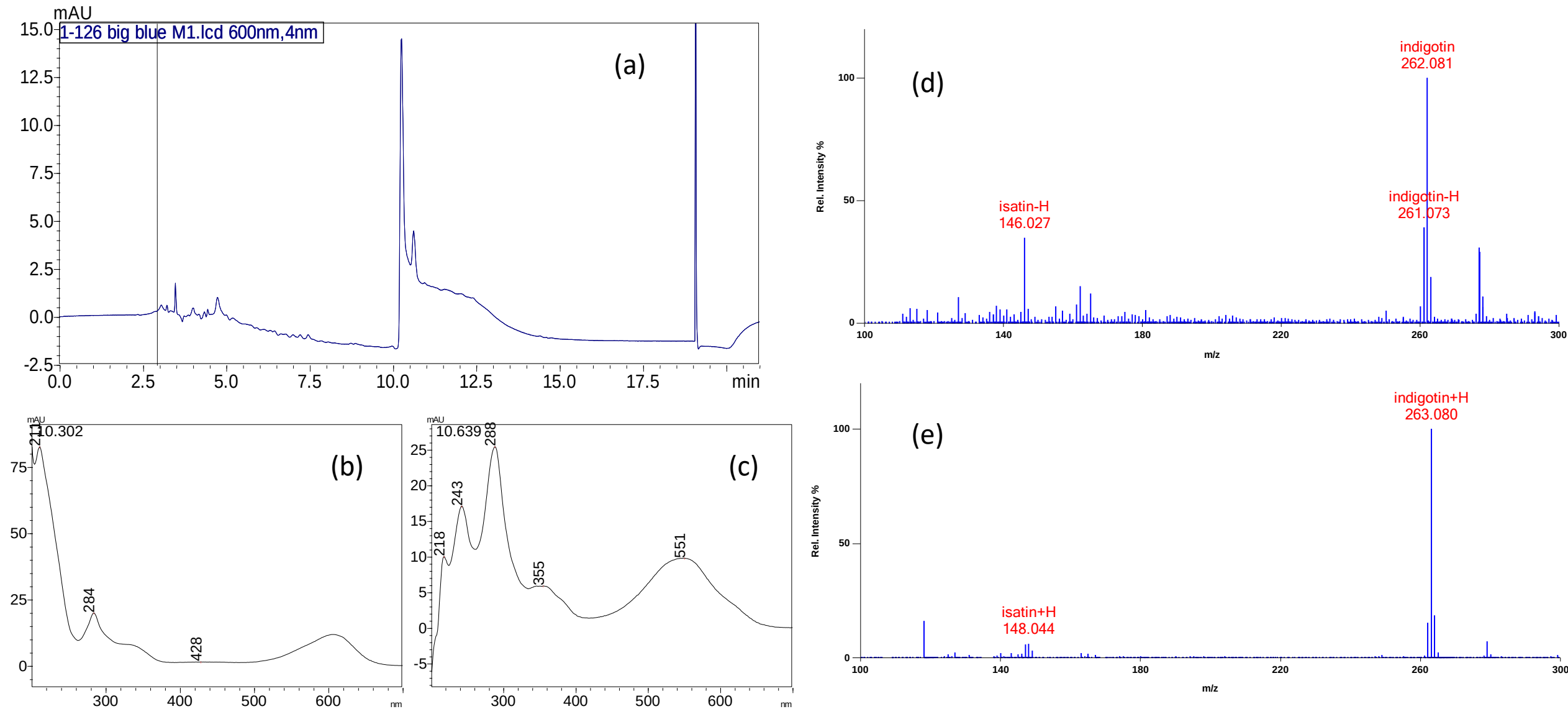
Supplementary Figure S13, continued. Specimen 68, subspecimen 02929, (i) poncho purple braid and (j) poncho border ground cloth green fibers; Specimen 72, subspecimen 02519, (k) black skirt fringe and (l) red skirt embroidery thread.



