The Estimation of Tomato Solids by Determination of Lycopene

By O. B. Darbishire

(*Crosse & Blackwell Laboratories, 36 Crimscott Street, London, S.E.1*)

Stock[1] gave widely differing figures for the lycopene content of tomatoes, but quite a narrow range, 1462 to 1856 p.p.m., for tomato purées. It was concluded that lycopene can be a fairly accurate index of tomato content of products made from tomato purée. In our experience with various commercial purées, we have found considerably more variation.

The extinction coefficient, $E^{1\%}_{1\,cm}$, was first determined on a sample of lycopene extracted from tomato purée and recrystallised from light petroleum. It was found to be 2820 at 505 mμ in light petroleum by using a Unicam SP600 spectrophotometer. (Messrs. Roche Products supply a synthetic lycopene and specify $E^{1\%}_{1\,cm}$ as 2850 at 508 to 511 mμ in cyclohexane.) Stock assumed $E^{1\%}_{1\,cm}$ for lycopene at 505 mμ to be 2000, but the difference can be explained by differences in the

wave-band width of various instruments. At the sharp absorption peaks shown by lycopene, an instrument with a wide wave-band will necessarily give a lower maximum reading than one that covers a narrow band only.

The method of extraction was to shake very vigorously 50 ml of a 0·2 per cent. aqueous suspension of purée with 25 ml of light petroleum, boiling-range 80° to 100° C, after which the mixture was shaken for 15 minutes in a mechanical shaker. With this procedure it is considered that almost complete extraction is achieved. A sufficient portion of the clear extract is drawn off into a 1-cm cell and the extinction coefficient measured at 505 mμ against light petroleum.

Table I gives the results of routine tests on commercial purées received during the past 12 months. Some were samples submitted by our purchasing department, and all samples were of approximately 28 to 30 per cent. concentration.

TABLE I

RESULTS FOR COMMERCIAL TOMATO PURÉES

Lycopene found in dry solids, p.p.m.							
Italian purée			Portuguese purée		Spanish purée		Czech purée
980*	1160	1510	1220	1740	940*	1550	1330
1070	1210	1530	1310	1740	1000*	1580	
1070	1270	1570	1330	1760	1030	1790	
1120	1280	1590	1340	1780	1100*	1800	
1130	1420	1610	1380	1810	1340		
1130	1440	1860	1440	1810	1420		
1150	1480	2000	1620		1550		

Mean value = 1420 p.p.m. Standard deviation = 275 p.p.m.

* Purée rejected as visually unacceptable by our standards.

The inference from these figures is that lycopene determination can give only a rough estimate of the tomato content of a food.

REFERENCE

1. Stock, F. G., *Analyst*, 1950, **75**, 117.

Received *December 2nd*, 1964