

## **Bestimmung akustischer Eigenschaften verschiedener Getreidearten**

Bachelor Thesis at the Section of Agricultural Engineering

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### Summary

A steadily working, acoustic detection system for insect pests in bulk-stored grain is potentially superior to previous methods. Developing such a system, it is advantageous to know acoustic properties of heaped grain. Transmission of sound between the insects and the sensors is of particular importance for determine the detection range of a sensor. For that purpose, the absorption coefficient spectra of four grain species (wheat, barley, corn and oats) were measured for two different heaped thicknesses, using the impedance tube measurement method. The absorption coefficient of all grain species showed resonances that were attenuated with increasing frequency of sound. A model-function was fitted to the measured data, calculating the least sum of the squared difference. From the variables of the fitted model-function the attenuation of sound was calculated for each grain species as a decline of sound pressure level per length. Corn showed to have the best, oats the least transmission properties. In grains of all four species sound transmission is much better at frequencies from 200-3000 Hz than at frequencies from 3000-6400 Hz. The results facilitate an estimation of a detection range of a sensor.