Studies of abscisic acid, cytokinins and gibberellins in maturing fruits of the oil palm (Elaeis Guineensis Jaquin).

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Abstract:

Maturing fruits of the oil palm (Elaeis guineensis JaCquin), were analysed for endogenous abscisic acid, cytokinin and gibberellin activities in relation to the growth rates of such fruits. Soybean callus bioassay was used to determine cytokinin activity both in n-butanol fractions, paper chromatographed and developed in n-butanol: acetic acid: water solvent system and in dried, 35% ethanol eluates from LH-20 Sephadex chromatographyl Lettuce hypocotyl and lettuce germination bioassays were used to determine the respective activities of ethyl acetate- and n-butanol- soluble gibberellins and diethyl ether-soluble abscisic acid after subjecting both to thin layer chromatography on silica gel. Developing solvent system for gibberellins was isopropanol: water, while benzene: ethyl acetate: acetic acid was for abscisic acid.

The results of the bioassays showed that the hormone activities occurred mainly at R_f values of 0.1-0.2, 0.4-0.5 and 0.7-0,9 for cytokinins; 0.1-0.2; 0.3-0,5 and 0,6-0,8 for gibberellins and 0.4-0.5 for abscisic acid. Co-chromatography with authentic growth substances gave R_f values at 0.7-0.8 and 0.8-0.9 for zeatin and zeatin riboside respectively; 0.7-0.8 for gibberellic acid and 0.4-0.5 for abscisic acid.
The drupaceous oil palm fruits increase in growth with time and produced a sequence of gibberellins, abscisic acid and cytokinins, each with four peaks of activity, the fluctuating level of which could be linked to the accelerating, deceleration and asymptotic growth phases. Endogenous gibberellic acid and abscisic acid were tentatively identified in this study. High levels of free gibberellins occurred in the young fruits while the conjugated forms predominated in the mature ones.

Four of the six isolated endogenous cytokinins were tentatively identified as zeatin, zeatin riboside, isopentenyladenine and isopentenyladonosine. Although the interconversion between ammonia- and water-soluble cytokinins presented an inconsistent pattern, yet the decrease in the free cytokinins was concomitant with an increase in the conjugated forms in the water-soluble fractions during fruit maturation.

Keywords: Abscisic/ cytokinin/ gibberellin/ oil/ palm/ chromatography/ fruit

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