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FIBER DIAMETER AND STANDARD DEVIATION IN MERINO WOOL SAMPLES MEASURED IN COMPARISON WITH OFDA2000 AND MINIFIBER EC

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Average fiber diameter (AFD) is the most important wool characteristics measured and accounts for 85% of values of wool and textile processing. Wool price increases as the mean fiber diameter decreases, especially fine and superfine wool type demand the higher premium price in wool trade. Therefore, an accurate and precise AFD measurement instrument is required at various stages of wool production, wool classing, marketing and processing. A number of wool testing instruments were operating and widely accepted as wool trade standard test procedures, such as Airflow, Projection Microscope, LaserScan and OFDA 100, and OFDA 2000. As an alternative or complementary to these existing devices, a portable fiber tester – Minifiber EC was designed, manufactured and released for laboratory experimentation and field trial [1]. The objective of this experiment was to validate the test performance for AFD and other associated characteristics measurement using the Minifiber EC in comparison with OFDA2000. Three hundred ninety six mid-side fleece samples (20 g/hd) were collected from Merino sheep farmed in Nevada, US and subsequently subsampled for conducting tests with OFDA2000 and Minifiber EC, respectively. The AFD and other associated characteristics were measured with OFDA2000 in according to the established the preparation and operation procedures. Whereas, sample preparation for Minifiber EC was similar to the preparation procedure for OFDA2000 but by capturing digital image, measuring, and analyzing 4000 or more fibers that spreads and holds between two square glass slides. However, 297 wool samples were prepared and measured as ‘greasy’ and 99 were prepared and measured as ‘clean’ wool with Minifiber EC. Data were analyzed following the statistical procedure of R v 3.5.2. The AFD and standard deviation (SD) of greasy wool group was 19.36 ± 0.09 and 3.52 ± 0.03 micron with OFDA2000 vs. 18.12 ± 0.12 and 4.42 ± 0.03 micron for Minifiber EC. Whereas, AFD and SD of clean wool sample group was 20.66 ± 0.19 and 3.55 ± 0.05 micron for OFDA2000 vs. 20.01 ± 0.23 and 3.96 ± 0.09 micron with Minifiber EC. The AFD measurement indicated that clean wool sample preparation for Minifiber EC had a closer agreement with OFDA2000 test values. Pearson’s correlation coefficients were found significantly high ($P < 0.001$) for OFDA 2000 and Minifiber EC measured fiber diameter and standard deviation values for both greasy (Figure 1) and clean (Figure 2) wool sample preparations and tests, respectively. The overall result indicates that AFD measurement using Minifiber EC is highly comparable and repeatable to AFD value measured by OFDA2000, therefore it is recommendable to use Minifiber EC as an alternative or complementary portable fiber testing instrument in wool production, classing, and on-farm field trials.

