Determining the emissivity of pig skin for accurate infrared thermography

Determining the emissivity of pig skin for accurate infrared thermography

Infrared thermography may be used for pig health screening and fever detection. In order to achieve the necessary accuracy for this purpose, it is necessary to know emissivity of the skin surface. Previous investigations attempting to find the emissivity of pig skin revealed numbers from 0.8 to 0.955. Such discrepancies can result in measured surface temperatures differing by several degrees Celsius. An unacceptable discrepancy if used for fever screening. In this study we determined the emissivity of three skin locations in ten sows when they were alive and dead: the ear base, udder, and shoulder. The shoulder was investigated with and without (clipped) hairs. Emissivity for ear base, udder, and shoulder (hairy) was 0.978 ± 0.006, 0.975 ± 0.006 and 0.946 ± 0.006, respectively. Clipping the hairs of the shoulder tended to increase the emissivity (p = 0.07). Emissivity of the hairy shoulder was significantly lower than for the ear base (p < 0.001) and the udder (p < 0.005). Emissivity of the three skin areas with no blood perfusion (after euthanasia) tended to be lower (p = 0.06) compared with the emissivity of the skin areas when perfused with blood. The results of this study confirm that it is valid to use the human skin emissivity value of 0.98 for infrared skin measurements on sows. However, when studying hairy skin areas or skin with no blood perfusion, the emissivity value is lower.

General information
State: Published
Organisations: Department of Chemical and Biochemical Engineering, CHEC Research Centre, Aarhus University, UiT The Arctic University of Norway
Contributors: Sørensen, D. D., Clausen, S., Mercer, J. B., Pedersen, L. J.
Pages: 52-58
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Computers and Electronics in Agriculture
Volume: 109
ISSN (Print): 0168-1699
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.27 SJR 0.814 SNIP 1.563
Web of Science (2017): Impact factor 2.427
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.27 SJR 0.873 SNIP 1.861
Web of Science (2016): Impact factor 2.201
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.99 SJR 0.816 SNIP 1.895
Web of Science (2015): Impact factor 1.892
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.71 SJR 0.961 SNIP 2.123
Web of Science (2014): Impact factor 1.761
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.89 SJR 0.95 SNIP 2.345
Web of Science (2013): Impact factor 1.486
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.86 SJR 1.053 SNIP 2.136
Web of Science (2012): Impact factor 1.766
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1