Longissimus thoracis et lumborum muscle volume calculation using in vivo real time ultrasonography [1]

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Introduction

The determination of 3D structure from 2D serial sections is a common problem in animal corporal composition studies.

Volume measured *in vivo* by computer tomography or magnetic resonance image accurately estimate the volume of the dissected tissues (r^2 >0.8).

However little information is available on muscle volume measurements using real time ultrasonography (RTU).

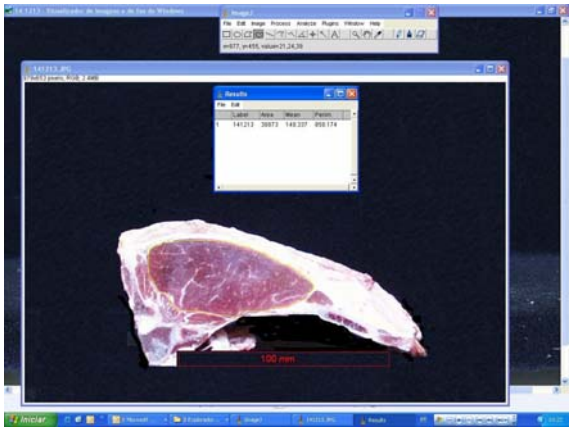

Figure 2. Example for LM measurement proceeding at 13 th thoracic verterbrae using Image J software (NIH Image J).

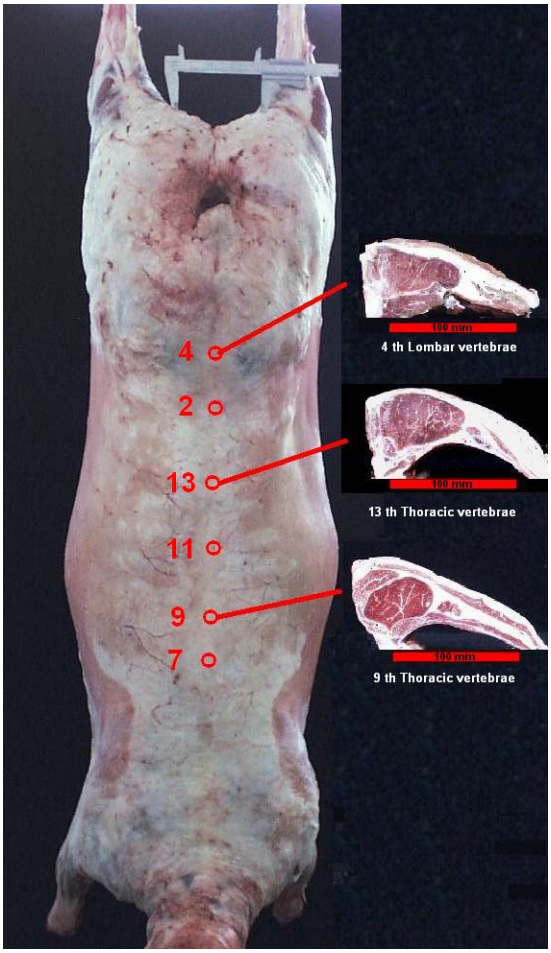

Figure 3. Carcass, measurement points and 3 examples of joints showing LM.

Objective

The purpose of the present study was to examine the *in vivo* RTU as a tool to estimate the *Longissimus thoracis et lumborum muscle* (LM) volume.

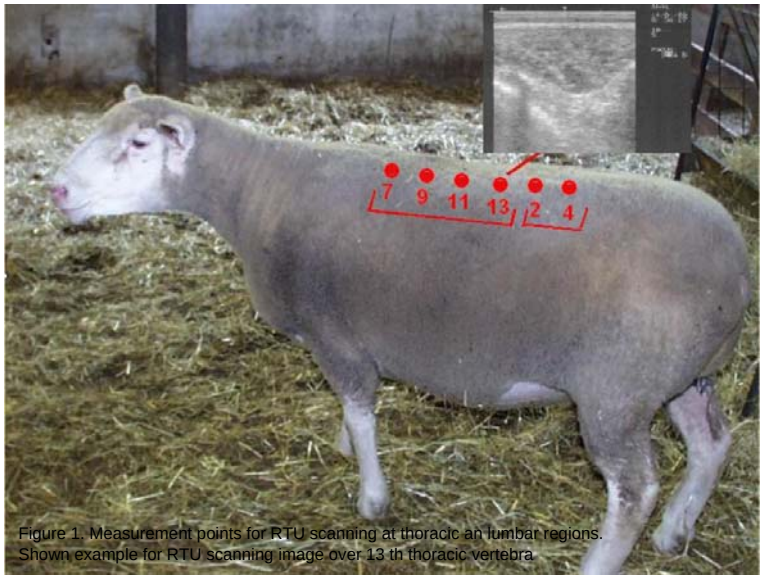

Figure 1. Measurement points for RTU scanning at thoracic an lumbar regions. Shown example for RTU scanning image over 13 th thoracic vertebra

Material and Methods

Thirteen Île-de-France mature ewes were used.

RTU images were taken over the 7th, 9th, 11th and 13th thoracic vertebrae and over the 2nd and 4th lumbar vertebrae (Figure 1).

These images were acquired using an Aloka 500V ultrasound scanner with a 5 MHz probe, and were analysed by Image J software for the determination of LM areas (Figure 2).

The distance between 6th thoracic vertebra and 5th lumbar vertebra was determined and it was divided by six to obtain the length of each slice.

The LM volume was calculated by multiplying the areas and slice lengths.

For the equivalent carcass measurements a joint from 6th thoracic vertebra to 5th lumbar vertebra were used (Figure 3).

Results

LM volume measured in carcass and *in vivo* by RTU was highly correlated (r^2= 0.92, 0.95 and 0.97 for lumbar, thoracic and all vertebrae, respectively).

Conclusions

These results give support to use *in vivo* RTU to accurately predict LM volume.

Reference

NIH Image J. http://rsb.info.nih.gov/nih-image/

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