

Refractometer How-to Guide

Refractometer comparisons

Refractometer	Use
Atago	Milk* / colostrum
Reichert R ² Mini	Milk* / colostrum
MISCO-Brix Only	Milk* / colostrum
MISCO-Brix and Total Proteins	Milk* / total protein / colostrum
Optical	Total protein

*pasteurized milk only

Using a Reichert R² Mini refractometer

<http://www.enasco.com/farmandranch/>

- **Calibration**
 - Apply distilled water to the measuring surface.
 - Allow distilled water sample to temperature equilibrate to the temperature of the instrument.
 - Press and hold the “CAL” key for at least 5 seconds.
 - While still holding the “CAL” key, press the “READ” key. Then release both keys.
 - Successful calibration will be indicated by the word “END.”
- **Testing milk/colostrum sample**
 - Make sure the well is clean and dry before applying a sample of milk or colostrum. Make sure the refractometer is on the Brix mode, by pressing the “MODE” key until “Brix” appears.
 - Add enough sample to completely cover the glass measuring surface.
 - Allow sample time to temperature equilibrate to the temperature of the instrument.
 - Press the “READ” key and note displayed value. To assure temperature stability of the sample, press the “READ” key until three similar readings result.
- **Cleaning**
 - Cleaning should be performed immediately after each sample reading. Never immerse the device in any liquid.
 - To properly clean the well and glass surface, use a mild soap and water solution or an alcohol pad.
 - After cleaning the well and glass, follow with a distilled water rinse and drying with a Kim-Wipe.

Using a MISCO Brix refractometer

<http://www.animart.com/store/digitalrefractometerbrix/>

- **Collect milk/colostrum sample**
 - You need only a few drops for sampling.
 - Fresh, refrigerated or thawed colostrum may be used.
- **Calibrate refractometer**
 - Turn on refractometer by pressing “GO.”
 - Press “MENU” button to “Set Zero?” then press “GO.”
 - When the window states “Apply Water, Press GO,” flip open lid, place 1-2 drops of distilled water on the eye of the well (cover completely), close lid, and press “GO.”
 - The window should now read “BRIX 0.0.”
- **Test milk/colostrum sample**
 - Press “MENU” until you get to “Brix GO to set.” Press “GO.”
 - Open lid and wipe off water with Kim-wipe.
 - Place 1-2 drops of milk or colostrum on well.
 - Close lid and press “GO” for Brix reading.
- **Before using the refractometer again**
 - Clean well between each sample by using distilled water and a Kim-wipe or an alcohol wipe.
 - Be sure to dry the well with a Kim-wipe before using it again. It is important that Kim-wipes are used so that the glass on the eye isn’t scratched.

Colostrum quality from Brix reading

Brix score	Colostrum indication
≥22	Colostrum can be used, unsupplemented, for an entire 4-quart feeding for heifers
19-21.9	Supplement natural colostrum with 1 quart (1/2 bag plus half the amount of water called for on tag) of colostrum replacer for bulls
<19	Feed only to bull calves or discard and substitute colostrum replacer

Pasteurized milk solids from Brix reading

Total solids = (0.9984 x Brix reading) + 2.077

- A Brix reading of 10.4 = 12.5% total solids
- A Brix reading of 10.9 equals 13.0% total solids



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Measuring total proteins by optical refractometer

<http://www.animart.com/store/refractometer/>

- **Collect blood sample**
 - Use a red-top serum collection tube (no anti-coagulant added), vacutainer, or 3cc syringe with 20g 1-in. needle.
 - Draw 2-3 mL blood from jugular vein in calves 2-5 days of age. Ideally, draw blood 1-2 hours after first milk or milk replacer feeding.
- **Separate serum**
 - Let blood sample sit at room temperature for 12-24 hours OR let it sit at room temperature for at least 30 minutes, then spin in centrifuge for 10 minutes.
- **Test**
 - Once the blood and serum are separated, either remove the clot and pipette the serum out of the tube or directly pipette the serum out of the tube around the clot, making sure the serum is free of red blood cells.
 - Place a drop of serum on the optical surface of the refractometer, making sure the refractometer has been properly calibrated according to manufacturer’s instructions before reading the samples.
 - Lower the lid over the glass and look through the eye piece to determine the concentration of total serum protein of the sample.
- **Clean**
 - Drop a small amount of distilled water onto the optical surface and wipe off with a Kim-wipe or use an alcohol wipe to clean off serum.
 - Be sure to dry the optical surface with a Kim-wipe before using it again. It is important that Kim-wipes are used so that the optical surface isn’t scratched.

Measuring total proteins with MISCO refractometer

<http://www.animart.com/store/drbrixandprotein/>

- **Collect blood sample**
 - Use a red-top serum collection tube (no anti-coagulant added), vacutainer, or 3cc syringe with 20g 1-in. needle.
 - Draw 2-3 mL blood from jugular vein in calves 2-5 days of age. Ideally, draw blood 1-2 hours after first milk or milk replacer feeding.
- **Separate serum**
 - Let blood sample sit at room temperature for 12-24 hours OR let it sit at room temperature for at least 30 minutes, then spin in centrifuge for 10 minutes.
- **Test**
 - Recalibrate the refractometer daily.
 - With a 3cc syringe or pipette, carefully draw up a small amount of serum.
 - Press menu bar of the Bric until you get the option “Read Total Protein.”
 - Place a few drops of serum with a pipette to the center well.
 - Close the lid, press the read button, and wait a few seconds before reading the results.
- **Before using the refractometer again**
 - Clean the center well between each sample by using distilled water and a Kim-wipe or an alcohol wipe.
 - Be sure to dry the well with a Kim-wipe before using it again.

Amount of total proteins determines passive transfer

calfnotes.com

Total proteins reading (g/dL)	Passive transfer
>5.5	Successful passive transfer
5.0-5.4	Moderately successful passive transfer
<5.0	Failure of passive transfer



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