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Fan Control Strategies for Natural Air Drying of Grain

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In-bin natural air drying of grain produces high quality grain and is cost effective. However, due to weather dependency of in-bin drying, it is important to use the right fan and heater (optional) control strategies. Appropriate control strategies are also required to optimize the drying performance with uniform drying, energy efficiency, minimum under/over drying, and to reach the target moisture without significant dry matter and quality loss prior to winter storage. Commonly used fan/heater control strategies (continuous Fan ON, fan ON During Day, Fan on During Night, NAD, and self-adapting variable heat (SAVH)) for in-bin natural air drying of grain were investigated. Integris Pro modeling software (Copyright © 2012 OPI-integris) was utilized to run simulations using historical hourly weather data from Regina (SK, Canada). It was found that the fan ON During Night control strategy gave very poor drying results in comparison to other control strategies, especially the inability to complete the drying cycle in the required time. The SAVH was the optimal control strategy among the control strategies investigated.