Centre de Recherches
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Adipocyte fatty acid-binding protein expression and mitochondrial activity as indicators of intramuscular fat content in young bulls

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Introduction

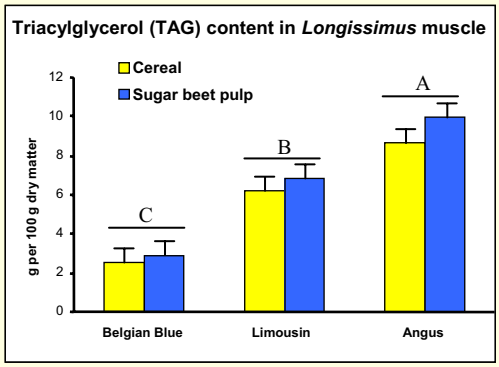
Intramuscular fat deposition influences many quality attributes of beef meat. However, the amount of intramuscular fat is low in late-maturing beef breeds, especially in young bulls. Thus, beef may not be tasty sufficiently. The aim of this work is to assess in young bulls the relevance of a marker of adipocyte differentiation within muscle (the adipocyte fatty acid-binding protein: A-FABP) and of muscle mitochondrial activity (assessed by cytochrome-c oxidase activity: COX) as previously demonstrated in steers (Hocquette et al., EAAP Publ. 109, 513-516).

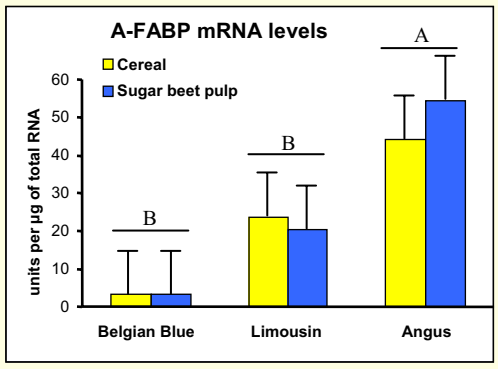
Animals and Samples

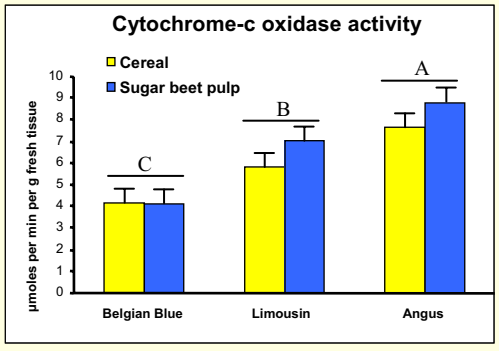
- Two groups of 6 young bulls from 3 breeds (Limousin, Angus, Belgian Blue).
- The first group is fed a cereal-rich diet, the second group is fed a sugar beet pulp-based diet.
- Samples of *Longissimus thoracis* muscle were taken at slaughter.

Analytical techniques

- Intramuscular fat and triacylglycerol contents were calculated from the fatty acid contents obtained by HPLC (Cuvelier et al., companion paper at the EAAP, 2004).
- Cytohrome-c oxidase (COX) activity was determined spectrophotometrically
- A-FABP mRNA levels were determined by real-time RT-PCR







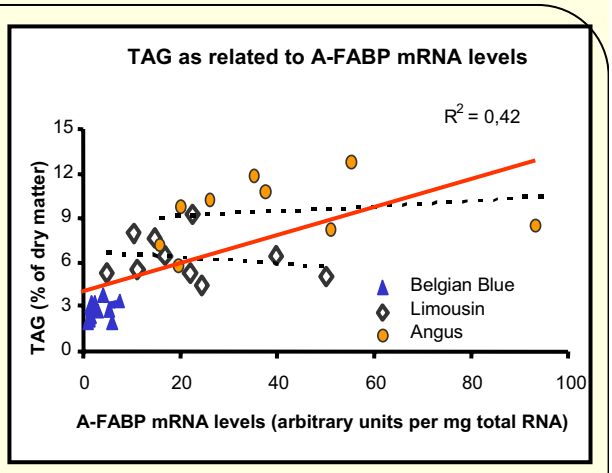
Results

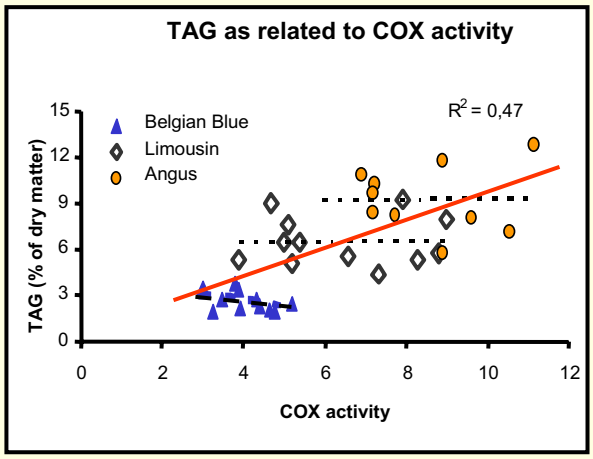
No differences between diets were observed.

Angus were characterized by the highest, and Belgian Blue, by the lowest TAG content, A-FABP mRNA level and COX activity.

A-FABP and COX explained each 42 to 47% of the variability in TAG content when the animals of the three breeds were considered together.
Thus, the more differentiated adipocytes, the more TAG.
The more mitochondria, the more TAG.

However, there were no relationships within each breed.





Conclusion

A-FABP (an indicator of intramuscular adipocytes) and COX activity (an indicator of muscle mitochondrial activity) may not be indicators of the ability of young bulls to deposit intramuscular fat, although these indicators differ between breeds which produce lean or fat beef meat.