Clinical Pathology in Bovine Practice

Dr. Keith Sterner: Here are some procedures we use in our practice in Ionia, Michigan.

Determining WBC's utilizing CMT solution and a capillary funnel.

Materials:

- CMT Solution
- A means of measuring 3 ml of soln. (i.e. 3ml syringe)
- Stopwatch
- Medicine Dropper
- Heparinized vacutainers
- A capillary funnel measuring 1.3mm x 2cm with a capacity of 4.5ml.
- 14ml glass centrifuge tube (preferably graduated)

Procedure:

Put 3 ml CMT Soln in Centrifuge tube. Be certain that the volume of CMT Soln is exactly 3ml.

It is suggested that several drops of blood are dropped from the dropper before putting a drop into the CMT soln.

Add 1 drop of well mixed heparinized blood to the tube, start stopwatch at the same time.

Invert the centrifuge tube 5 times within 30 seconds. Pour the mixture into the funnel before the 30 seconds are up. Stop the stopwatch when the solution empties from the funnel. Refer to the table for the corresponding WBC to the seconds elapsed. A more accurate WBC is attainable by running the same procedure three times and taking an average. There is a difference between species as to the flow time so be sure to check the tables for the correct WBC.

This method is described in Veterinary Hematology by Schlam pp. 63-66 3rd Edition 1975 Lea & Febiger.

This list is from the above listed text for cattle.

FLOW TIME (SECONDS)	ESTIMATED MEAN LEUCOCYTES/uL BLOOD
6	5,500
7	8,500
8	11,000
9	13,500
10	15,000
11	16,500
12	18,000
13	18,500
14	19,500
15	20,000
16	21,000
17	21,500
18	22,000
19	23,000
20	23,500
21	24,500
22	25,000
23	26,000
24	26,500
25	27,000

Determination of plasma fibrinogen utilizing a temperature compensated refractometer.

Materials:

- Temperature compensated hand held refractometer (A/O)
- Microhematocrit tubes and sealer
- Hematocrit centrifuge
- Centigrade thermometer
- Some means of maintaining a water bath at 55 to 60 degrees centigrade
- Stopwatch

Procedure:

Fill 2 microhematocrit tubes with blood and spin in centrifuge for 5 minutes. Break 1 of the hematocrit tubes at the level of the buffy coat and place the plasma layer on the refractometer. This reading will give the total protein. Next, place the second hematocrit tube in a hot water bath at 55 to 60 degrees centigrade for three minutes. Remove the tube and place it in the centrifuge for 5 minutes. When this is completed, break the tube just above the precipitated fibrinogen level and place the clear plasma layer on the hemocytometer chamber. Subtract this reading from the original total protein

this reading from the original total protein determination. This gives the fibrinogen in the plasma. This can be very useful even in the presence of dehydration, as the relative increase in hemoconcentration is accompanied by a relative increase in fibrinogen. The ratio of fibrinogen to plasma protein (minus the fibrinogen) is easily determined with the values already determined. The fibrinogen value is subtracted from the total protein value and this remaining value is divided by the fibrinogen value. This gives the PP (Plasma Protein):F(Fibrinogen) ratio. For normal cattle this value is almost always 15.1 or higher. Anything below 10.1 is considered a marked increase in fibrinogen. Often times the fibrinogen values will increase markedly well before the Leucocyte count will. An excellent description of this technique can be found in Veterinary Hematology by Schlam or in the third edition of Veterinary Clinical Pathology by Coles.

Both of the above described procedures are used a great deal in our practice and have proven to be very quick and reliable tests which can be performed by almost any of the clinical personnel. They for the most part do not require a great capital investment in materials and these materials are *easily* obtained from almost any veterinary laboratory supplier.