MEASUREMENT OF CASHMERE YIELD USING THE OPTICAL FIBRE DIAMETER ANALYSER

A.D. PETERSON and S.G. GHERARDI

Sheep Industries Branch, Dept of Agriculture, South Perth, W.A. 6151

The prohibitive cost of measuring cashmere yield has motivated research into developing a new low cost method for fibre measurement. The Optical Fibre Diameter Analyser (OFDA) was used to measure cashmere yield on the basis of fibre diameter distribution and validated using standards of known cashmere yield.

Cashmere and guard hair were obtained from a commercial dehairer. Standards of 10, 20, 30, 40, 50 and 60% cashmere yield (cashmere weight/total weight) were prepared using weighed portions of cashmere and guard hair. Each standard was mixed using a high pressure air gun to agitate the fibres within a small secure vessel. Standards were scoured in detergent and hot water, dried and 5 minicored samples (2 mm snippets) were taken from each standard and conditioned at 20°C and 65% relative humidity for 24 hours.

Each entire sample was spread onto 2 to 3 OFDA slides and the fibre diameter distribution of each slide was measured. The OFDA cashmere yield was calculated using the combined diameter distribution from slides of the same sample. Fibres with diameters ranging from 1 to 35 μm were classified as cashmere. The diameter of the fibres was used as an index of the weight of fibres as fibre length was constant, and it was assumed that the specific gravity of cashmere and guard hair were the same. The OFDA cashmere yields were calculated using the following formula:

\[
\text{OFDA cashmere yield (\%) = \frac{\sum_{i=1}^{35} d_i^2 \times f_i}{\sum_{i=1}^{35} d_i^2 \times f_i} \times 100}
\]

Where \(d\) = diameter of fibres, and \(f\) = frequency of fibres

There was a significant linear relationship (\(P < 0.001\)) between OFDA cashmere yield and true cashmere yield (Figure 1). The 95% confidence interval for the measurement of OFDA cashmere yield of a 10 and 60% standard was 7.8-12.2% and 55.7-64.3% respectively. These results demonstrate the ability of the OFDA to measure cashmere yield using the fibre diameter distribution of a cashmere fleece.

This work was supported by the Rural Industries Research and Development Corporation.

![Figure 1. Relationship between OFDA cashmere yield and true cashmere yield. \(y = 0.91 (\pm 0.02) \times -0.91 (\pm 0.84), r^2 = 0.98.\)