



PRELIMINARY ASSESSMENTS OF THE COLOUR PATTERNS OF TAPEJARID PTEROSAURS FROM THE CRETACEOUS CRATO FORMATION (ARARIPE BASIN, NE BRAZIL)

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ABSTRACT: Since 2008, the identification of melanosomes in fossils of exceptional preservation have enabled palaeontologists to suggest the possible colour patterns and physiological traits of many extinct animals. Melanosomes are organelles responsible for the synthesis and storage of melanin, the commonest type of natural pigment. Among all types, the eumelanin is produced by eumelanosomes, whose morphology can be oblate to rod-shaped, and size varying between 0.12 to 2.0 μm . As pterosaur lineages were extinct at the end of the Cretaceous Period, leaving no descendants, and because few specimens exhibit preservation of soft tissues, the presence of these organelles remain poorly known for this group. In the present study, small fragments of the headcrest of two Tapejarid pterosaurs were collected and examined under electron microscope and chemical techniques. The specimens *Tupandactylus imperator* and *Tupandactylus navigans* are preserved in micritic limestones from the Crato Formation (Araripe Basin, NE Brazil). The result of the SEM-EDS analysis in *T. imperator*, revealed the presence of oblate microbodies consisted mainly of C and P, whereas in *T. navigans* they are rod-shaped and composed by Fe and O. SR- μ XRF indicated additional elements in both specimens, such as Cu, Mn, Sr and Zn; all occurring as trace amounts. Raman Spectroscopy of *T. imperator* exhibited bands typical of eumelanin, whereas in *T. navigans* they showed spectra of iron oxyhydroxides. The melanin spectra are also supported by the oxidation process and HPLC analysis, which revealed the presence of eumelanin chemical markers, the pyrrole-2,3,5-tricarboxylic acid (PTCA), pyrrole- 2,3,4,5-tetracarboxylic acid (PTeCA) and pyrrole-2,3-dicarboxylic acid (PDCA). Considering the morphology of eumelanosomes and their chemical ID, it is possible to speculate that both *T. imperator* and *T. navigans* had a dark brown to matte black headcrest. However, questions regarding these pigments have also emerged. For instance, why melanosomes were preserved differently, and how it occurred? Because both species share overall similarities, it is also possible that colour patterns may represent a display trait, which it could mean the existence of sexual dimorphism in Tapejaridae. Aside these questions, we expect that more evidences will shed light on the palaeobiology and taphonomy of Crato pterosaurs. [GMEMP Scholarship: CAPES]

KEYWORDS: Melanin, Melanosomes, Pterosaurs, Palaeocolour, Crato Formation