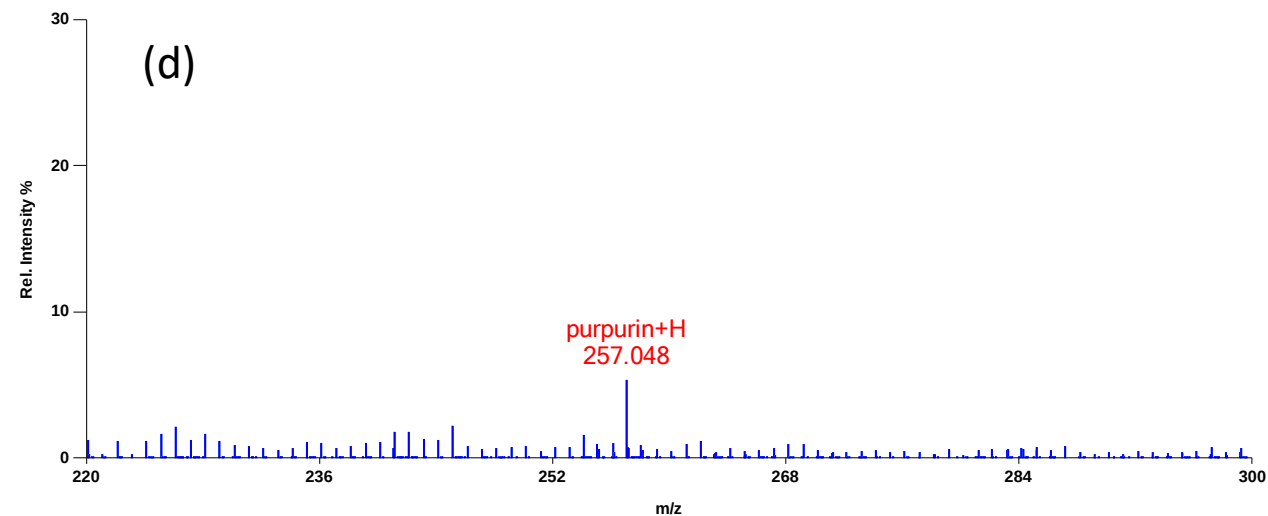
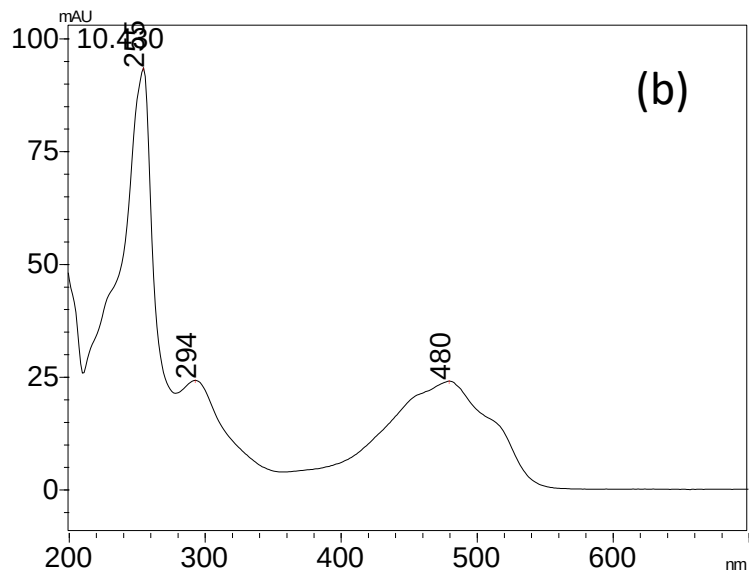
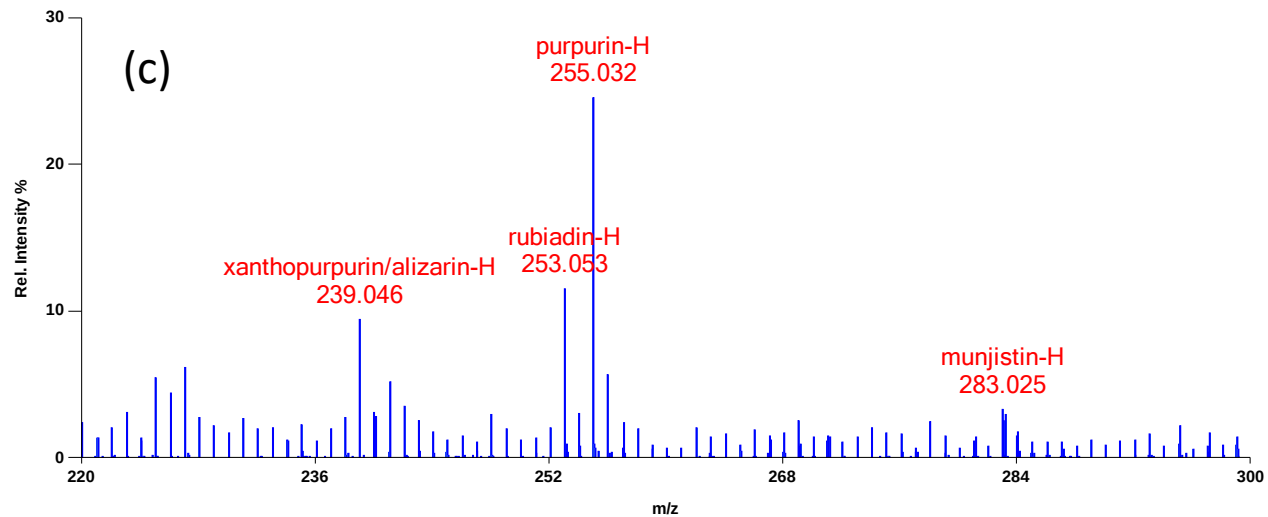
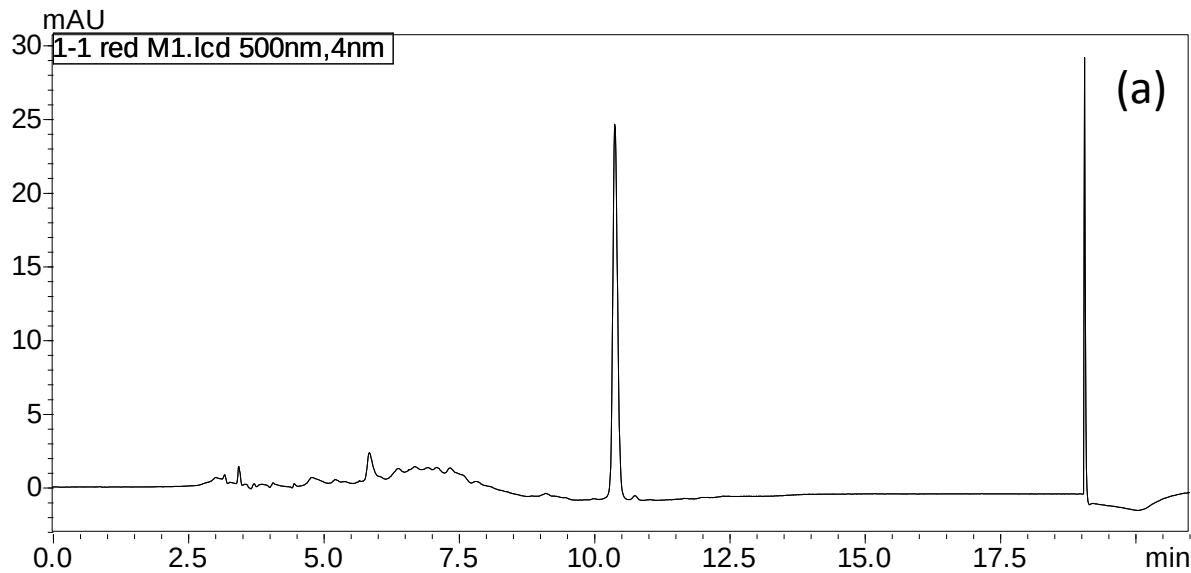
Supplementary Figure S14. Paracas Necropolis yarn fragment samples collected by Anne Paul in 1985 from the Museo Nacional de Arqueología, Antropología, e