



## Evaluation of the Bentley ChemSpec 150 Standard Error of Estimates (Sy,x) against the pH Differential Reference Method for the Routine Analysis of Urea in Raw Milk.

The ChemSpec standard error of estimates (Sy,x) was estimated by compiling the National DHIA Urea Ring Test reports from January to August 2002.

Each month Eastern Laboratory Services (ELS) selects 12 bulk tanks of milk from commercial dairy farms. The tanks are selected to have a wide range of composition for urea, fat, protein, and somatic cell counts. Each tank is thoroughly mixed and samples are drawn for use in Quality control testing. Sets of 24 samples (2 samples from each of the 12 bulk tanks) are sent to each DHIA laboratory and to the reference testing laboratories. The samples are analyzed by all the laboratories and the results are sent to the National DHIA office where the data are compiled.

The chart below (chart 1) presents the data from 12 laboratories equipped with the ChemSpec 150. The ChemSpec were calibrated with a single milk standard provided by the manufacturer. The ChemSpec standard error of estimates (Sy,x) against the pH differential reference method are presented for each laboratory and for the eight different sets of samples sent from January to August 2002. The 2088 samples were analyzed by the ChemSpec at an analytical speed of 150 samples/hour and by the reference method and the mean values were used to compare the methods. The results are expressed in mg urea / 100 ml. This study reveals a very good relationship between the ChemSpec and the pH differential method with an overall standard error of estimates (Sy,x) of 0.74 mg urea/dl, well within the manufacturer specification (Sy,x < 1.00 urea mg/dl). The overall standard error of estimates (Sy,x) is significantly improved when removing the results from laboratory N° 9 with a Sy,x of 0.68 mg/dl.

Chart 1 . ChemSpec standard error of estimates (Sy,x) compare to the pH Diff. Method

Laboratories/Month	Jan.	Feb.	March	April	May	June	July	August	Mean
Lab # 1	0.51	0.41	N/A	N/A	N/A	N/A	N/A	N/A	0.46
Lab # 2	0.90	0.56	0.62	0.66	0.58	0.45	0.64	0.54	0.62
Lab # 3	0.51	0.51	0.71	0.92	0.77	0.79	0.58	0.62	0.68
Lab # 4	0.36	0.79	0.84	0.71	0.77	0.86	0.82	0.62	0.72
Lab # 5	0.43	0.45	0.73	0.51	0.43	0.56	0.43	0.45	0.50
Lab # 6	0.47	0.43	0.64	0.73	0.51	0.88	0.75	0.97	0.67
Lab # 7	0.79	0.79	0.49	N/A	0.88	0.60	0.84	0.86	0.75
Lab # 8	0.75	N/A	1.18	1.18	1.14	0.69	0.73	0.47	0.88
Lab # 9	2.19	0.30	0.58	0.62	0.75	1.74	2.53	2.21	1.36
Lab # 10	0.54	0.71	0.39	0.54	0.77	0.97	0.64	0.73	0.66
Lab # 11	0.66	1.14	0.49	1.84	0.34	0.77	0.88	0.43	0.82
Lab # 12	0.47	0.51	0.45	N/A	0.54	0.77	0.58	0.47	0.54
<b>Mean Sy,x</b>	0.72	0.60	0.65	0.86	0.68	0.82	0.86	0.76	0.72
<b>Overall Sy,x</b>	<b>0.74</b>								

**CC: The ChemSpec 150 is a robust, automated and easy to calibrate instrument that can be used to monitor accurately and reliably the urea level in cow's milk.**

PJB – August 27, 2002