



Contribution ID: 4

Type: Oral Presentation

## The nanoscale structure of the Octopus ink: *Sepia melanin*

*Monday, 22 March 2021 15:20 (20 minutes)*

*Sepia melanin* isolated from the ink sacs of *Sepia officinalis*, is commonly used as standard in many research activities on melanin such as photobiology and photoreactivity of skin pigments. Melanins are difficult to characterize because of their intractable chemical properties and the heterogeneity in their structural features. Melanin pigments, in fact, are composed of many different types of monomeric units that are connected through strong carbon-carbon bonds. Its high insolubility and undefined chemical entities are two obstacles in its complete characterization. The morphological characterization and particle size distribution for *sepia melanin* by Scanning Electron Microscopy (SEM) on surface structure and Transmission Electron Microscopy (TEM) to confirm the morphology obtained from SEM was done. Both results show that *Sepia melanin* is formed by many aggregates agglomerated together. These aggregates are formed also by small spherical granules with different size distributions that have been determined using image-J software. The small granule diameter obtained from different TEM and SEM micrographs were 100-200nm. EDS reveals that C and O were the most abundant in *sepia melanin* with concentration average concentrations of about 57% and 24% respectively. The major compositions of *sepia melanin* are C, O, Na, Cl, while the minor are Mg, Ca, K, S and N. From TEM micrograph at high resolution, it was possible to measure the distance between polymers layers of *sepia melanin* using image-J software and it was 0.323 nm = 3.23 Å.

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**Session Classification:** Molecular biophysics

**Track Classification:** Molecular biophysics