Historia del Perú (MNAHP), mummy bundle 421. (a) Specimen 39, subspecimen 03083, red loose fibers from mantle; (b) specimen 132, subspecimen 03096, brown mantle fibers from box.



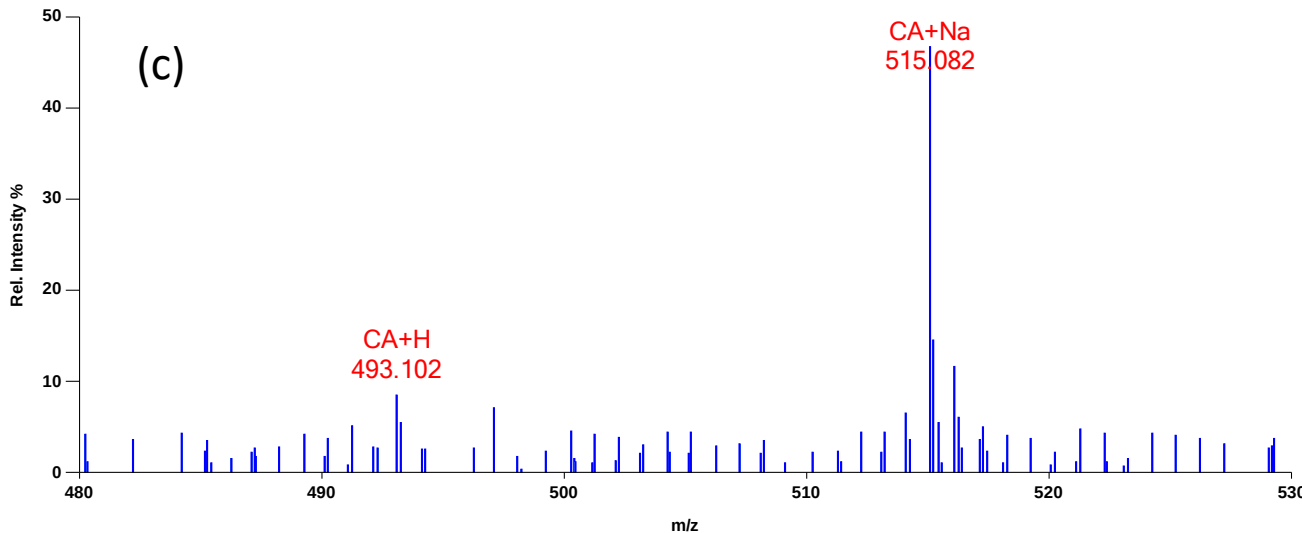
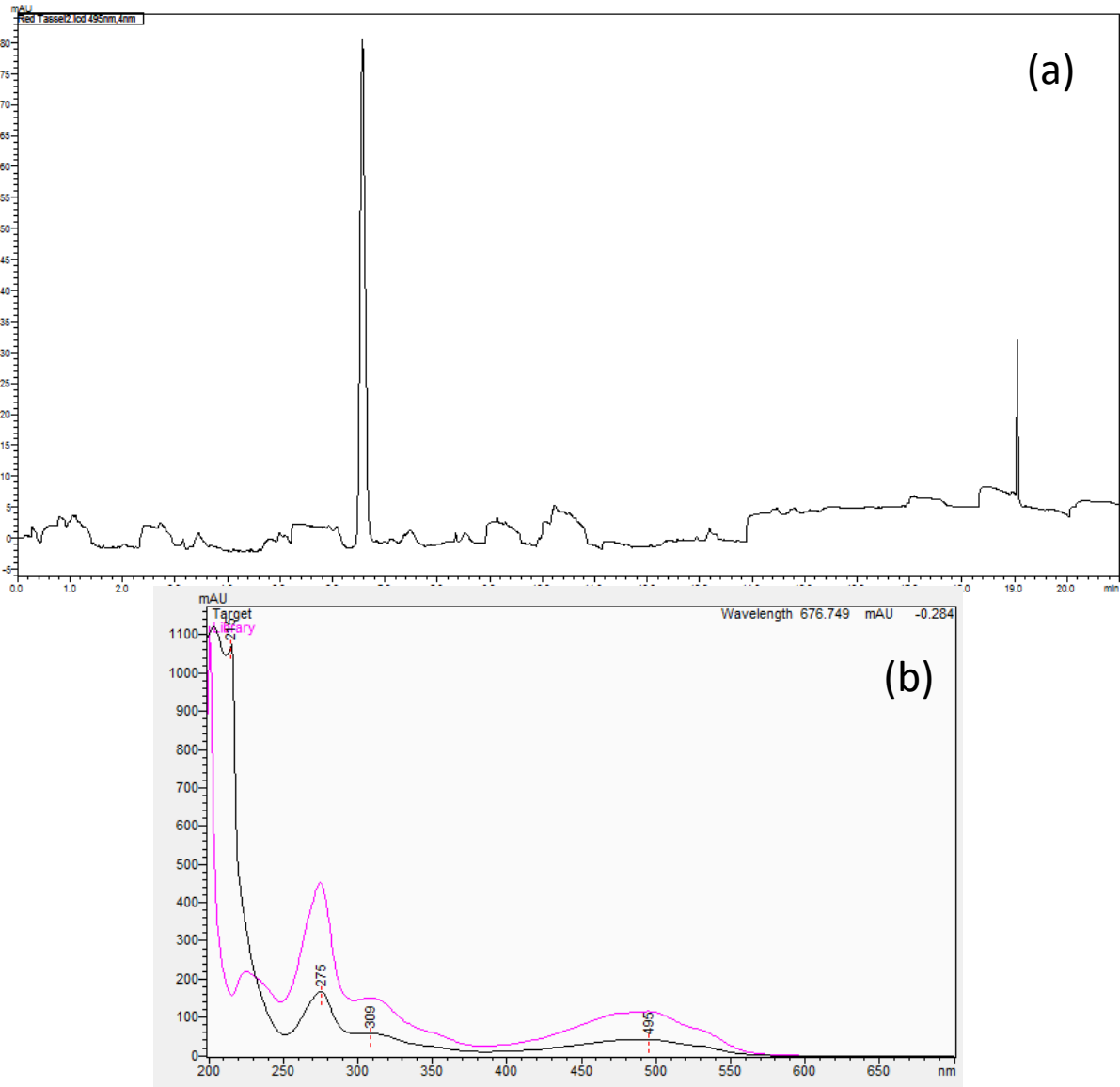
Supplementary Figure S15. Example chromatogram at 600 nm (a) for a blue sample from 2002.1.126, yarn from Chancay weaver's basket, indicative of indigo. UV-vis spectra for the two major peaks: indigotin (b) detected at 10.3 min and indirubin (c) detected at 10.6 min. DART mass spectra in negative ion mode (d) and positive ion mode (e) of the same sample.



