Simple method for simultaneous determination of chlorophyll and carotenoids in tomato fruit

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The contents of chlorophyll and carotenoid in tomato fruits have been analyzed respectively by different methods in a conventional way. We studied simple method for simultaneous determination of pigments in tomato. All pigments in sample are extracted with acetone-hexane (4:6) at once, then optical density of the supernatant at 663nm, 645nm, 505nm and 453nm are measured by spectrophotometer at the same time. From these values, the content of chlorophyll a, b, lycopene and β-carotene could be estimated using our proposed equations. Tomatoes of different ripening stage were analyzed by our method. Also the same samples were analyzed by conventional methods. The results by our method were similar to those of chlorophyll contents by Mackinney’s method and of lycopene contents by Kimura’s method. It confirmed the availability of our method.


Equation (2)

\[ \text{Chlorophyll a (mg/100ml)} = 0.999A_{663} - 0.0989A_{645} \]
\[ \text{Chlorophyll b (mg/100ml)} = -0.328A_{663} + 1.77A_{645} \]
\[ \text{Lycopene (mg/100ml)} = -0.0458A_{663} + 0.204A_{645} + 0.372A_{505} - 0.0806A_{453} \]
\[ \text{β-Carotene (mg/100ml)} = 0.216A_{663} - 1.22A_{645} - 0.304A_{505} + 0.452A_{453} \]

*(A_{663}, A_{645}, A_{505} and A_{453} are absorbance at 663nm, 645nm, 505nm and 453nm each other.)*
Fig. 1. Tomato samples at various ripening stage.

Fig. 2. One gram sample in test tube.

Fig. 3. Acetone-Hexane (4:6) 10-20 mL/tube.

Fig. 4. Homogenization.

Fig. 5. Measurement of UV spectra.

Fig. 6. Extract of tomato pigment.