The Old School, Brewhouse Hill, Wheathampstead,
Hertfordshire AL4 8AN, UK
www.ufaw.org.uk

Animal Welfare 2014, 23: 391-400
ISSN 0962-7286
doi: 10.7120/09627286.23.4.391

Evaluation of microwave energy as a humane stunning technique based on electroencephalography (EEG) of anaesthetised cattle

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Abstract

Humane slaughter implies that an animal experiences minimal pain and distress before it is killed. Stunning is commonly used to induce insensibility but can lead to variable results or be considered unsatisfactory by some religious groups. Microwave energy can induce insensibility in rats, and high power equipment has recently been developed for sheep and cattle. We examined the effectiveness of different settings for microwave energy delivery, power and duration, to induce insensibility based on electroencephalography (EEG) of anaesthetised cows, using the minimal anaesthesia model. All applications resulted in the appearance of seizure-like complexes in the EEG, a pattern considered incompatible with awareness. Shorter duration of application resulted in more rapid EEG changes, as quickly as 3 s. Higher power resulted in a longer duration of EEG suppression, at least 37 s and up to 162 s. Microwave energy can induce insensibility in cattle based on seizure-like complexes in the EEG.

Keywords: *animal welfare, electromagnetic, euthanasia, insensibility, pre-slaughter, slaughter*