In situ starch localisation in *Cocos nucifera* L. and *Elaeis guineensis* Jacq.: the major reserve carbohydrate in these *Arecaceae* or not ?

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Carbohydrates accumulated in plants can later be mobilized to support biosynthesis for metabolism and growth particularly during periods of low assimilation (dry season), or after biotic or abiotic stresses. So, they play an important role in plants functioning. Starch is considered as the most important reserve carbohydrate in plants. Its content has been often used as sole indicator of a carbohydrate surplus over current needs, more generally, of carbohydrate status of plants. The subject is well documented for temperate and fruit-bearing species, little for tropical perennial species and almost none for *Arecaceae*. The distribution of starch was investigated on the basis of histological studies in all vegetative organs of adult coconuts (20-years old) and oil palms (12-years old) and compared. The anatomy of the studied organs has been described. Except for roots and leaflets, coconut and oil palms were characterized by anatomical structure uniformity. In the stem, many vascular bundles and groups of fibres were distributed in a parenchyma with small cells. Vascular bundles density decreased from the outer periphery of stem to the inner part, whereas their size showed reverse gradient. Starch grains were absent in roots, leaflets and lower parts of stem. They were found primarily at mid-height of stem, sometimes at its top and in leaf petioles and rachis, although these observations varied considerably among plants. Starch accumulates mainly in the parenchyma of bark and wood of trees. In coconut and oil palm, starch grains were located mainly in the reserves parenchyma cells and very little in the vascular bundles. In parallel, quantitative biochemical analyses confirmed our anatomical observations. Starch appeared in coconut and oil palms as not a major storage carbohydrate compared with soluble sugars like sucrose and glucose. Coconut and oil palms are characterized under optimal conditions by continuous vegetative growth and fruits production with a high caloric content (68-80% of stored lipids in the mature fruit). In order to meet quickly and continuously these very consuming needs for energy, storage in the form of soluble sugars seems well to be adapted to the functioning of coconut and oil palms (with a rapid adjustment of the mobilisable carbon level according to the needs). However, the starch pool varied clearly (in time) according our initial experimental conditions (e.g. a recovery after a pathological stress on coconut palm). For this reason, starch, even if there was little, could be a good indicator of a temporary carbohydrate surplus exceeding plant demand like numerous temperate woody species and, in our case, a good indicator of phytosanitary status. After hydrolysis, starch would seem to help occasionally in achieving optimum productivity again.

Keywords:
starch – anatomy – oil palm – coconut – vegetative organs – storage carbohydrates