THE CASE OF THE MISSING COARSE FIBRES

Explaining the 'Trim High' setting on OFDA2000 fibre testing equipment

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When I first became involved with fibre testing alpacas over 15 years ago, about the only figure on alpaca fibre test reports that received any interest was the average fibre diameter (microns). Thankfully, SD is now co-starring alongside micron, as breeders appreciate the need to reduce fibre variability when breeding towards quality fleeces.

Most alpaca fibre testing these days is carried out using OFDA2000 fibre testing equipment. OFDA2000 equipment measures the full length of the fibre sample. It can measure fibre samples after the samples are 'scoured' or cleaned of lanolin, seeds, grass etc, or it can be used to test raw fibre samples using capabilities to offset the presence of impurities on the fibres. Another form of OFDA testing technology used when testing alpacas is the OFDA100, although these devices are no longer manufactured. Lazerscan is another form of testing technology, but is not as widely used when testing alpacas.

This paper refers only to the use of OFDA2000 testing devices.

When breeders use fibre test results, there are two elements that underpin their ability to rely on the data. Firstly, the results need to possess a high degree of accuracy, whereby the test results give a true account of what has just been measured.

Secondly, the test needs to possess a reasonable degree of precision, that is, the test result needs to be relatively repeatable. Put another way, if we test one midside sample from one alpaca, then test more midside samples from the same alpaca, yet the results continually have significant differences, then any of these test results would be useless. There would be no way of telling which result can be relied upon.

With these two essential elements of fibre testing in mind, there is a characteristic of alpaca fibre that presents a dilemma for operators of OFDA2000 equipment. As many would be aware, fleeces are comprised of bundles or clusters of fibres (staples). While the diameter of the individual fibres within these staples can vary by around 25 microns, the extent of that variation remains surprisingly constant between staples throughout the fleece, particularly around the saddle area.

A problem exists however, at the very coarse edge of the micron range within these staples. An extremely small number of extremely broad fibres (can be more than 40 microns broader than the average) become evident at unpredictable levels. In other words, one sample from the midside may have none of these extremely coarse fibres, while the staple next to it may have, say, 5 of these fibres. These fibres will represent no more than 1% of all fibres, but because of their very high microns, they can have a big impact on the SD figure of

the sample if they are present. This would substantially reduce the level of repeatability of the testing, thereby rendering the test unreliable.

For example, a typical alpaca staple test of 1400 measurements with a mean of 22.4 and an SD of 4.9 will return a mean of 22.4 and an SD of 5.1 with addition of a single 80um fibre. This fibre could also be a piece of fibrous vegetable matter.

To preserve the integrity of fibre testing using OFDA2000's, the units have the capacity to remove the very small number of fibres with extremely high microns. For those mathematically minded, this function removes fibres with average diameter that is greater than 4 standard deviations above the mean.

The thing to remember is that we are only removing less than 1% of the fibres. Further, the test results for the remaining 99%+ fibres will tell us if there is a problem with the level of coarse fibres (including guard hair) on the alpaca – we don't need to include these 1% to find that out.

This function is called the 'Trim High' (TH) setting. When the TH setting is turned on, the OFDA is removing the extremely coarse fibres. When the TH setting is off, the OFDA is including all coarse fibres. In saying that, there is another function that allows OFDA2000 operators to set a maximum diameter the device will include in measurements (normally 80mm), but that's another story.

To illustrate the impact the TH setting has on testing alpaca fibre, the following table represents the testing of midside samples taken from 2 alpacas. Each midside sample was divided into three subsamples. All subsamples from each of the two alpacas was tested with the TH setting turned off (TH Off), then tested with the TH setting turned on (TH On).

Table 1 – Test results showing impact of TH On/Off

OFDA 2000 REPORT : SORTED BY EID/TAG

Trim High trial (12Records)

Alpaca	Sample	Mic	SD	CEM	<15	CF	SF	SD	CRV
Alpaca 1	TH Off 1	18.1	4.7	7.8	17.8	98.0	18.5	1.40	48.3
Alpaca 1	TH Off 2	18.2	4.5	8.1	17.2	98.2	18.4	0.60	47.0
Alpaca 1	TH Off 3	17.8	3.9	7.5	19.1	99.5	17.5	1.10	48.5
Alpaca 1	TH On 1	17.9	3.7	7.0	16.8	99.8	17.4	0.50	48.0
Alpaca 1	TH On 2	17.8	3.7	7.3	17.5	99.8	17.3	1.20	46.8
Alpaca 1	TH On 3	17.5	3.6	6.9	18.7	99.7	17.0	1.10	47.4
Alpaca 2	TH Off 1	26.0	6.5	11.3	2.8	78.4	26.3	1.80	29.1
Alpaca 2	TH Off 2	25.7	6.2	10.4	2.3	82.0	25.8	2.00	28.6
Alpaca 2	TH Off 3	24.9	7.0	11.8	5.2	81.5	25.9	1.40	33.5
Alpaca 2	TH On 1	25.6	6.1	10.7	3.0	80.3	25.5	1.80	32.3
Alpaca 2	TH On 2	25.4	5.8	10.5	2.5	82.7	25.1	2.10	28.0
Alpaca 2	TH On 3	25.5	6.1	10.9	3.3	81.3	25.5	1.50	31.4

With regard to testing samples from alpaca one, we find the three subsamples with the TH setting turned off gave a range in SD from 3.9 microns to 4.7 microns, while the testing of the same three subsamples with the TH setting turned on gave a range in SD of 3.6 microns to 3.7 microns. The fact that the SD varies by a substantial 0.8 microns when the TH is

turned off reflects the erratic nature in which these very coarse fibres can appear in samples. These coarse fibres have such an unpredictable impact on the fibre test result, they seriously impede the test's repeatability.

When the TH setting is applied, we find the remaining 99% of fibres (or thereabouts), fall into a normal distribution, with the consequence that testing of these samples becomes highly repeatable. This is evidenced by the range between the three SD figures of only 0.2 microns. This repeatability allows breeders to effectively rely on these test results.

With regard to testing the three samples from the second alpaca, we find the same thing has occurred.

Once again, because the very small number of very coarse fibres occur within these subsamples at highly variable numbers, the SD figures lose their repeatability if the TH setting is turned off. In this case, we find the SD figures range from 6.2 microns to 7.0 microns.

Conversely, the repeatability of the SD's is returned with the TH setting turned on, with the range narrowed down to 5.8 to 6.1 microns.

One thing that should be stressed is that while a small number of coarse fibres are excluded from the reported data with TH on, the remaining 99% + fibres provide an accurate account of the characteristics of the fibres within the sample being tested.

A second benefit of the TH setting is that it removes any measurements taken from foreign matter such as seeds, although the 'maximum diameter' setting will also help to deal with this.

Given the TH settings can be responsible for significant impact on the fibre test results, BSC Electronics who invented and manufacture the OFDA2000, has released new procedures it recommends be implemented by operators of OFDA2000 equipment. To inform breeders if their samples have been tested with the TH setting turned on or off, the test report will have 'TH on' or 'TH off' as the case may be, printed at the top of the report.

On a final note of comfort to breeders, nothing has really changed. Since OFDA2000 devices have been used to test alpaca fibre, the TH settings have been turned on, and will remain on unless, for whatever reason, the client asks the OFDA technician to turn the setting off.

Just be aware though, if you ask to have the setting turned off, be prepared for higher SD measurements and less repeatable results.