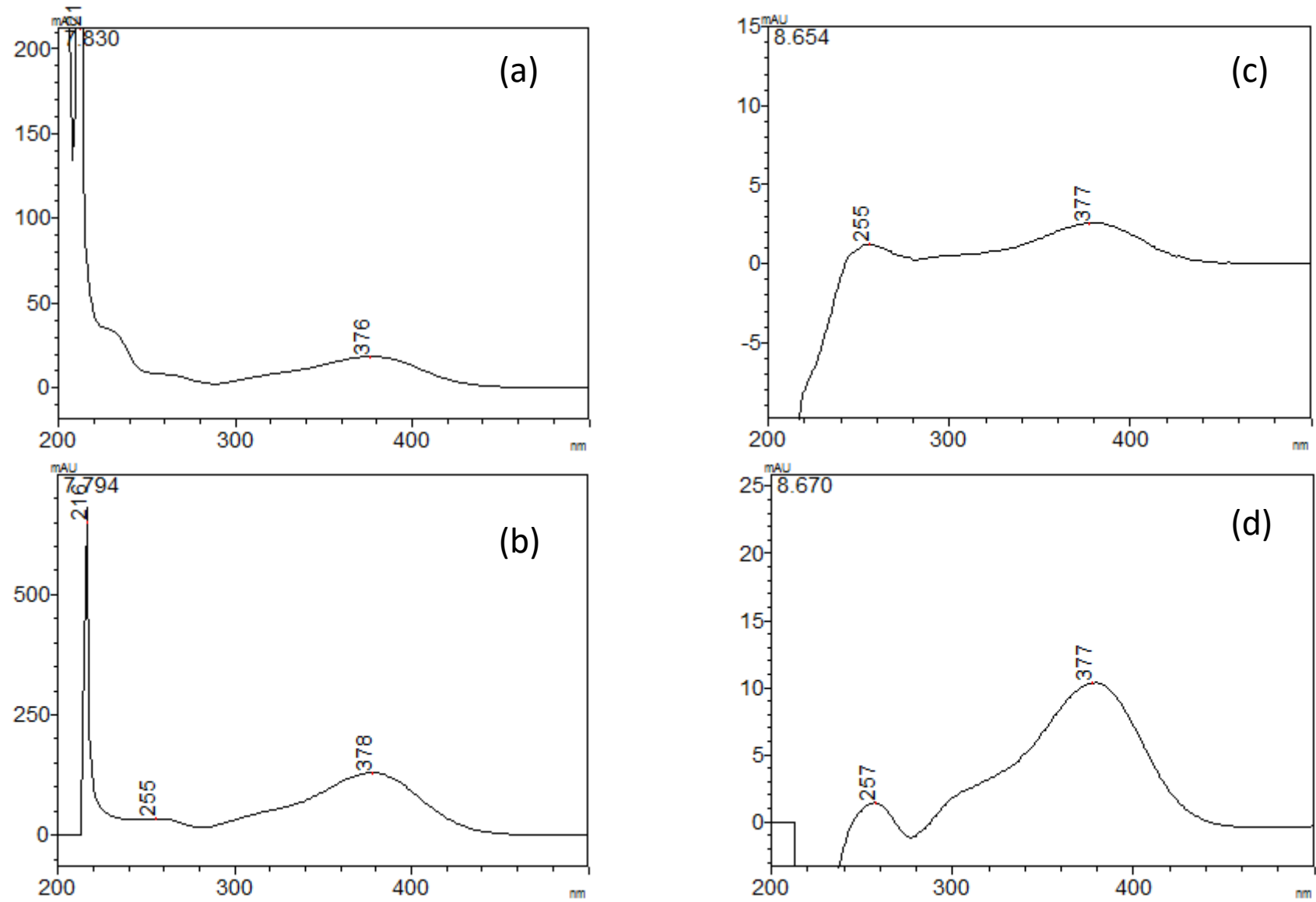
Supplementary Figure S16. Example chromatogram at 500 nm (a) for a red sample from 2002.1.1, yarn from tie-dye Wari textile, indicative of a plant red consistent with *Relbunium*. UV-vis spectrum for the major peak identified as purpurin (b) detected at 10.4 min. DART mass spectra in negative ion mode (c) and positive ion mode (d) of the same sample.



