Journal of Automatic Chemistry/Journal of Clinical Laboratory Automation, Vol. 7, No. 4 (October–December 1985), pp. 204–205

Measurement of serum AST activity using the Seralyzer system

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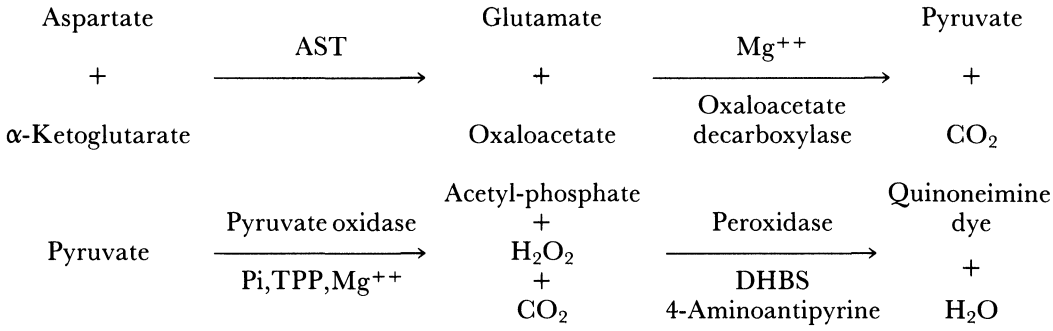
The performance of the Seralyzer reflectance photometer system [1] for the measurement of various analytes [2 and 3] and for the enzymes CK and LDH [4] has been previously reported by the authors. This paper describes an evaluation of a new assay for AST (Aspartate Transaminase) determination.

The Seralyzer AST system (Ames Division) is based on the measurement of the rate of formation of a quinoneimine dye at 530 nm at a temperature of 37 °C, with an incubation and test period of 4 min. Serum specimens are diluted 1 in 3 prior to analysis; for AST activities above 250 IU/L a further nine-fold dilution is required. The reaction sequence is shown below:



Comparisons were made with the Centrifichem (Baker) ultra-violet method using Boehringer reagents supplied for this system (BCL), also performed at 37 °C. Normal and high control sera (pooled normal control sera, and Dade II control serum, respectively) were used for precision measurements, while 183 routine hospital clinical serum specimens were analysed in duplicate by both methods. Total bilirubin estimations were also made.

The between-run and within-run precision figures were obtained from the control sera included in each batch of analyses, and from the patient sera analysed in duplicate, respectively (table 1). The within-run precision showed no difference between the Seralyzer and the Centrifichem (SD 1.66 and 1.78 IU/l respectively). The between-run precision showed a better performance for the Centrifichem than the Seralyzer (SD 2·5 as opposed to 6·4) and this probably reflects the smaller batches used with the Seralyzer requiring a calibration for each batch—for the purpose of this study only. In practice, the Seralyzer calibration would not be redone unless the batch of strips were changed or the control values were out of range. The precision was acceptable for clinical purposes. When comparing the two systems for accuracy (table 2), the Seralyzer and the Centrifichem showed a good correlation over the range 0–250 IU/l (r = 0·95, slope = 0·95). Samples with values over 250 IU/l on the Seralyzer are repeated in dilution, and the correlation over the whole range was equally good (r = 0·93, slope = 0·95).

The results from the Seralyzer on patient sample were on average 6·7% higher than the Centrifichem values. The

Table 1. Analytical precision of Seralyzer and Centrifichem AST methods—using control sera, and duplicate testing of patient sera.

	Between-run		Within-run
	Low control	High control	Patient sera duplicates
Seralyzer:			
Mean (IU/L)	36·4	130·7	86·9
S.D.	5·2	7·6	1·66
Centrifichem:			
Mean (IU/L)	23·3	98·3	81·5
S.D.	2·5	2·5	1·78
N	23	23	183

Table 2. Linear regression comparison of accuracy of Seralyzer and Centrifichem AST results, using clinical serum specimens.

AST range	*N*	Intercept	Slope	Correlation coefficient
0–250	170	7·83	0·95	0·95
0–700	183	7·97	0·95	0·93

differences in the control sera were greater, but this difference is probably due to a matrix effect affecting the two methods differently.

Values for control sera and normal ranges should, therefore, be determined for the Seralyzer AST method before routine use of the system.

In many analyses, bilirubin is said to be a possible interfering substance, and for this reason total bilirubin was measured at the same time as the AST levels. Although the bilirubin values covered the range 0–280 μmol/l, no direct effect of bilirubin on either method could be demonstrated.

In summary, a rapid (4 min) AST method is now available, which is simple to use by the trained operator, and which demonstrates performance essentially equivalent to conventional high-cost, automated laboratory methodology. The Seralyzer AST system would be especially suitable for emergency or out-of-hours estimations in this routine hospital laboratory, particularly where this is accompanied by rapid CK measurements on the same system.

References

1. Zipp, A., *Journal of Automatic Chemistry*, **3** (1981), 71.
2. Stevens, J. F. and Newall, R. G., *Journal of Clinical Pathology*, **36** (1983), 9.
3. Stevens, J. F., Tsang, W. and Newall, R. G., *Journal of Clinical Pathology*, **36** (1983), 598.
4. Stevens, J. F., Tsang, W. and Newall, R. G., *Journal of Clinical Pathology*, **36** (1983), 1371.

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