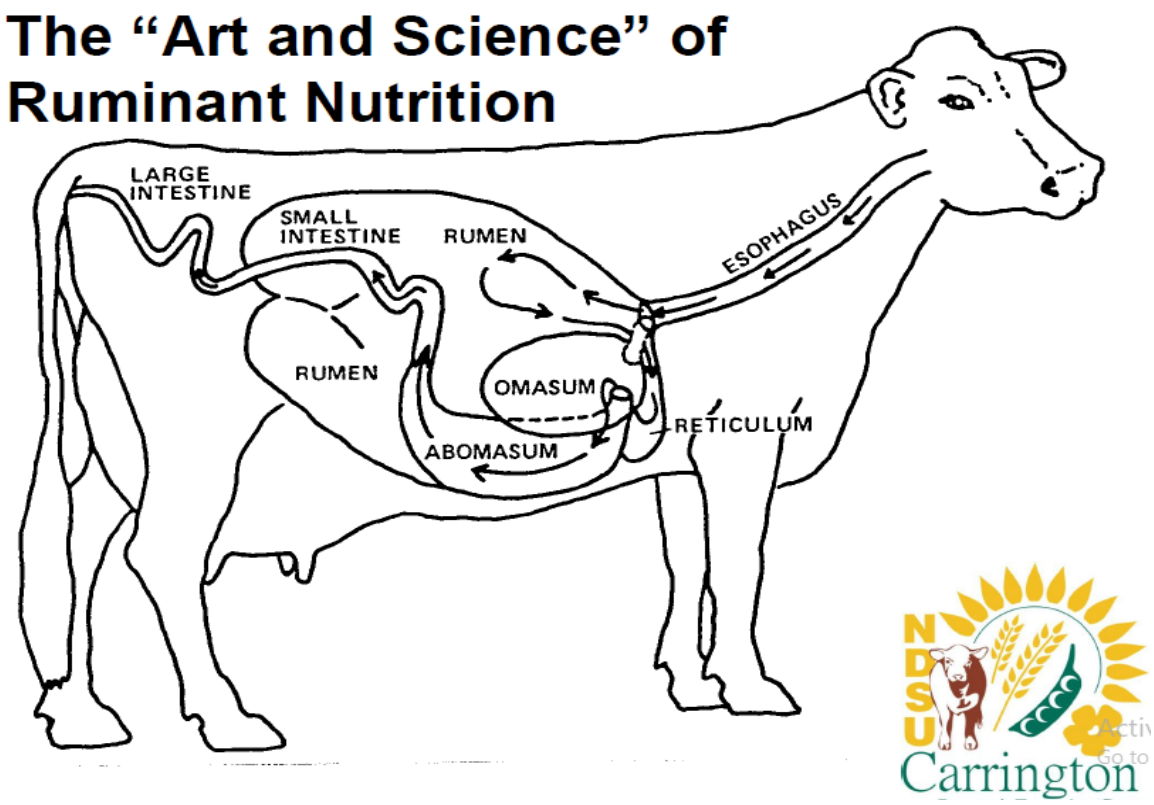
## Recommendations of Feeding standards

Recommendations, published mostly by expert committees, that describe acceptable nutrient contents of diets to be fed to different types and species of animals. The recommendations are guidelines for good practice and do not necessarily describe the most economically or biologically efficient nutrient composition of a diet for a particular animal or population of animals.

**Quality control in feed mills**: Quality control standards within the modern feed mill are set by central governments. However, mills supplying feed for livestock that are entering the supermarket retail business normally work to higher standards laid out by retail quality assurance schemes. As part of these, all raw materials entering the feed mill must come from an approved supplier or be part of a farm quality-assured production system. All materials must adhere to predetermined quality criteria. They are then mixed according to a known formula and the amount of each raw material is recorded against a batch number, so that there is full traceability of all feeds produced. To avoid any cross-contamination from one feed to another, feeds can only be manufactured in a specific order, with particular reference to the scheduling of any feed that may contain some form of medication. Mills are required to have written standard operating procedures (SOPs) for the whole process and to have a hazard analysis by critical control points (HACCP) programme in place. There is usually a legislative requirement to monitor and control production by the chemical analysis of the finished feed.