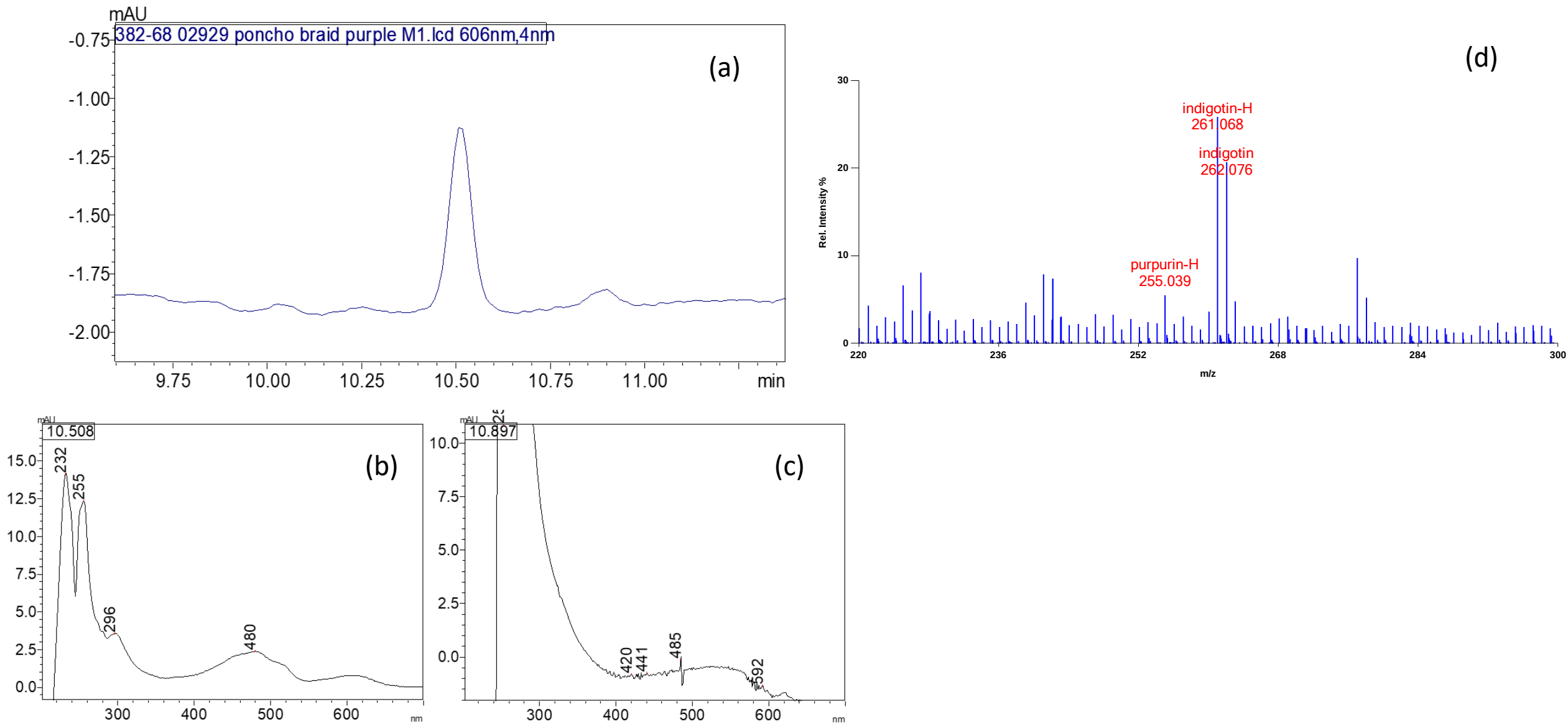
Supplementary Figure S17. Example chromatogram at 495 nm (a) for a red sample from 2004.61.1, yarn from Lambayeque tasseled tunic, indicative of insect red consistent with cochineal. UV-vis spectrum for the major peak compared with that of carminic acid standard (b) detected at 6.6 min. Paper spray mass spectrum (c) in positive ion mode of the same sample extracted in methanol:HCl.



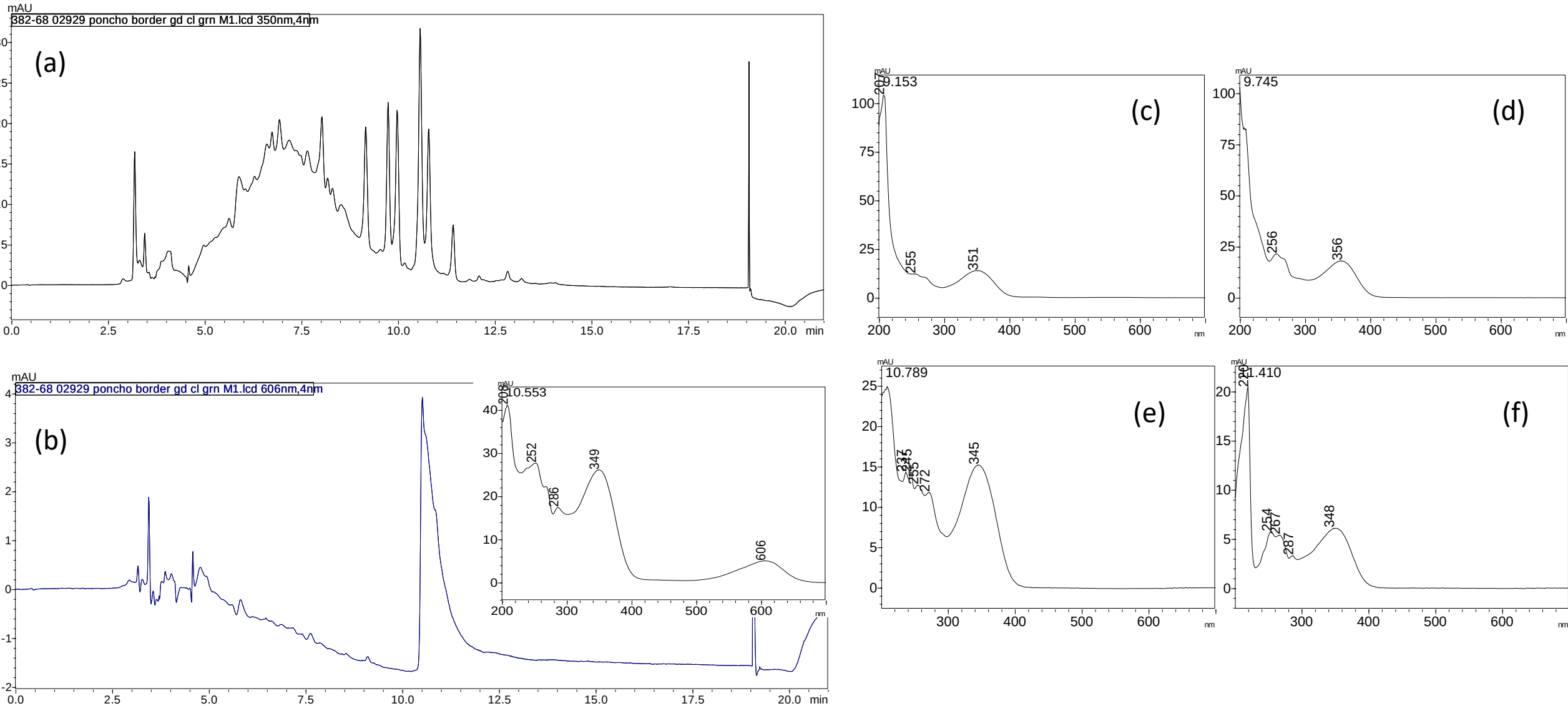
Supplementary Figure S18. UV-vis spectra for peaks observed in the chromatogram shown in Figure 1 in the main text. Spectrum of peak at 7.8 min in the extract from the gold embroidery thread from Paracas turban 382-54 02896 (a), compared to the spectrum of the okanin standard (b). Spectrum of peak at 8.6 min in the extract from the gold embroidery thread from Paracas turban 382-54 02896 (c), compared to the spectrum of the butein standard (d).



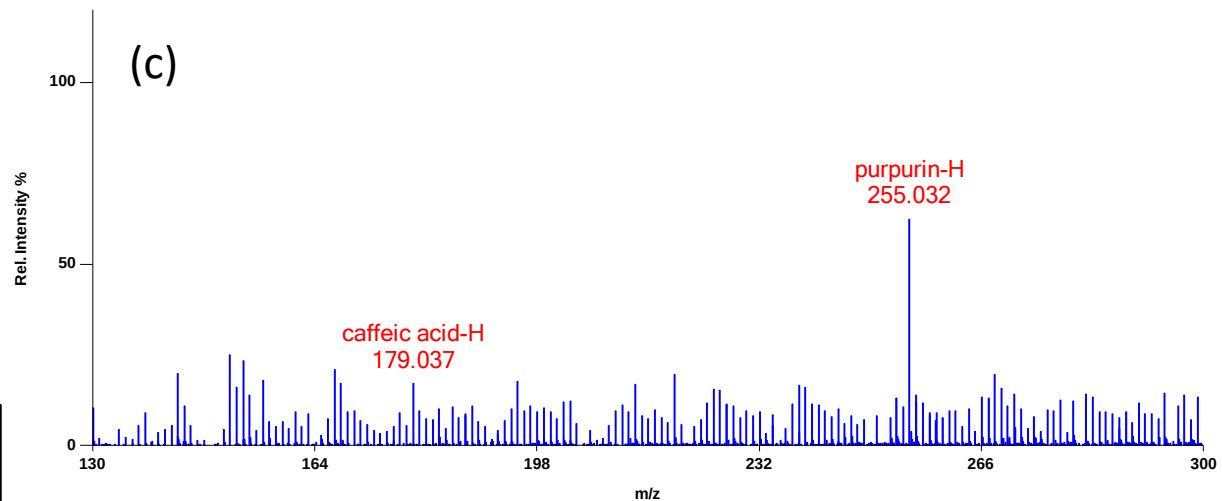
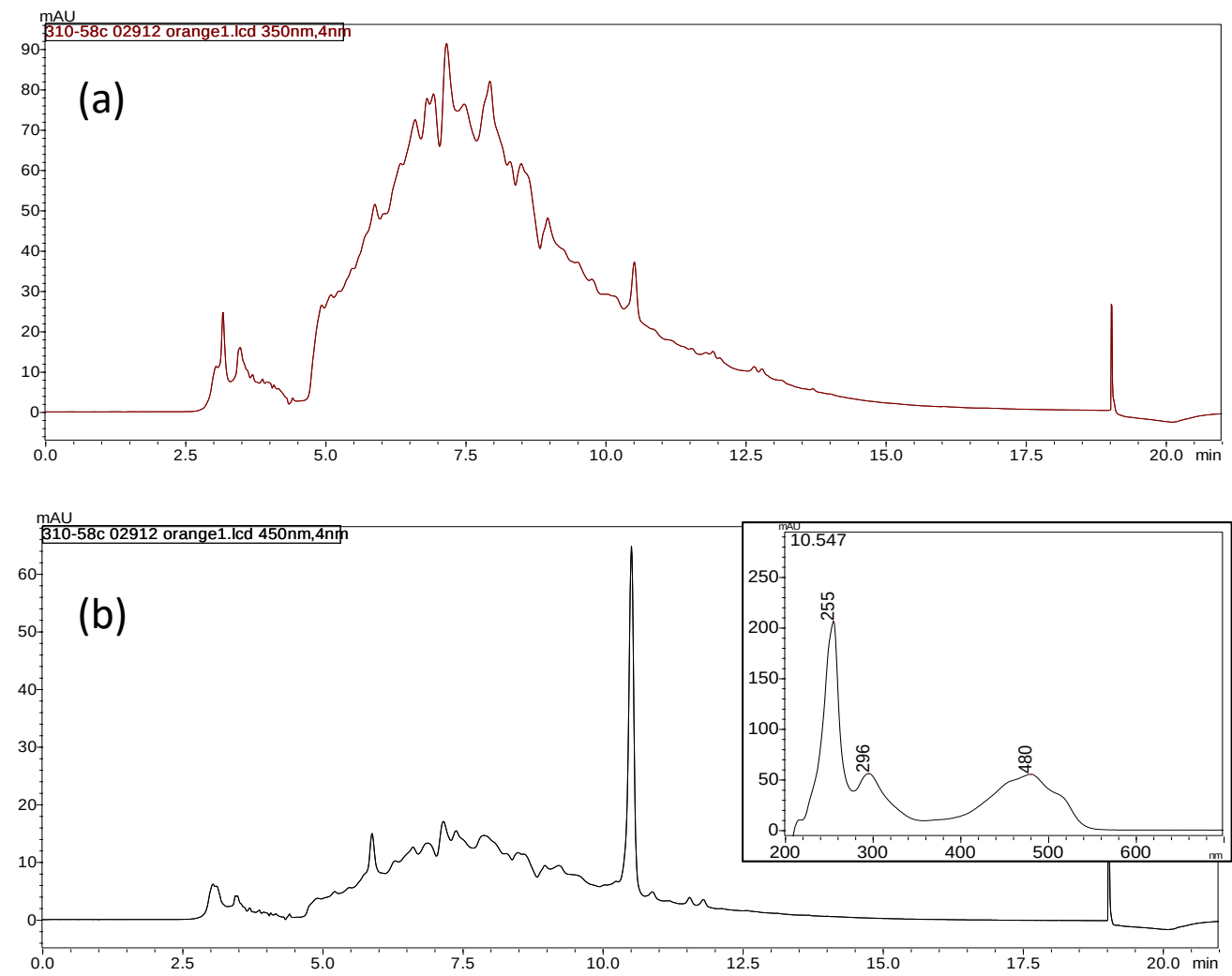
