Producers are growing canola with much higher oil content compared to 10 years ago. Current recommendations for safe storage of canola are based on previous lower oil content varieties. In this two-year project in 2010 and 2011, PAMI conducted three testing activities to determine recommendations for safe for long-term storage of canola, and the possible impact of large storage bins on high oil content canola. Overall, the small-scale storage tests showed some quality changes, but none exceeded accepted tolerance limits. The compression test results indicated that compression forces experienced by canola seed in tall bins (up to approximately 100 ft tall) are not detrimental to canola. Researchers recommend further testing before new recommendations for safe canola storage can be developed.

Canola is a major cash crop in Saskatchewan and acreage continues to increase. Producers are also growing canola with much higher oil content compared to 10 years ago. Current recommendations for safe storage of canola are based on previous lower oil content varieties. As a result, some recent storage issues have been blamed on changes to canola seed from the increased oil content. Another issue is the increasing bin size in conjunction with higher oil content seeds, causing concerns regarding the effect of compaction and compression due to the weight of canola in taller bins.

In this two-year project, the Prairie Agricultural Machinery Institute (PAMI) conducted three testing activities to establish seed condition criteria and environmental conditions that could be recommended as safe for long-term storage of canola, and to determine the possible impact of large storage bins on high oil content canola.

1. Small-Scale Storage Testing
Small-scale canola storage trials were conducted to investigate the effect of temperature and grain seed moisture content (MC) on seed oil quality of stored canola. For the study, four different canola samples were used, including standard clean canola, high green count canola, high oil content canola and high dockage canola. The samples were conditioned to seven different MC and stored at five different temperatures for
approximately four months. The temperature within all 140 test samples was monitored for any increase that might indicate spoilage. Two months after testing began, the samples were tested for Acid Value (AV), Free Fatty Acid (FFA), Peroxide Value (PV) and P-Anisidine Value (ANV). These values were compared with tests done on the initial base samples to determine if oil quality had changed.

Overall, the analysis of the lab results and physical sample inspections showed there had been spoilage in the form of mold growth in several samples. Although it appeared that canola would spoil under warmer storage conditions, there was no

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**Figure 2. Test Sample Visualization.**

**Figure 2. Shows Ambiant Chamber Temperature (E2) Versus the Temperature of a Test Sample (A3) Within the Chamber Starting October 12, 2010.**
indication of spoilage from the temperature changes within the samples. Oil quality tests indicated that oxidation and oil quality deterioration processes had begun at lower storage temperatures and MC, but still within acceptable maximums. The lack of firm trends makes it difficult to draw definite conclusions and updating storage guidelines would be preliminary.

2. Structural Integrity (Compression) Testing

The second tests were developed to evaluate the effect of canola compression under its own weight in tall bins. A compression test stand was developed to simulate the force applied by the vertical column of canola seed stored in a tall bin. The test included a compression load of up to a 30.48 M (100 ft) column of grain. Four separate samples were tested including standard canola at low and mid MC and high oil content canola at mid and high MC. The samples were monitored under load and measurements of compressed displacement were recorded. Samples were inspected for signs of oil exudation. Germination tests were conducted on each sample, prior to and again after compression testing. Overall, none of the tested samples showed any negative effect due to the compression. The results indicate that compression forces experienced by canola seed in tall bins (up to approximately 100 ft tall) are not detrimental to canola.

A third test was aimed at a larger-scale, longer term storage trial, but the inconclusive results from the small-scale trial suggested this was not practical at this time.
Although the research provided new information, researchers want to conduct additional testing before recommendations can be made about storage conditions for canola. The tests indicated that canola may begin spoilage at MCs as low as 7% moisture and at temperatures as cool as -5C (23F). Since the current recommendation is 8% MC, researchers believe that more research is required to understand and develop new specific ‘safe storage’ conditions for canola.

Figure 6. Natural air drying cells which were used for conditioning the grain moisture content.