## Criteria for choosing grazing methods:

In normal conditions, the use of one of the grazing methods discussed above throughout the grazing season will probably not give optimum results. A number of comparisons between continuous stocking and rotational grazing of cattle in temperate climates have shown that using rotational grazing, rather than continuous stocking, has little advantage: a 6–7% increase in meat production and an even smaller increase in milk production. This is particularly true when stocking rate is adequate for efficient utilization of pasture production (Hodgson, 1990). In lactating sheep, grazing improved pasture of annual ryegrass, subterranean clover and burr medic for the entire grazing season at a stocking rate of 6 ewes/ha; no significant improvement in production was observed when using rotational grazing as opposed to continuous stocking (Sitzia et al., 1996). The available biomass, however, tended to be greater when rotational grazing was used.

Short-term studies (Avondo *et al.*, 1994) in spring and summer on sheep whose access to pastures of oats or clover was limited to 6 h a day, with a high stocking rate of 15 ewes/ha, indicated that mean daily intake and milk yield were higher with rotational grazing (1295 g DM and 615 ml, respectively) than with continuous stocking (1125 g DM and 460 ml). These differences, while small in absolute terms, were statistically significant and may be associated with the greater availability of biomass in rotational grazing (4.8 t DM/ha) than with continuous stocking (3.7 t DM/ha).

While there is relatively little information on Mediterranean pastures grazed by sheep, general criteria for grazing management can be established (Table 11.5). These criteria provide only broad guidelines because, as previously stated, changing the stocking rate or the grazing pressure could result in a different method giving better production levels.

**Table 2.** Cut yields (% of body weight) of standard and *label rouge* guinea fowl.

| | Slaughter age (days) | Body weight (kg) | Ready to cook yield | Abdominal fat | Thigh with shank | Breast |
|---|---|---|---|---|---|---|
| Standard | 77 | 1.7–1.8 | 70.3–71.5 | 2.0–2.3 | 25.2–25.3 | 15.8–17.2 |
| *Label rouge* | 98 | 2.0 | 69.6–69.8 | 1.5–2.4 | 24.6–25.3 | 16.0–17.8 |

**Table 3.** Composition (g 100 g$^{-1}$) of breast and thigh meat without skin (Cerioli *et al*., 1992).

| | Water | Protein | Lipids | Ash | ME (kJ 100 g$^{-1}$) | SFA | MUFA | PUFA | S/US |
|---|---|---|---|---|---|---|---|---|---|
| Breast | 74.16 | 25.76 | 1.90 | 1.28 | 475 | 34.26 | 38.46 | 27.74 | 0.52 |
| Thigh | 72.40 | 24.02 | 3.29 | 1.27 | 492 | 33.92 | 38.22 | 27.84 | 0.51 |

SFA, saturated fatty acids; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids (% total fatty acids); S/US, saturated/unsaturated

Fuller, M.F. (2004). The Encyclopedia of Farm Animal Nutrition. Typeset by Columns Design Ltd, Reading Printed and bound in the UK by Biddles, King's Lynn.

**Appendix 2.** Mean macromineral composition of major feedstuffs sampled in the UK by the Ministry of Agriculture (standard deviations in parentheses) (MAFF, 1990). By following the diagnostic flow diagram (Appendix 1), the data can be used to conduct a 'mineral audit'. Farm values for a *major* ration constituent that lie >1 standard deviation below the mean for that feed (or above for an antagonist such as potassium) strengthen the possibility of mineral imbalance. The exception is for sodium, where coefficients of variation are generally high.

