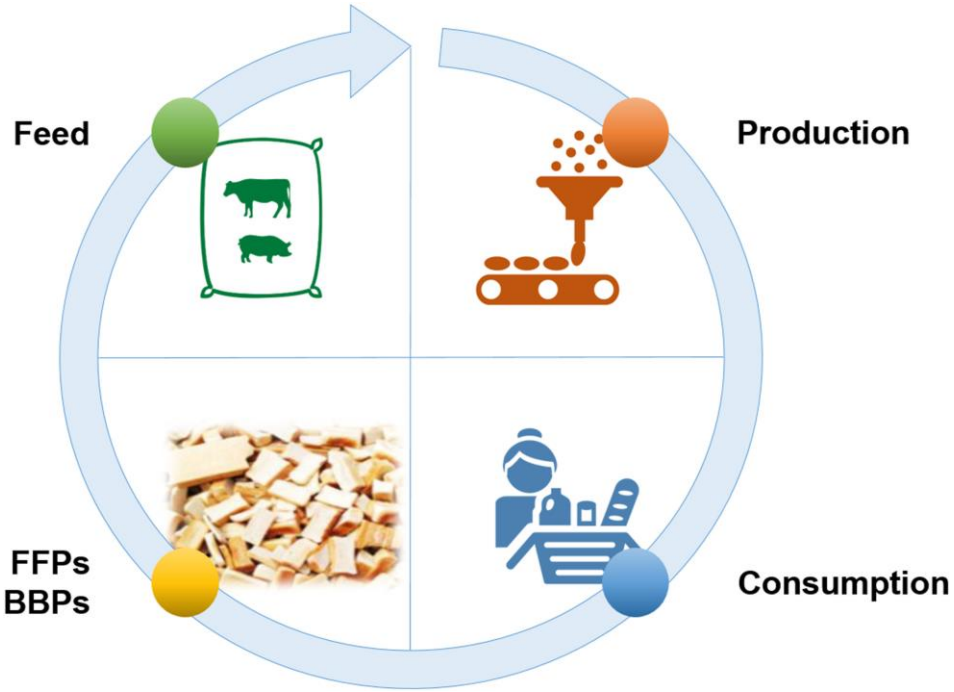
UNIVERSITÀ DEGLI STUDI
DI MILANO

Former foodstuffs Products

Prof. Luciano Pinotti
Department of Veterinary Medicine and Animal Science

feed and food circularity



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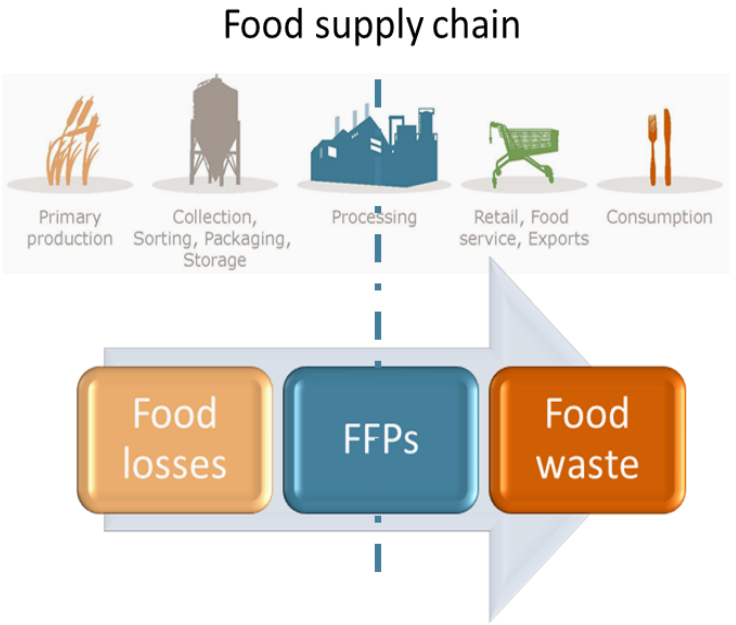
Review

Recycling food leftovers in feed as opportunity to increase the sustainability of livestock production

L. Pinotti [a, d], A. Luciano [a], M. Ottoboni [a], M. Manoni [a], L. Ferrari [a], D. Marchis [b], M. Tretola [a, c, *]

Food losses, Food waste, Former foods products (FFPs)

- **Food losses** often related to post-harvest activities.
- **Food waste** often refers to later stages of the food supply chain, such as retail and consumer households.
- **FFPs** are food effluents that are somewhere in the middle.
  - FFPs can be used to feed humans or animals which does not represent a form of waste treatment;

