

Lipaemic clearing: the effect of LipoClear on a range of chemistry analytes

The presence of lipid in a grossly lipaemic plasma/serum sample can have significant effects on various chemistry parameters and is a problem in many routine biochemistry departments. In a small study, Jessica Thibeault looks at the effect of an innovative clearing system.

Lipaemia in plasma/serum can result in a sample that is simply too cloudy to be read on a chemistry analyser, making it necessary to use time-consuming manual techniques. Now, a complete system for clearing lipaemic samples has been available from Rapid Sample Processing for a couple of years. The simple system involves the addition of a lipaemic serum/plasma sample to a StatSpin LipoClear prefilled tube, mixed and left to stand for five minutes. The sample is then centrifuged to concentrate the lipid at the bottom of the tube.

StatSpin also offers a choice of centrifuges that are ideal for dealing with lipaemic samples. Using the StatSpin MP centrifuge, two lipaemic samples can be cleared in just 95 seconds. Alternatively, using the StatSpin Express 2, up to four samples can be processed in three minutes. The final option is the StatSpin Express 3, which can process up to eight samples in three minutes.

Once centrifuged, the clarified sample is removed for analysis and the results are multiplied by a factor of 1.2 when finished.

Effect on analytes

Recently, a study investigated use of the LipoClear lipaemic clearing agent in order to confirm that it does not interfere with the methodologies used for the determination of the most

‘Clearing involves addition of a lipaemic serum/plasma sample to a LipoClear prefilled tube, which is centrifuged after standing for five minutes’



Fig 1. The StatSpin MP centrifuge system, which can clear two lipaemic samples in just 95 seconds.

TABLE 1. STATISTICAL DETAILS OBTAINED IN THE STUDY OF THE EFFECT OF LIPOCLEAR ON COMMON BIOCHEMICAL ANALYTES.

	Mean	SD	Corr Coef	P value
Glucose	93.5	17.5	0.983	0.076
BUN	15.5	9.9	0.997	0.080
Creatinine	0.88	0.16	0.954	0.003
Albumin	4.43	0.22	0.890	0.000
Total protein	7.26	0.50	0.659	0.000
Calcium	8.98	0.46	0.937	0.000
Urid acid	5.18	1.63	0.993	0.006
Total bilirubin	0.61	0.78	0.965	0.000
LDH	145.0	18.2	0.953	0.000
CPK	127.0	117.5	0.999	0.000
Alkaline phosphatase	70.87	14.1	0.987	0.000
SGPT	17.73	6.8	0.936	0.096
SGOT	18.6	7.5	0.941	0.008
GGPT	25.83	21.6	0.999	0.001
Amylase	43.36	15.9	0.986	0.000
Sodium	136.9	3.5	0.886	0.456
Potassium	3.99	0.33	0.952	0.030
Chloride	102.27	2.9	0.902	0.443
CO ₂	24.6	1.8	0.888	0.000
TSH	1.45	0.89	0.991	0.446
T4	6.36	1.7	0.968	0.000
Troponin 1	NA	NA	NA	NA
CKMB	1.67	1.3	0.957	0.000

'A slight decrease in total protein was observed, which confirmed the findings reported by previous studies'

On obtaining the results, the values obtained from the treated samples were multiplied by a factor of 1.2 in order to account for the dilution factor introduced by the clearing of lipid by the LipoClear reagent (Fig 2).


Statistical clarity

Most analytes tested presented acceptable correlation coefficients in the range 0.886–0.999. These analytes included Glu, BUN, Creat, Alb, Ca⁺⁺, uric acid, T Bili, LDH, CPK, Alk Phos, SGPT, SGOT, GGPT, Amy, Na⁺, K⁺, Cl⁻, CO₂, TSH, T4 and CKMB. In the main, probability (*P*) values were low; however good correlation was noted and accepted based on the comparative values.

Total protein was slightly decreased in the study, although this finding had been noted in previous studies and was highlighted in the LipoClear product insert. The effect on troponin I could not be calculated because all the samples analysed in the study had troponin levels that were undetectable. Full statistical details are shown in Table 1.

Good correlation

The data obtained from this limited study revealed that total protein values are slightly decreased when treated with LipoClear, a finding that confirms the results of previous studies. This effect may be due to the binding of high-density proteins. With the exception of total protein, all other LipoClear-treated samples tested produced acceptable correlation when compared to the results obtained on untreated samples.

Clearly, LipoClear provides a fast and reliable method of enabling lipaemic samples to be read on an analyser, and currently is used by around 50 NHS trusts across the UK. 

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common chemistry analytes tested in the clinical laboratory.

Thirty volunteers each provided a lithium heparin plasma sample that was split into two aliquots. One aliquot was treated with LipoClear while the other aliquot was tested without prior pre-treatment of any kind. All the samples tested were non-lipaemic in order to maintain an accurate baseline. The sample tubes were separated using a StatSpin MP, which spins for 95 seconds at 15,800 rpm (Fig 1).

Each sample was tested for a wide range of analytes including glucose (Glu), blood urea nitrogen (BUN), creatinine (Creat), albumin (Alb), total protein (T Prot), calcium (Ca⁺⁺), uric acid, total bilirubin (T Bili), lactate dehydrogenase (LDH), creatinine phosphokinase (CPK), alkaline phosphatase (Alk Phos), serum glutamate pyruvate transaminase (SGPT, ie alanine aminotransferase [ALT]), serum glutamate oxaloacetate transaminase (SGOT, ie aspartate transaminase [AST]), geranylgeranyl protein transferase (GGPT), amylase (Amy), sodium, (Na⁺), potassium (K⁺), chloride (Cl⁻), CO₂, thyroid stimulating hormone (TSH), thyroxine (T4), troponin I and creatine kinase MB (CKMB).

Various methodologies were used in the testing of the above analytes. For example, TSH, T4, troponin I and CKMB were all tested on a Bayer Centaur; electrolytes (Na⁺, K⁺, Cl⁻) were performed via indirect ISE methodology and the remaining analytes were determined on an Olympus AU 400 analyser. The samples were processed and treated according to the LipoClear product insert sheet.



Fig 2. The effect of the StatSpin LipoClear system on a lipaemic sample, showing the clearing achieved (right) after centrifugation.