**Jing Li**

Dr, PhD Adel.

Research Fellow

**Personal profile**

**Biography**

I have work experience in both commercial and academic environments, where I have undertaken research in world-class centres. My research includes dissecting mechanisms that underpin cellulose and callose biosynthesis in plants; functionality studies of enzymes involved in starch metabolism; and recently, employing metabolic engineering approaches, focusing on strategies to improve plant quality, produce bio-energy and functional foods. In my current project, I have used gene transfer technology to produce transgenic plants with modified phytosterols. These novel sterols may have applications in insect resistance and human nutrition. A patent application is being evaluated.  
  
In addition to my technical expertise in research, I also have experience in the food and grain processing industries. I have a strongly entrepreneurial approach, based on firm knowledge and experience. I actively assist the Australian agricultural sector to secure new opportunities and to enhance international competitiveness and value.

**Roles and responsibilities**

Project management and leadership  
Research activities and support  
Capacity building, linkages and future funds.  
  
Expertise  
Molecular Biology  
Protein Chemistry  
Plant transformation

**Teaching overview**

Postgrad student supervision

**Current projects**

My current research topic involves modifying plant sterol metabolism to control insect pests.  
  
New approaches are required to control insect pests which cause enormous global crop losses. Phytophagous insects are incapable of synthesizing cholesterol which is an essential molecule for many important biological functions. In particular, cholesterol is a precursor of the molting hormone. Insects rely on converting host phytosterols to cholesterol via a unique dealkylation pathway. There are stringent structural demands on phytosterols used as substrates, therefore some phytosterols cannot be utilized by insects. This important pest-host interaction provides a unique platform from which to explore the opportunity for a new insect pest control strategy.

Our project aims to develop a novel technology which is achieved by modifying plants to produce non-utilizable sterols. The plants with modified sterols will unable to support insect growth & reproduction but will nevertheless function normally in plants*.* The specific aims are to modify canola plant sterols by overexpression/knock-out (using Crispr technology) of novel sterol biosynthetic genes, or by exploiting natural variation in sterols already present in canola and introgressing non-utilizable sterols from other *Brassicaceous species*.

We have genetically modified a model plant (Arabidopsis) with specific sterol biosynthetic genes that synthesize non-utilizable sterols in sufficient quantities without apparent effects on plant growth. Insects reared on the modified Arabidopsis plants tend to have delayed growth. Transgenic plants are also undergoing further physiological and ecological evaluations. The transformation of these genes into agricultural crops such as canola, cotton is progressing and has the potential to save billions of dollars in insect control.