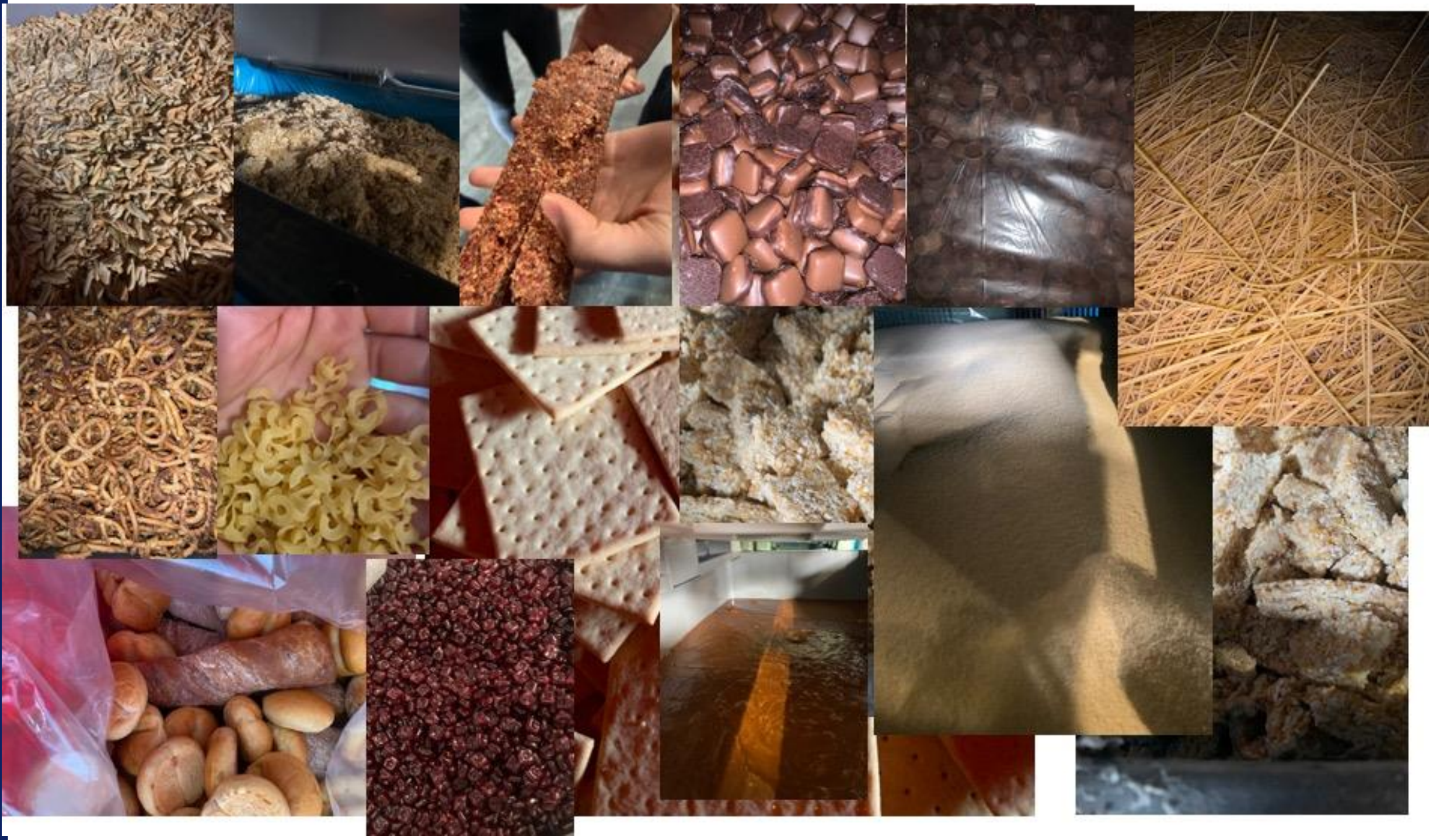


WHAT ARE FFPS?

- According to Commission Regulation (EU) No 68/2013, 'Former foodstuffs' means foodstuffs, other than catering reflux, which were manufactured for human consumption in full compliance with the EU food law but which are no longer intended for human consumption for practical or logistical reasons or due to problems of manufacturing or packaging defects or other defects and which do not present any health risks when used as feed

Regulation (EC) No 1069/2009
Regulation EC 68/2013
Directive (EU) 2018/851

Nijsen/Granico FFP processor company, the Netherlands.