| | Ca | Mg | P | K | Na | S | Ratio of S to N[a] |
|---|---|---|---|---|---|---|---|
| Roughages | | | | | | | |
| Grass – fresh (242) | 5.4 (1.7) | 1.6 (0.56) | 3.0 (0.68) | 25.8 (6.6) | 2.5 (2.1) | 2.2 (0.6) | 0.088 |
| Grass – hay (128) | 5.2 (2.5) | 1.4 (0.52) | 2.3 (0.75) | 20.7 (5.3) | 2.1 (1.7) | – | – |
| Grass – silage[b] (180) | 6.4 (2.0) | 1.7 (0.54) | 3.2 (1.7) | 25.8 (6.8) | – | – | – |
| Grass–dried (112) | 7.4 (4.9) | 1.8 (0.47) | 3.3 (1.1) | 26.0 (8.0) | 2.8 (1.6) | 3.5 (0.3) | 0.12 |
| Lucerne – hay (5) | 15.6 (1.8) | 1.7 (0.27) | 3.1 (0.66) | 27.3 (5.0) | 0.6 (0.07) | – | – |
| Lucerne – silage (8) | 17.6 (3.4) | 1.8 (0.23) | 3.0 (0.35) | 24.6 (4.0) | 1.3 (0.95) | – | – |
| Lucerne – dried (50) | 15.0 (2.6) | 2.3 (0.65) | 3.0 (0.8) | 25.4 (8.3) | 1.3 (0.8) | – | – |
| Clover silage (10) | 16.7 (5.5) | 2.3 (0.75) | 3.1 (0.66) | 27.4 (7.6) | 0.3 (0.1) | – | – |
| Maize silage (26) | 4.3 (2.0) | 2.2 (0.69) | 2.6 (1.2) | 12.3 (4.1) | 0.3 (0.2) | – | – |
| Fodder beet (10) | 2.8 (2.4) | 1.6 (0.30) | 1.8 (0.3) | 17.5 (4.8) | 0.3 (0.4) | – | – |
| Kale – all varieties (10) | 13.1 (1.4) | 1.6 (0.2) | 4.1 (0.4) | 29.3 (3.2) | 1.2 (0.6) | – | – |
| Straw – barley[c] (17) | 3.8 (1.8) | 0.7 (0.31) | 1.1 (1.10) | 16.0 (6.5) | 1.8 (2.1) | 2.0 (0.4) | 0.33 |
| Straw – oat (6) | 3.9 (1.2) | 0.9 (0.31) | 0.9 (0.24) | 17.9 (2.4) | 1.8 (2.1) | 2.0 (0.4) | 0.19 |
| Straw – wheat (70) | 3.9 (1.1) | 0.9 (0.9) | 0.8 (0.35) | 10.2 (3.7) | 4.8 (0.6) | 1.3 (0.4) | 0.24 |
| Concentrates | | | | | | | |
| Barley[d] (56) | 0.9 (0.6) | 1.2 (0.2) | 4.0 (0.46) | 5.0 (0.7) | 0.3 (0.4) | 1.5 (0.3) | 0.073 |
| Maize (16) | 0.1 (0.1) | 1.3 (0.1) | 3.0 (0.3) | 3.5 (0.2) | – | 1.6 (0) | 0.10 |
| Oats[d] (27) | 0.9 (0.2) | 1.0 (0.1)[e] | 3.4 (0.5) | 5.0 (0.9) | 0.2 (0.1) | 1.9 (0.1) | 0.11 |
| Sorghum (5) | 0.3 (0.3) | 1.1 (0.1) | 2.8 (0.5) | 3.7 (0.14) | 0.5 (0.0) | – | – |
| Wheat (37) | 0.6 (0.2) | 1.1 (0.1) | 3.3 (0.4) | 4.6 (0.4) | 0.1 (0.06) | 1.6 (0.08) | 0.078 |
| Cottonseed meal (9) | 2.1 (0.21) | 5.8 (0.4) | 8.9 (1.1) | 15.8 (0.8) | 0.2 (0.06) | 5.0 (0.32) | 0.083 |
| Fish meal, white (7) | 56 (6.0) | 2.3 (0.3) | 38 (14.5) | 10.2 (1.3) | 11.2 (1.5) | – | – |
| Linseed meal (5) | 3.4 (0.1) | 5.4 (0.1) | 8.7 (0.1) | 11.2 (0.1) | 0.7 (0.0) | 5.0 | 0.083 |
| Maize-germ meal (9) | 0.2 (0.04) | 2.1 (0.7) | 2.8 (1.2) | – | – | 4.9 | 0.046 |
| Maize-gluten feed (22) | 2.3 (3.6) | 4.1 (0.7) | 9.3 (1.2) | 12.5 (2.7) | 2.6 (1.4) | 4.1 | 0.065 |
| Palm-kernel meal (7) | 2.4 (0.3) | 3.0 (0.4) | 6.2 (0.6) | 6.9 (1.2) | 0.2 (0.1) | 3.2 | 0.118 |
| Rapeseed meal (17) | 8.4 (2.7) | 4.4 (0.5) | 11.3 (1.5) | 14.3 (2.2) | 0.4 (0.3) | 16.9 (1.7) | 0.26 |
| Soybean meal[f] (12) | 3.9 (1.6) | 3.0 (0.2) | 7.4(0.4) | 25.0 (1.0) | 0.16 (0.05) | 4.6 | 0.058 |
| Sunflower meal (6) | 4.8 (1.4) | 5.8 (0.5) | 10.8 (1.9) | 17.1 (1.8) | 1.0 (1.2) | – | – |

*Continued*





McDonald, P. , R. A. Edwards, , J. F. D. , Greenhalgh , C. A. Morgan , L. A. Sinclair and R. G. Wilkinson . (2010) . Animal Nutrition. Seventh Edition . Pearson. U K.