Invited Speaker Abstract

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Title of Presentation

Future proteins for sustainable food systems

1. Abstract

Population growth, increased life expectancy and improved economic performance in much of the developing world, will increase global demand for high quality protein. Protein quality is defined in terms of both indispensable amino acid content and bioavailability, with animal proteins generally regarded as the highest quality. However, livestock are frequently fed human edible sources of protein, predominantly soya and various cereals and, as recently highlighted in the EAT-Lancet report, such agricultural systems are unlikely to be able to meet the requirements of the growing population without major effects on the environment. Furthermore, excessive consumption of animal products, particularly red and processed meat, has deleterious effects on human health, including increased susceptibility to cardiovascular disease and colon cancer. In higher income countries significant changes are also being seen in the demographics of the population with increasing number of elderly (>65y) people. Protein requirements increase with age, against a background of reduced appetite and, frequently, physical and mental incapacities that can restrict food intake. Taking all of these factors into account there is an urgent need to consider the sustainable production of alternative sources of high quality protein, acceptable to our ageing population.
While animal protein could be replaced by consumption of a variety of protein-rich plant sources, or other novel, non-conventional foods (including insects and fungi), such sources also contain factors (e.g. phytate and proteinase inhibitors) which reduce uptake amino acids and micronutrients. Genetic selection, alongside novel food processing methods, may be required to maximize the value of such novel protein sources.
To meet increased global demands there is an urgent need for agricultural, nutritional and food scientists to work together to decrease the reliance of the livestock industry on human-edible crops and to develop alternative sustainable sources of protein which meet the needs of our growing and aging population.

2. key references

- Willett W, Rockstrom J, Loken B *et al.* (2019) Food in the Anthropocene: the EAT- Lancet Commission on healthy diets from sustainable food systems. Lancet 393, 447-492.
- Salter AM (2018) The effects of meat consumption on global health. Rev. Sci. Tech. Off. Int. Epiz., 37, 47-55.
- Lonnie, M Hooker E, Brunstrom *et al.* (2018) Protein of life: Review of optimal protein intake, sustainable dietary sources and the effect on appetite in ageing adults. Nutrients 2018, 10, 360; doi:10.3390/nu10030360.

3. key messages

- Population growth and increased life span means that we cannot rely on conventional livestock production to meet our needs for high quality protein.
- Increased protein requirements in elderly, coupled with reduced appetite and physical and mental incapacity makes it particularly challenging to identify alternative protein sources for this growing

demographic.

- Urgent work is required to develop sustainable, high quality protein sources including underutilized crops, insects, fungi, or even bacteria.