

Concurrent Session 1: Selenium and Health

Food selenium for human health and well being

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Background –Selenium, an essential element in mammals, has been under intense examination for its potential to influence growth, health and well being, since it was identified as an essential element and nutrient, a component of the 21st amino acid selenomethionine, and of at least 25 selenoproteins with varying significant functions. It has been shown to be an effective anticancer agent at intakes exceeding several fold current dietary recommendations. Other studies have shown it to be capable of boosting immune status, antioxidant status, inhibiting some viral diseases (influenza, AIDS, hepatitis C, coxsackie virus cardiopathy etc), preventing arthritis and improving mood states. However, not all study reports have been consistently positive.

Objective –To review briefly the claims and evidence regarding the role of selenium in human health and well being, to discuss the sources of selenium in our diet, the levels at which it has been shown to be effective and to address some concerns regarding over consumption of selenium.

Outcomes – Inorganic and organic Se dietary supplements have been shown to significantly reduce cancer expression, both in vulnerable Se deficient subjects, as well as where intakes significantly exceeded currently recommended intakes. Food forms of selenium have been found to be effective, but there can be significant differences in bioavailability and efficacy, depending on the vehicle. Selenium enriched dairy proteins (TaturaBio®Se) has proved to be very effective. Evidence of toxicity when selenium is supplemented in such food forms is minimal, while biopotency is significant.

Conclusions – Foods enriched with selenium are becoming increasingly available, which are capable of improving selenium status, offering an excellent option with respect to selenium's ability to provide significant disease prevention.

Selenium in animal production

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Background – The role of selenium, an essential element, has been the subject of controversy because of the devastating effects of Se deficiency and toxicity, both of which can occur in grazing animals or animals consuming grains from low and high Se soil regions, respectively. The major issue in Australia is that of deficiency and this has been largely eliminated through Se supplementation. In addition, there is a growing interest in increasing the Se content of the human diet to improve health with animal proteins serving as a safe and efficacious vehicle.

Objective –To review briefly the evidence regarding the role of selenium in animal health and safety, and to review appropriate sources of Se for animal health and safety and for the production of Se enriched animal products.

Outcomes – In Australia, there are Se-deficient soils along the coasts of Queensland, New South Wales, Victoria, South Australia, Western Australia and the interior of Tasmania and historically many primary products sourced from these areas contain relatively low Se concentrations. Fortunately, Se deficiency has largely been eliminated as a result of intervention programs such as Se supplementation to farm animals. However, there are differences in bioavailability and perhaps safety of inorganic versus organic forms of Se and this has become even more important as consumers are looking towards animal products for sources of Se. While inorganic Se is successful in ensuring overt deficiencies are avoided, it appears that organic Se sources such as selenised yeast or selenomethionine are more bioavailable and safe forms of supplementation to improve animal performance and produce animal products (e.g. eggs, milk meat) to augment human health. For example, supplementation of dairy cows with selenised yeast can increase milk Se by over 10x with no signs of toxicity and products produced from this milk have cancer preventative properties in animal models.

Conclusion – While Se deficiency of farm animals has been largely overcome by inorganic Se supplementation, organic Se offers a means of safely producing Se enriched products while reducing the risk of animal toxicity.