Supplementary Figure S19. Example chromatogram at 606 nm (a) for a purple sample from 382-68 02929, yarn from poncho braid, indicative of both *Relbunium* and indigo. UV-vis spectra for the major peaks (b) show that purpurin ($\lambda_{\text{max}} \sim 480$ nm) and indigotin (λ_{max} at 606 nm) co-elute under the chromatographic conditions used; only a trace of indirubin (c) was observed, in part because it does not absorb strongly at 606 nm. DART mass spectrum in negative ion mode (d) of the same sample.



Supplementary Figure S20. Example chromatograms at 350 nm (a) and 606 nm (b) for a green sample from 382-68 02929, yarn from poncho border ground cloth, indicative of indigo and an as-yet undetermined but unique yellow. The UV-vis spectrum for the peak at 10.6 min (b, inset) is consistent with that of indigotin. The other peaks observed at 350 nm gave similar spectra (c-f), which did not correlate with any of the standards or reference dyes.



Supplementary Figure S21. Example chromatograms at 350 nm (a) and 450 nm (b) for an orange sample from 310-56c 02912, yarn from a decorative border from a Paracas Necropolis period textile. The UV-vis spectrum for the peak at 10.5 min (b, inset) is consistent with that of purpurin from *Relbunium*. No major peaks were observed at 350 nm and none could be identified as any of the known yellow components. No signal consistent with any of the yellow colorants was observed above 1% relative abundance by DART-MS; the negative ion spectrum (c) shows only purpurin and caffeic acid.



Supplementary Figure S22. Example chromatogram at 375 nm (a) for the deteriorated brown fibers from 421-132 03096 (brown). The chromatogram from the gold yarn consistent with *Bidens* or *Coreopsis* is shown in gray for comparison. A trace of butein may be present around 8.6 min, but the poor signal-to-noise ratio limits the identification. Several signals consistent with yellow colorants from *Bidens* or *Coreopsis* were observed both by negative ion DART-MS (b) and paper spray mass spectrometry (c); no glycosides were detected, likely due to the sample extraction in methanol:HCl.

