

## Amino acid composition of South African beef

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**Research focus area:** Red Meat Safety, Nutritional Value, Consumerism and Consumer Behaviour

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### Full Title of the project

**Determining the amino acid profile of selected cuts from four age groups of South African beef, as additional to the previously approved project on the nutrient content of South African beef, in order to determine protein quality.**

### Aims of the project

- To determine the amino acid profile of South African beef
- To determine the validity of using nitrogen and a specific Jones factor to define protein quantity
- To determine the protein quality of South African beef in the context of human nutrition

## Executive summary

Globally protein quality is under the spotlight. The importance of protein quality was emphasized by both the 2007 and the 2011 Food and Agriculture Organization/ World Health Organization (FAO/WHO) Protein and amino acid requirements in human nutrition reports. These reports questioned the validity of current measures to determine crude protein content and protein absorption, and called for more research. Locally, the national Department of Health Directorate Food Control's most recent legislation on food labelling and advertising requires that in order to make protein content claims, amino acid data in addition to crude protein (nitrogen), is needed.

During this project, raw and cooked beef cuts (prime rib, rump and shoulder) from all four age groups according to the South African classification system were sent for amino acid analyses at the ARC Irene Analytical laboratory.

Aligning with international debates, a literature review was completed to investigate existing literature on the validity of using the Jones factor of 6.25 to quantify the amount of protein from nitrogen within the red meat matrix. Amino acid data obtained was also compared to the use of the Jones factor to quantify the total protein content of red meat, and alternative factors were explored - similar to what has been done by Sosulki et al. in 1990. Mariotti et al (2008) also queried the use of 6.25 as the converting factor for red meat. Our study found that complete amino acid profiles of local beef amounted to 91% on average of protein based on total Nitrogen content (in weight). This indicates that there is an overestimation of protein in beef when the conversion factor of 6.25 is used.

For local legislative purposes, the study found that all cuts from all age groups contain adequate quantities of the essential amino acids as required by the R.429 Food Labelling Legislation. This provides the scientific evidence required for South African beef to make protein content and functional protein claims on packaging and in marketing activities.

## Summary of outputs

### Technology transfers

1. Participation of the Human Nutrition and Health Committee Meeting of the International Meat Secretariat (Canada, 1-3 July, 2015) (Addendum 2)
2. Participation of the Human Nutrition and Health Committee Meeting of the International Meat Secretariat (Oslo, Norway, 15-18 July, 2016) (Addendum 2)

### Reports to Industry

1. NRF-THRIP progress report 2014
2. NRF-THRIP final report 2015
3. RMRD SA Progress report 2014
4. RMRD SA Progress report 2015

## Popular articles and media

### Scientific articles

1. **Schönfeldt H.C.**, Pretorius B. and Hall, N. (2016) 'Bioavailability of Nutrients', In: Caballero, B., Finglas, P., and Toldrá, F. (eds.) *The Encyclopedia of Food and Health* vol. 1, pp. 401-406. Oxford: Academic Press.
2. Article to be submitted after presenting "Updating and expanding the Food Composition Table for Western Africa" at International Food Data Conferences (IFDC) - Official INFOODS conference. Center for Science in the Science and Technology Pole, Buenos Aires, Argentina. 11-13 October 2017.
3. Article to be submitted after presenting "Amino acid and protein content of lean beef" at International Food Data Conferences (IFDC) - Official INFOODS conference. Center for Science in the Science and Technology Pole, Buenos Aires, Argentina. 11-13 October 2017.

### Theses

1. Hall, N. 2015. Sustainable red meat from a nutrition perspective. University of Pretoria.

### Conferences, symposia

1. Co-author FAO/INFOODS (2017) Updating and expanding the Food Composition Table for Western Africa. 12<sup>th</sup> International Food Data Conference (IFDC) - Official INFOODS conference. Center for Science in the Science and Technology Pole, Buenos Aires, Argentina. 11-13 October 2017.
2. Schönfeldt, H.C., Hall, N., Pretorius, B. and Van Deventer, M.M. (2017) Amino acid and protein content of lean beef. 12<sup>th</sup> International Food Data Conference (IFDC) - Official INFOODS conference. Center for Science in the Science and Technology Pole, Buenos Aires, Argentina. 11-13 October 2017.

### Literature review

1. Hall, N.G. and **Schönfeldt, H.C.** (2013) 'Total nitrogen vs amino-acid profile as indicator of protein content of beef', *Food Chemistry*. 140 (3): 608-612.