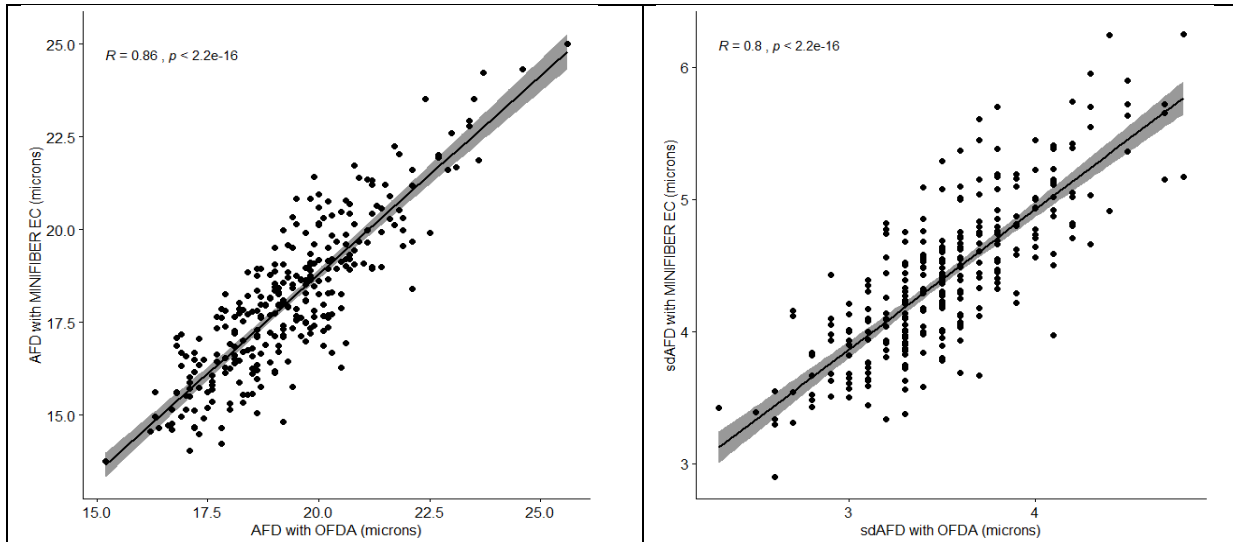


Figure 1. Correlation coefficient and confidence interval of AFD and SD values measured for greasy wool by OFDA2000 and Minifiber EC.

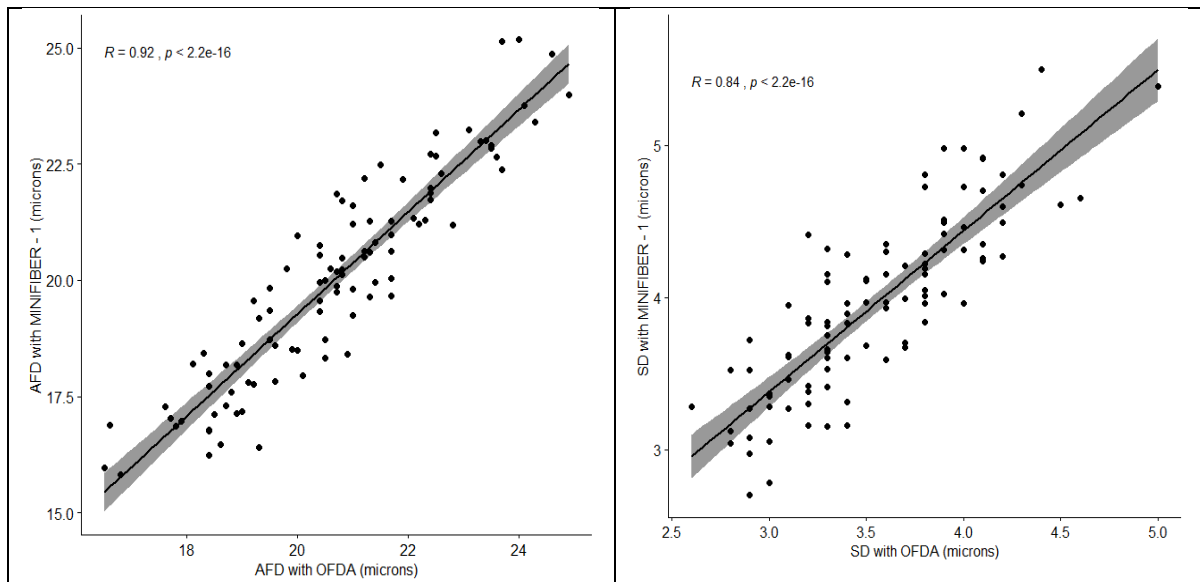


Figure 2. Correlation coefficient and confidence interval of AFD and SD values measured for clean wool by OFDA2000 and Minifiber EC.

[1] MD. Quispe, G. Benavidez, RA. Sauri, JJ. Bengorchea, EC Quispe, *South African Journal of Animal Science*. 2017 et al. 2017, 47, 1-9.