

Abstract

Monitoring and Registering of Rumen Movement in Ruminants [†]

Joan Oliver ^{1,*}, Alejandro Peralta ^{1,*}, Ahmed Salama ^{2,*}, Carles Ferrer ^{1,*} and Gerardo Caja ^{2,*}

¹ Department de Microelectronica i Sistemes Electronics, Universitat Autònoma de Barcelona, Bellaterra 08193, Spain

² Department de Ciència Animal i dels Aliments, Universitat Autònoma de Barcelona, Bellaterra 08193, Spain

* Correspondence: Joan.Oliver@uab.cat (J.O.); Alejandro.Peralta@uab.cat (A.P.); Ahmed.Salama@uab.cat (A.S.); Carles.Ferrer@uab.cat (C.F.); Gerardo.Caja@uab.cat (G.C.)

[†] Presented at the 5th International Symposium on Sensor Science (I3S 2017), Barcelona, Spain, 27–29 September 2017.

Published: 6 December 2017

Teams composed of electronic engineers and animal science scientists are nowadays collaborating to find mechanisms that help to understand rumen behavior in order to prevent diseases and improve animal goods. Temperature analysis, internal motility, and chemical composition of rumen, are physical magnitudes of interest.

In this way, this paper presents a system for registering and monitoring the internal motility of the rumen in ruminants using an embedded system with an Inertial Measurement Unit (IMU). The total system is composed of an electronic bolus (the device introduced to the ruminant) and an external base station (attached to the ruminant). The bolus is configured as an embedded system with an IMU responsible for registering the rumen motility. The external host registers (using a second IMU) the animal movements. Rumen behavior and ruminant movement are separated in a posterior data process.

An RF link at 433 MHz is used to maintain communication between the bolus and external base station. This flag-based communication is used to synchronize the ruminant and rumen movements registered by the IMUs.

In the end, the paper shows results obtained in real experimentation performed in collaboration with the Animal Science Department of our university.

Acknowledgements: The authors would acknowledge the project AGL2013-44061-R: *Efectos bioclimáticos en ovino y caprino: Niveles de respuesta, desarrollo de sensores y nuevas estrategias de control*, Ministerio de Economía y Competitividad (MINECO) for the support provided to this work.



© 2017 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).