Animal feed SCIENCE AND TECHNOLOGY

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Highlights

- • Seaweeds have a long history of use as livestock feed
- • Seaweeds have a highly variable composition
- • Green and red seaweeds contain higher protein but lower minerals than brown seaweeds
- • Seaweeds can contribute to the protein and energy requirements of livestock
- • Prebiotic compounds in seaweeds may help to enhance livestock production and health

Abstract

Seaweeds are macroalgae, which generally reside in the littoral zone and can be of many different shapes, sizes, colours and composition. They include brown algae (Phaeophyceae), red algae (Rhodophyceae) and green algae (Chlorophyceae). Seaweeds have a long history of use as livestock feed. They have a highly variable composition, depending on the species, time of collection and habitat, and on external conditions such as water temperature, light intensity and nutrient concentration in water. They may contain non-protein nitrogen, resulting in an overestimation of their protein content, and nitrogen-to-protein conversion factors lower than 6.25, normally used for feed ingredients, have been advocated. They contain considerable amount of water. Most essential amino acids are deficient in seaweeds except the sulphur containing amino acids. Seaweeds concentrate minerals from seawater and contain 10 to 20 times the minerals of land plants. They contain only small amounts of lipids (1–5%), but majority of those lipids are polyunsaturated n-3 and n-6 fatty acids. Brown seaweeds have been more studied and are more exploited than other algae types for their use in animal feeding because of their large size and ease of harvesting. Brown algae are of lesser nutritional value than red and green algae, due to their lower protein content (up to approx. 14%) and higher mineral content; however brown algae contain a number of bioactive compounds. Red seaweeds are rich in crude protein (up to 50%) and green seaweeds also contain good protein content (up to 30%). Seaweeds contain a number of complex carbohydrates and polysaccharides. Brown algae contain alginates, sulfated fucose-containing polymers and laminarin; red algae contain agars, carrageenans, xylans, sulfated galactans and porphyrans; and green algae contain xylans and sulfated galactans. In ruminants, step-wise increase in the levels of seaweeds in the diet may enable rumen microbes to adapt and thus enhance energy availability from these complex carbohydrates. In monogastrics, those polysaccharides may impact the nutritional value but the addition of enzyme cocktails might help. *In vivo* studies on ruminants, pigs, poultry and rabbits reveal that some seaweeds have the potential to contribute to the protein and energy requirements of livestock, while others contain a number of bioactive compounds, which could be used as prebiotic for enhancing production and health status of both monogastric and ruminant livestock. Seaweeds tend to accumulate heavy metals (arsenic), iodine and other minerals, and feeding such seaweeds could deteriorate animal and human health. Regular monitoring of minerals in seaweeds would prevent toxic and other undesirable situations.

List of the134 References : http://www.animalfeedscience.com/article/S0377-8401(15)30027-4/references