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Variable pressure scanning electron microscopy (VPSEM) and atomic absorption spectrometer characterization of *Zea mays* (Maydis stigma) hairs

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Abstract

Rhetorically, primitive and ancient civilizations have long relied on dietary minerals in the prevention of diseases. Being elemental atoms, minerals, in contrast to micro molecules do not undergo changes during digestion. Major minerals serve as structural components of tissues, function in cellular and basal metabolism, and in water and acid-base balance. The soft textured *Zea mays* (Maydis stigma) hairs are a well-organized collection of stigmas of the corn maize that historically as ancient as the Aztec civilization was cited for traditional medicinal care. In modern medicine, it was used as a mild diuretic, urinary demulcent and for the management of bladder irritation (due to uric acid and phosphatic gravel). This study revisits the *Zea mays* to elucidate its reported therapeutic prowess by initiating a high-resolution microscopical inspection and its micronutrients using VPSEM, EDX and AAS. Results: The outermost film of the corn hairs soaked in ethanol manifest a very smooth, nodenatured like surface. While cross-sectional view of fresh corn silk samples revealed microtubules of non-homogenous diameters and size configurations. The measured diameter of the porous tubules ranges from 58 - 101 μ m. The amounts of Ca, Mg, Na and K on raw freshly harvested and oven dried corn hair were comparatively higher than the amounts of other minerals. The concentration of Ca in fresh and oven dried corn hair was accounted for 546 and 323 mg/L, respectively and significantly higher than the values of corn silks macerated with NaOH (108 mg/L) and NaHClO (7.58 mg/L), respectively. In conclusion, ethanol is an excellent preservative for cornsilk by revealing a smooth non-denatured surface of corn silk while NaOH and NaHClO is detrimentally and distorted natural cytoskeleton of the tissues by removing essential organic and inorganic components. The highest mineral contents presented in raw freshly harvested and oven dried corn silk were Ca, Mg, K and Na.

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