Computers and Electronics in Agriculture
The sensor to estimate the sound pressure level in eggs

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Abstract

Before assessing the effects of sound stimuli on the embryonic development of poultry, the current study asked the following question: what sound pressure level (SPL) would embryos inside eggs be exposed to? The question has motivated the current research, which developed a reduced-size sensor (miniaturized decibel meter) to help measuring SPL inside artificially-incubated eggs (microenvironments). The sensor was developed by using the Arduino® microprocessor-a standard amplifier circuit and electret microphones. Calibrations were performed in a commercial decibel meter to allow confirming the sensor capacity. However, it was necessary using mathematical models to help converting the sound measures to the decibel scale, since the direct conversion of them was not possible. The use of the sensor in studies focused on artificial incubation confirmed the acoustic insulation capacity of eggshells. However, results showed that the internal SPL (air chamber) in eggs externally exposed to 90 dB (A) remains high and probably perceptible to embryos. Such information is highly relevant to studies focused on investigating bioacoustics during incubation.