
Plant-based meats engineering innovations and commercial opportunities

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The livestock industry is a major user of agricultural land, yet only produces approximately 16% of our food worldwide. It emits large quantities of nitrate, which can pollute ground water, and methane, which is a well-known greenhouse gas. With the global demand for livestock products expected to increase 30% by 2050 (FAO), sustainably feeding the world's growing population is one of the major challenges of our time.

Increasingly conscious consumers are shifting away from a diet that relies for protein mainly on animal-based foods, towards a flexitarian or vegan diet where animal-derived protein is partially or wholly replaced by alternative protein sources such as legumes. The majority of consumers, however, do not fully embrace animal-free alternatives: For example, only 12% of Australians are vegetarian or vegan. The mainstream consumers, even those seeking to reduce their meat consumption, still wish to enjoy the familiar textures, flavours, nutritional benefits, and cultural associations of meat. Tailoring plant-based foods to address these traditional consumer preferences is considered the key to unlocking massive growth in the consumption of animal-free foods globally.

Many plant-proteins, especially from legumes, are currently used for animal feed. Converting this feed to produce human food applications could be a sustainable solution to the agri-food sector and offers a tremendous innovation opportunity. This opportunity has seen a major increase of private and public investment in this area and fast development of technological solutions over the last decade.

This presentation will discuss benefits of alternative proteins and how material transformation via processing can be used to design food matrices and ingredients with good sensory attributes and proven health benefit to the end-consumer. Recent industry case studies and product applications, including plant-based meat substitutes of leading international and Australian companies, as well as future technologies, such as high moisture extrusion, 3D-printing, and precision fermentation of molecules for enhanced sensory experience, will be presented.