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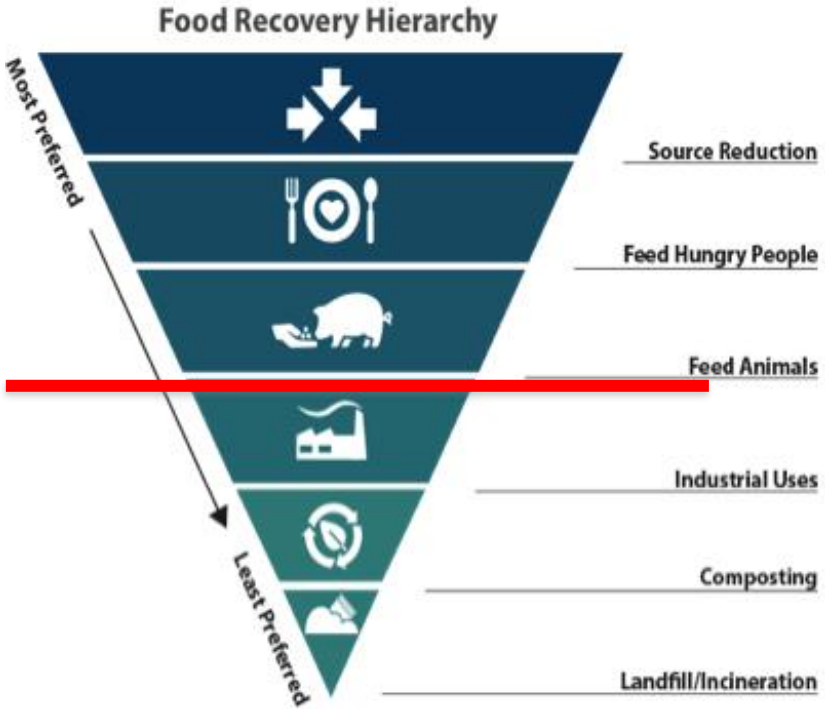
WHAT ARE NOT FFPS?

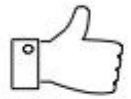


Animal proteins (e.g. meat)

Catering reflux

Household waste

Exceptions



Milk

Eggs

Honey

Non-ruminant gelatin

Food-waste-ABP legislation

The production of FFPs has nothing to do with waste processing or food waste recycling (see Commission Notice 2018)

