

IFM surface profiler, μ CT 3D SCAN, and electron microscopical investigation of ‘*Sanggul Fatimah*’ (*Anastatica Hierochuntica L*)

Farid Che Ghazali

School of Health Sciences Universiti Sains Malaysia, Health Campus,
Kubang Kerian, Kelantan, Malaysia 16150

farid@kb.usm.my

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Malaysia is blessed with natural products that represent a valuable source of bioactive agents with potent and unique medicinal properties. However, many of these natural products (marine or herbal) are not strictly pharmaceutical products (real medicines) but represent a novel class of dietary supplements or nutraceuticals or exploited in traditional medicines. Traditional medicines has not only been used for primary health care of the poor in developing countries but has also been used in countries where conventional medicines are predominant. This have causes commercial exploitation that has endangered species of therapeutic natural products. In order to clarify and ascertain the identities and properties of the species, effort by utilizing high-resolution electron microscopy is now being pursued as a prelude and to harness the taxonomical identity and chemical characterization of therapeutic potentials of these natural products.

‘*Sanggul Fatimah*’ or *Anastatica Hierochuntica L*. (The True Rose Of Jericho), a resurrection plant, is a very well-known traditional herbal remedy closely associated with and consumed minutes prior to labor. This is a rhetoric practice among the Malay Kelantanese women where its tea is believed to help ease childbirth. In the course of our research interest in identifying the most sort herbal during pregnancy and post-partum in Malaysia, we have include a surface morphological characterization of *Anastatica Hierochuntica L* that was observed under the variable pressure scanning electron microscope (VPSEM). Scanning electron microscopical characterization of this plant is virtually a research lacuna. Information on this herb of the Negev and Sahara Desert is important, as it will affect for the women’s attitudes and practices.

The supra variable pressure scanning electron microscope study of these plants that dies and dries up, curling its stems into a tight ball revealed a surface characterization built-up of pebbles-like structures, asinus rings with thick tunica, an overwhelming soft lamellated surface and spiky coral-like or torn-like structures closely associated with the raised pedunculated putative shoots of cactus-like feature highly prominent in the stem.

Microdiffraction analysis (EDX) of the herb revealed inert significant presence of carbon, oxygen, silica, calcium, magnesium, aluminum, potassium, zinc and iron. Although silica is quite significant in major probe areas, the topographical distributions of these periodic elements are non-homogenous. The combination silica and calcium may be associated with bones repairs and help form collagen. This suggests that the folkloric use of *Anastatica Hierochuntica L*. in labor and post labor will enhance good tissue and organ repair. The microdiffraction analysis also suggest therapeutic potential role as a adjuvant supplement in the improvement in bone density and in the prevention of osteoporosis.

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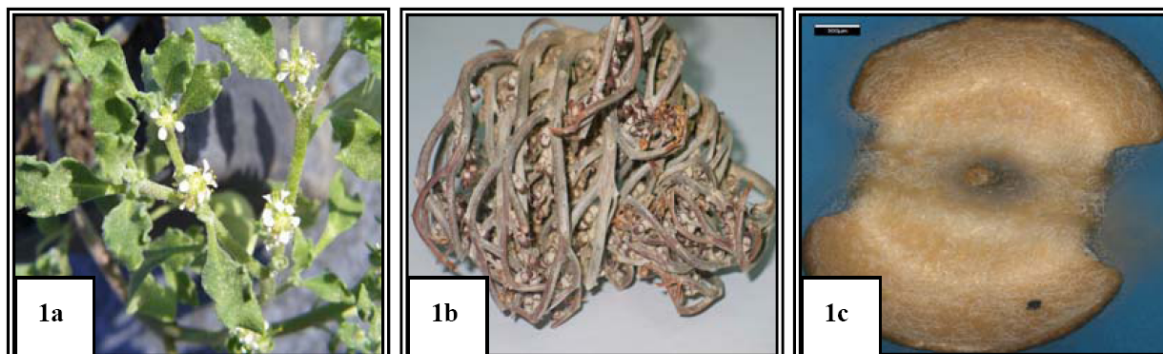


Figure 1. **a** Stereo-photomicrograph of the fresh *Anastatica Hierochuntica* with white flowers. **b**. The dried *Anastatica Hierochuntica*: indurated curled up, dormant and brown in color. **c**. IFM true colour surface profiler of the flower and stigma.

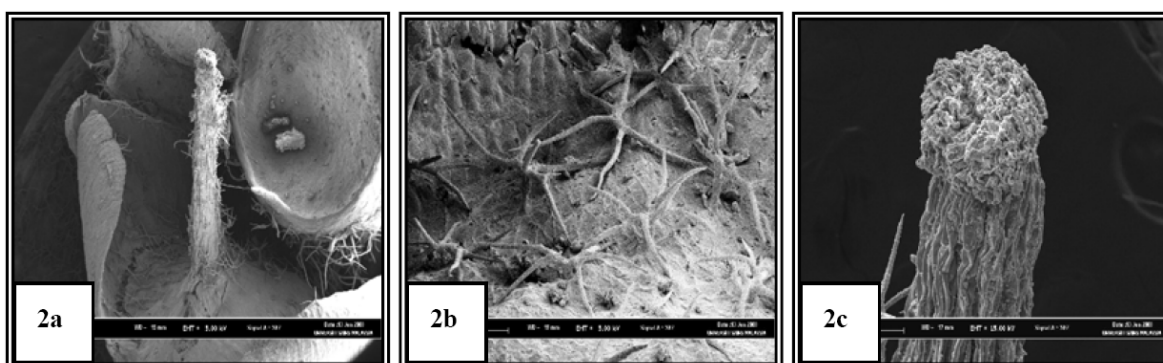


Figure 2. **a**. The central core of *Anastatica Hierochuntica L* petals revealed a raised stigma. **b**. Numerous stellates raised as singular inoculums or out-budding from the flower petal epidermal surface. Each end point is sharp horn-like prominences. **c**. The elongated stigma with its putative pollen.



Figure 3. The cross sectional image of the central core and cortical thickness of *Anastatica Hierochuntica L*, flower with a raised stigma. Scanco μ CT-35 Scan. Energy 45 kVp, image matrix 2048 x 2048 x 925 pixel