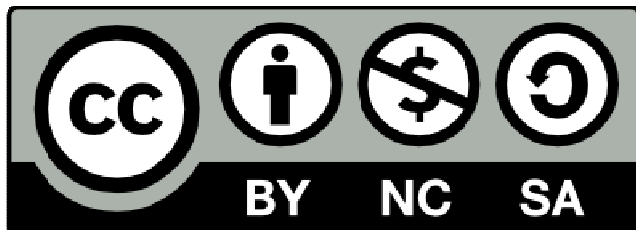


# Tips for Milk NIR analysis by reflectance and transfectance

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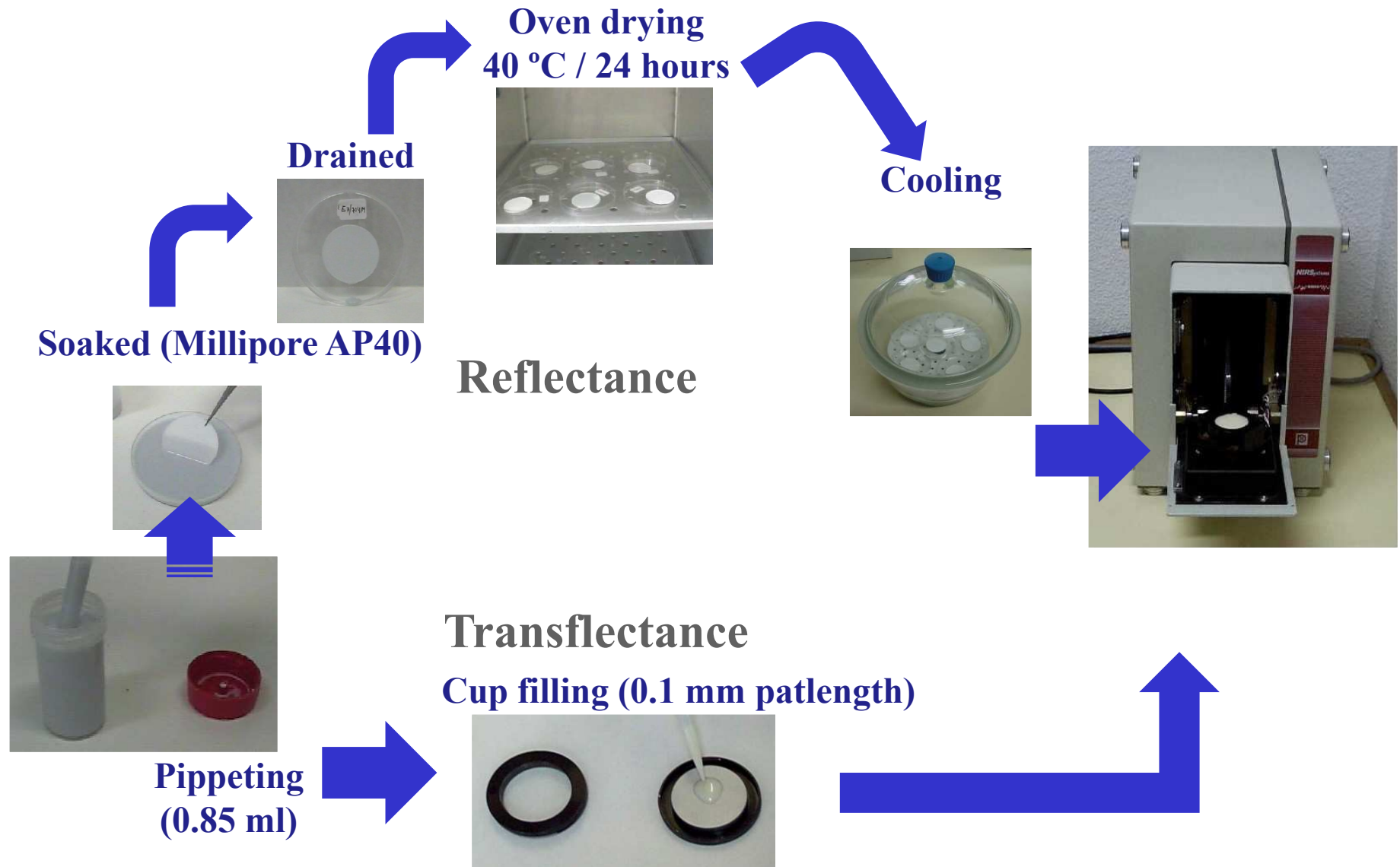
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# Standardize sample presentation



One of the most critical aspects!!!!

(Nuñez et al., 2002)

# Tips

- ❑ One of the main obstacle to obtaining an NIR spectrum for milk is its high water content (80% - 90%), since water absorbs most infra-red radiation, thus hindering the calibration of other components.
- ❑ Homogenization it is also important. Before NIRS and chemical analysis milk samples are heated in water at 40°C, mixed gently in order to achieve uniform dispersion of fatty matter and other components, and then left to cool at room temperature.

# Tips

- ❑ In our Lab we have developed calibrations both for reflectance and transflectance and since the 90's we use them for routinely analyze hundred samples from milk breeding schemes. Both analysis modes produces accurate calibrations . Each mode has advantages and disadvantages ((Nuñez et al., 2002).
- ❑ We scan samples FNS 6500 with spinning module and transport module.
- ❑ For reflectance we use a modified a modified version of the DESIR (G. Alfaro and M. Meurens. Proceedings of the 2nd International NIRS Conference. Tsukuba, Japón, p. 204 (1989).

# Tips

- ❑ Dried filters should be placed at the bottom of the capsule, with the reading side facing the quartz window
- ❑ For transreflectance we used in the past aluminum cups. At present we use golden cups. Samples are analyzed by duplicate using two different cups. The calibrations are build with the mean spectrum, but we also keep the original two NIR files.

# Tips

□ Even with a perfect standardized sample presentation method both reflectance and transreflectance analysis of milk is affected by controlled and uncontrolled error sources (ie. Filters moisture uptake, change in reflectance properties of the gold with the time of use....).

□ We resolve this problem by using repeatability files. (see publication by Perez-Marin et al., 2007, this papersis related to fat analysis but the methodology is the same for milk)

## USEFUL READINGS AND REFERENCES

- NIRS analysis of liquid and dried ewe milk. Near Infrared Spectroscopy Núñez N., Garrido A., Serradilla J.M. y Ares J.L.: *Proceedings of the the 10th International Conference of Near Infrared Spectroscopy. Korea. E: Davies T. and Cho R.K. NIR Publications. Chichester. UK, 179-182, (2002).*
- Chemometric utilities to achieve robustness in liquid NIRS calibrations: Application to pig fat analysis D. Pérez-Marín, A. Garrido-Varo, E. De Pedro and J.E. Guerrero-Ginel. *Chemometrics and Intelligent Laboratory Systems, Volume 87, Issue 2, 15 June 2007, Pages 241-246.*
- Effect of moisture on the repeatability of Near Infrared Spectroscopy analyses of ewe milk using DESIR method. Núñez-Sánchez N., Serradilla-Manrique JM., Ares JL. and Garrido-Varo A.: *Journal of NIRS. 16(4); p.381-388; (2008)*