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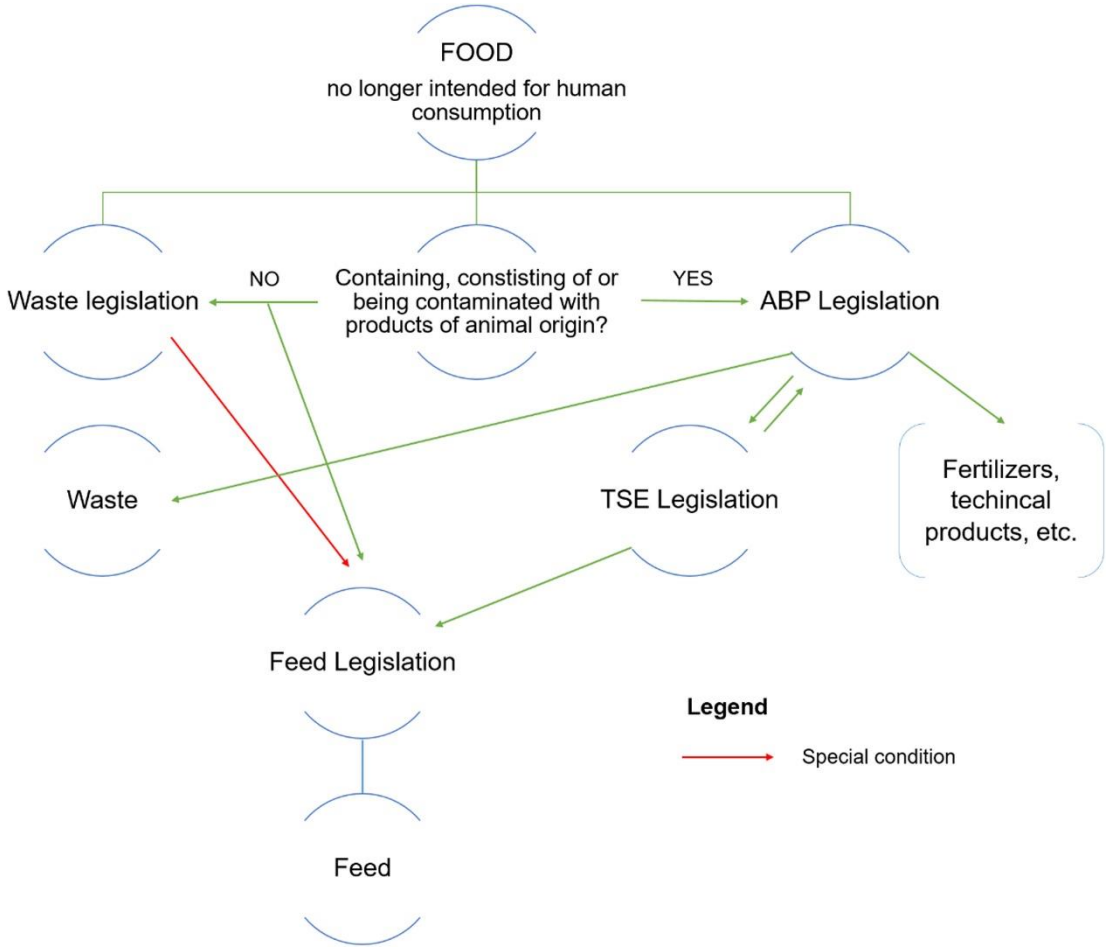
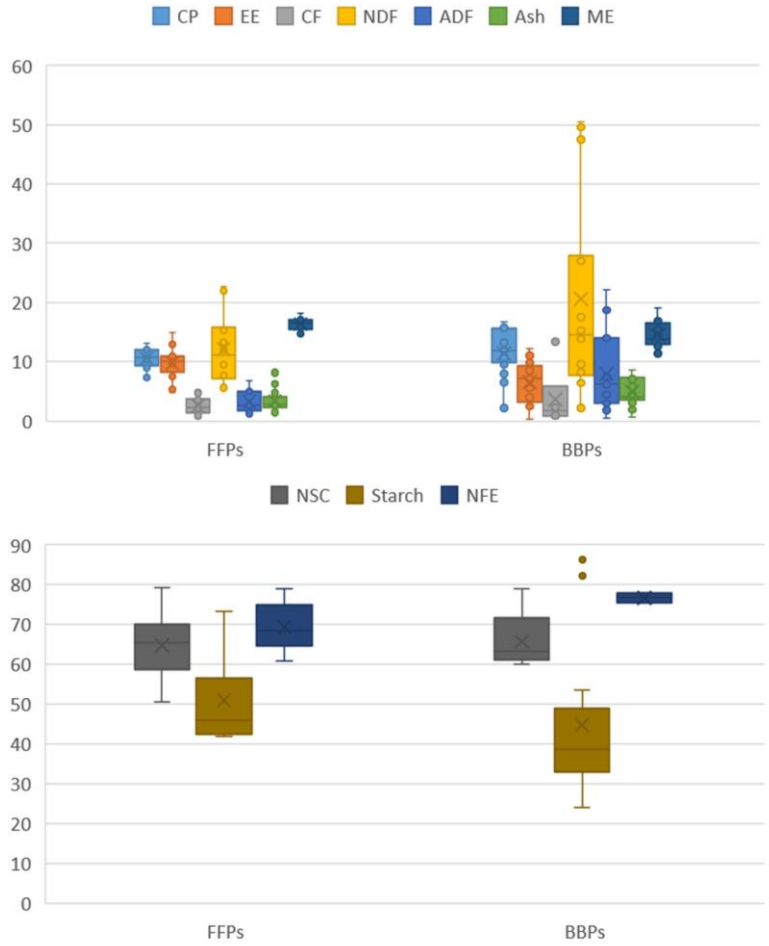


Flow chart from FOOD to FEED. Adapted from: European Commission Notice, 2018.

Nutritional



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Minimum value (min), maximum value (max), mean, and relative coefficient of variation (CV) of FFPs and BBPs considered in the present study. CP = crude protein; EE = ether extracts, CF = crude fibre; NDF = neutral detergent fibre; ADF = acid detergent fibre; NSC = non-structural carbohydrates; NFE = nitrogen free extractives; ME = metabolizable energy.

Items	FFPs				BBPs			
g kg^{-1} DM	min	max	mean	CV	min	max	mean	CV
CP	7.30	13.2	10.6	0.15	2.10	16.7	11.4	0.40
EE	4.80	15.0	9.80	0.23	0.30	12.2	6.50	0.51
CF	0.50	5.20	2.60	0.54	0.50	13.4	3.60	1.36
NDF	5.40	22.6	12.1	0.47	2.10	50.5	20.5	0.80
ADF	1.20	6.80	3.20	0.57	0.40	22.1	7.90	0.80
Ash	1.40	8.20	3.40	0.52	0.70	8.60	4.90	0.46
NSC	50.6	79.3	64.7	0.13	60.1	78.9	65.7	0.11
Starch	41.9	73.4	50.9	0.22	24.0	86.3	44.7	0.43
NFE	60.8	79.0	69.4	0.08	75.5	77.9	76.7	0.02
ME, MJ kg^{-1} DM	14.5	18.2	16.4	0.07	11.4	19.0	14.6	0.16