

TABLE III

METABOLITE LEVELS IN WHOLE LEAF TISSUE ON PLANTS IN A 24 h LIGHT-DARK REGIME

Intact spinach plants were grown in a 10 h light/14 h dark regime in hydroponic culture. Three samples, each of four leaf discs (fresh weight 90 mg), were collected from matched leaves after: 10 h light; 10 h light and 0.25 h dark; 14 h dark; and 14 h dark plus 0.25 h light. The discs kept under the prevailing light regime, were quenched in liquid N₂, extracted at -5°C in 20% (v/v) HClO₄, neutralized and assayed for substrates (see Methods). Chlorophyll was determined in parallel samples extracted in darkness in 80% acetone. The data for intact protoplasts are taken from experiments reported in Table II. All results are given as the mean ± S.E. of three replicates. The starch was measured in a separate experiment as in Ref. 35). n.d., not determined.

| Compound | Amount (nmol/mg chlorophyll) in | | | | | |
|------------------------|---------------------------------|----------------------------------|------------|----------------------------------|----------------------|-------------|
| | whole leaf tissue after | | | | isolated protoplasts | |
| | 10 h light | 10 h light and 0.25 h dark | 14 h dark | 14 h dark and 0.25 h light | dark | 4 min light |
| Glc-6-P | 176 ± 17.0 | 40 ± 5.5 | 132 ± 11.1 | 148 ± 8.5 | 142 ± 28 | 84 ± 17 |
| Fru-6-P | 61 ± 10.3 | 17 ± 4.3 | 44 ± 3.8 | 41 ± 4.9 | 48 ± 14 | 33 ± 6 |
| Fru-1,6-P ₂ | 41 ± 1.8 | 5 ± 0.5 | 10 ± 1.6 | 26 ± 0.8 | 8 ± 3 | 32 ± 5 |
| Triose-P | 40 ± 5.2 | 10 ± 0.6 | 19 ± 3.8 | 35 ± 3.7 | 33 ± 2 | 58 ± 1 |
| 3-Phosphoglycerate | 251 ± 17.9 | 108 ± 7.4 | 263 ± 13.3 | 369 ± 12.6 | 87 ± 9 | 94 ± 5 |
| Rib-1,5-P ₂ | 62 ± 4.5 | 7 ± 0.3 | <0.5 | 44 ± 5.1 | 12 ± 1 | 19 ± 4 |
| UDPglucose | 18 ± 0.7 | 10 ± 3.7 | 19 ± 2.2 | 18 ± 2.2 | 30 ± 3 | 13 ± 3 |
| Free hexose | 11 284 | 10 920 | 4149 | 5669 | 528 | n.d. |
| Hexose in starch | 29 900 | n.d. | 970 | n.d. | n.d. | n.d. |