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SHORT COMMUNICATION

PLASTID PIGMENTS OF BLACK PEPPER CULTIVARS UNDER HEAT STRESS

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An index for thermostability in chlorophyll and carotenoid pigments in the cultivars of black pepper was evaluated. The studies suggest that chlorophyll/carotenoid ratio can be used as an index for stress studies.

The relationship of photosynthetic efficiency and overall productivity with plastid pigments has been correlated in coconut (Mathew and Ramadasan, 1975), arecanut (Yadav and Mathai, 1972). Chlorophyll stability index is designated as one of the parameters for stress studies in coconut (Mathew and Ramadasan, 1973) and cocoa (Ravindran and Menon, 1981). Relative degradation of chlorophyll pigments during stress has been reported in black pepper (Kurup and Vijayakumar, 1987). The importance of carotenoids as protective pigments under stress conditions cannot be overlooked (Burnett, 1976). Hence a study on the role of chlorophylls and carotenoids in black pepper during stress was conducted.

Leaf discs of recently mature leaves of ten black pepper cultivars viz., Karimunda, Kottanadan, Neelamundi, Thommankodi, Narayakodi, Kuthiravally, Arakulam munda, Aimpirian and Panniyur-1 were used for pigment extraction. Total chlorophylls (chl) and carotenoids (car) from control and heat treated (a+60° C) samples were estimated as per the method of Weybrew (1957).

Data on total chlorophylls and total carotenoids content are presented in Table I. Total chlorophylls and carotenoids varied from 1.2-4.9 mg/g and 0.3-1.3 mg/g and the highest being in Panniyur-1. The per cent reduction in chlorophylls and carotenoids varied from 25-73 and 24-57 respectively and maximum reduction being in Panniyur-1 followed by Karimunda. In other cultivars such as Neelamundi, Thommankod, Narayakodi, Kuthiravally and Kalluvally, the per cent reduction of carotenoids was negligible. It was observed that those cultivars where reduction in pigments was high, the chlorophyll carotenoids ratio was also high.

Table I. Plastid pigments, %reduction and Chlorophyll/carotenoid ratio at ambient and 60°C temperature in black pepper (*Piper nigrum* L.).

Cultivar	Total Chl. mg/g fr. wt.	Total Car mg/g fr. wt.	% Reduction Cal.	% Reduction Car.	Chlorophyll/Carotenoid rates Ambient	Chlorophyll/Carotenoid rates 60°C
Karimunda	2.7	0.8	73.5	40.5	3.49	1.53
Kottanandan	2.4	0.6	62.7	29.2	3.88	2.01
Neelamundi	2.1	0.6	44.3	—	3.51	1.93
Thommankodi	1.5	0.5	28.4	—	3.10	1.74
Narayakodi	1.4	0.4	25.6	—	3.25	1.83
Kuthiravally	1.6	0.5	32.9	—	3.36	2.20
Kalluvally	1.2	0.3	33.4	—	3.63	1.94
Arakulam munda	2.2	0.6	59.6	24.8	3.98	2.14
Aimpirian	2.5	0.6	54,0	30 1	3.95	2.57
Panniyur-1	4.9	1.3	73.6	57.0	3.76	3.28

—Negligible.

Albert *et al.* (1977) mentioned that minimum reduction in chloroplast is related to tolerance. In the present study, the cultivar variation for chlorophyll carotenoids ratio is not pronounced. However, in the heat treated cultivars a differential response was observed. The study indicates that chlorophyll/carotenoid ratio can possibly be used as an index for stress studies in black pepper.

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