Boron, chromium, lithium, molybdenum, nickel, silicon, tin and vanadium have been summarized as occasionally beneficial elements (Chapter 17).

Aluminium, arsenic, cadmium, fluorine, lead and mercury are described in Chapter 18 as essentially toxic elements.

Finally, designs of supplementation trials for assessing mineral deprivation are described in Chapter 19.

The textbook “Mineral Nutrition of Livestock” reviewed important aspects of major and trace element nutrition. The book is recommended to veterinarians, animal scientists advisors and advanced students of animal nutrition.

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Escherichia coli O157 in Farm Animals

As Escherichia coli O157 is a dangerous pathogen communicated from animal to man, a workshop was held at the Rowett Research Institute, Bucksburn, Aberdeen, UK in April 1998 to discuss the problems and challenges arising from it in an international group. The book contains the 11 papers of this workshop and two more reviews concerning the occurrence of Escherichia coli O157 in farm animals and the factors affecting the spread of this bacterium in the environment and to humans. Most of the contributors came from UK (22) but also 16 came from USA and eight from Canada and only one from Germany. So the meeting seemed to be only international with regard to some English-speaking countries but, however, these are the countries mostly concerned with the problem.

The book takes care of all aspects of E. coli starting with basic information such as genetic/molecular belongings according to pathology and ecology of the diseases and acid tolerance which is responsible for the survival of the bacterium in food and during the gastrointestinal passage. A section with three papers concerning bovine infection follows for both the animals and contaminated milk and meat from bovines are often the source of infection for humans and, besides, cattle often perceived to be the major reservoir for the bacterium. The next part is concerned with epidemiological aspects, the risk of human infection and experiences with outbreaks and the isolation of E. coli O157 in animals, the environment, food and humans in different countries. Two articles follow dealing with preventive measures at slaughter and the ecological cycle of E. coli O157 as base of prevention in general. The book is concluded by an outlook on possibilities for a
reduction of *E. coli* infection in future dealing with the example of UK comprising the government, slaughterhouses, farms, surveillance, meat production and the training of consumers.

The text is mostly readable and illustrated with clear figures and tables fitting well to the written parts. Each chapter starts with an introduction summarizing early knowledge and current assumptions and ends with a comprehensive reference list.

Only some chapters are concluded by a short summary and recommendations of what gives the reader the chance for a quick look up. The usefulness of the book as a guide for recommendations in practical use would be enhanced if all chapters were fitted with such a conclusion. The current findings are properly discussed and further information is suggested in the references comprising old and updated knowledge.

According to the subject, the chapters are more or less understandable. Especially the genetic and molecular basic topics are a little bit difficult to take up and some knowledge is required to understand them clearly. Nevertheless, the first two chapters are necessary to catch the problematic nature of toxicity and pathogenicity as well as the special characteristics of *E. coli* O157:H7 to understand the problems of investigations and conclusions and the danger arising from it.

Chapters 3–5 discuss the problem of bovine carriers in a similar way and some described experiments are repeated in all the three chapters. Some new aspects are given such as the doubting of a real carrier state in cattle and the discussion of a possible elimination of *E. coli* from the gut of bovines. All the authors come to the same conclusion that further studies are needed to really assess the influence of all discussed reasons for shedding, infection and contamination.

Chapter 6 about commensal-pathogen interactions tries to give a review of the physiology, microbial ecology and interactions in the gastrointestinal tract of ruminants closing with a suggestion of possible measures to reduce the risk of infection for humans and animals. This conclusion is very helpful as a guideline, for it summarizes and critically comments the possible measures for a reduction of shedding and infection in animals, especially bovines, such as feeding regimes, additives and immunization.

Chapters 7–9 give a review on what is known about the causes of outbreaks in different countries (Scotland, England, Germany). This is very interesting for it is shown that the line between cattle and human infection is not always that easy to draw. In Germany for example, almost no bovine was cultured positive for *E. coli* O157:H7 but most of the outbreaks were caused by this serotype. The occurrence of outbreaks within the countries is different in many ways including seasonality, number and causes. Worse conditions for microbial analyses could be the cause for negative results elsewhere in the world, so it would be of interest to keep such investigations and the establishment of a worldwide surveillance system in mind.

Chapter 10 completes the findings laying the mark on the correlation between human infection and a rural environment. The conclusion drawn is that living in a rural environment increases the risk of an *E. coli* O157-associated disease but it cannot be clearly assessed. With a careful handling of potentially contaminated materials, a reduction of the exposure of farm visitors, children and old people as risk groups to animals, a control of water, food and meat processing are some protective advises given by the author.
In Chapter 11, the problem of bacterial contamination during the slaughter process is discussed and preventive measures described to minimize the risk thereof. A lot of possibilities are suggested but a concluding summary is missing on what might be done in practice and could be used as a guideline for recommendations.

The ecological cycle of *E. coli* described in Chapter 12 shows that bovines play a role as a reservoir and in the spread but the persistence of the bacterium in wild birds, soil and water makes it difficult to keep the bacterium out of the environment. A lot of other possible ways of infection are discussed but are difficult to verify. To estimate the risk, more knowledge about the ecology is needed.

From the last chapter, I would have expected clearer information. The recommendations given by the Pennington group remain rather undefined and are restricted to UK. A lot of points are mentioned but unfortunately no real advise is given as to what farmers, consumers and abattoir workers can really do.

Altogether the book gives comprehensive information on the subject of *E. coli* O157 in farm animals, humans and the environment and enough suggestions for further readings in the references. At the end of the book, I would have appreciated a conclusion and summary of the current knowledge and the present recommendations of this expert group.

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