A RAPID METHOD FOR THE EXTRACTION AND ESTIMATION OF WAX AND SUINT IN WOOL

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Estimation of the major components of raw wool is relevant to many research projects concerned with wool production. Daly and Carter (1954) described a method for fractionating raw fleece samples using Soxhlet extraction, cold water immersion, and mechanical separation. A method for wax and suint estimation is described which, compared with Daly and Carter's procedure, requires simple equipment, is faster, requires less solvents, and both wax and suint are subjected to less heat.

Raw or conditioned raw wool (1-6 g) is placed into a weighed 30 ml syringe containing a disk of perforated teflon or stainless steel mesh at the tip end. This disk enables better extraction of the wool compressed at the end of the syringe. The wool in the syringe may be dried to estimate moisture and then compressed with a stainless steel spring device mounted on top of the open syringe. This compression ensures uniform and slow solvent percolation through the wool.

The wool wax is extracted first by percolating 25 ml Shell solvent X222 petroleum ether through the compressed wool and into a plastic vial. Most of the residual solvent left in the wool after draining can be blown gently into the vial with compressed air. Solvent X222 is preferred to other solvents because of its low boiling range (40-87°C), its ability to dissolve the more polar components of wax and its low density (0.65 g/ml). The small amount of dirt in the extract is centrifuged down (c. 1000 g for 5 min) and the supernatent, which contains the wax, is decanted off. The residual dirt can be further rinsed with solvent but usually contains less than 2% of total wax. The petroleum ether extract is dried to constant weight preferably under reduced pressure.

Both the wax-free wool and the vial containing dirt are dried. For suint extraction, 25 ml warm water is then percolated through the wool. The extract is collected into the vial containing dirt, resuspended and treated using the steps described for wax extraction. The water extract is oven dried, or freeze dried if heat damage must be avoided, and finally dried under vacuum over phosphorus pentoxide.

The procedure described above removed 98-99% of wax and 95-98% of suint, as assessed by repeated extractions of the same sample of wool. Extraction of a batch of 24 samples with petroleum ether and water, excluding initial and final drying of both the wool and extracts, takes one person 2½-3 hours to complete.

Comparisons were made with a variety of wool samples extracted by the proposed method or with the Soxhlet apparatus. Correlation coefficients between the two methods were 0.99 for wax and 0.96 for suint. Regression analysis of the proposed method (y) and Soxhlet extraction (x) was performed for both wax and suint contents (g/100 g dry raw wool). Equations derived by least squares regression for wax were: y = 0.986x + 0.460; and x = 0.989y + 0.943; and for suint were: y = 1.018x - 0.422; and x = 0.912y + 1.001.

Since both techniques are subject to measurement error, least squares regression is not strictly appropriate. However, the similar regression coefficients which approach unity, and the small intercepts calculated using y on x and x on y respectively indicate a satisfactory correlation between the two procedures.


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