

Title *Fusarium langsethiae*: Storage environment influences dry matter losses and T2 and HT-2 toxin contamination of oats

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Abstract

The aim of this study was to determine the environmental conditions over which *Fusarium langsethiae* species can (a) grow, (b) produce T-2 and HT-2 toxins in oats, and (c) to determine the relationship between dry matter losses (DMLs) and mycotoxin accumulation in stored oats for the first time. Oats were stored under different combinations of water activity (0.89–0.97 a_w) and temperature (15–30 °C) and the amount of CO₂ produced was measured on a daily basis by gas chromatography (GC). These data were used to quantify the effect of storage on dry matter losses. Results showed that the optimum conditions for colonisation of oats and T-2 and HT-2 toxin production by *F. langsethiae* were at 0.97 a_w and 25 °C. T-2 and HT-2 contamination exceeded 4 mg/kg and 0.75 mg/kg respectively after 10 days storage at these conditions and the calculated DMLs were also higher, exceeding 2%. At intermediate (0.945) and suboptimal (0.89) a_w levels for growth of *F. langsethiae*, DMLs were higher at 30 °C than 25 °C. Models were developed to relate quality losses and toxin production to the different storage conditions. This allows the identification of high and low risk conditions for storage of oats. A good positive correlation was obtained between combined T-2 and HT-2 toxin production and DMLs. This suggests that *in situ* measurements of CO₂ production during storage may be useful in predicting toxin accumulation in stored oats.