

INSECT AND FUNGAL RESPONSE TO  
SORBIC ACID TREATED STORED COMMODITIES

by

Florence V. Dunkel  
Department of Entomology  
University of Minnesota

Liang Chuan  
Guangdong Institute of Grain Science Research  
Guangzhou, China

and

Huang Fan Yin  
Guangdong Institute of Microbiology  
Guangzhou, China

Sorbic acid is a conjugated diunsaturated fatty acid produced in the fruit of the mountain ash tree and by the pigment producing cells of some aphids. The structure of sorbic acid corresponds to the saturated fatty acid caproic which is present in butterfat at concentrations of 1-2%. Under non-fasting conditions in mammals sorbic acid is completely oxidized to  $\text{CO}_2$  and  $\text{H}_2\text{O}$  and yields its entire 6.63 cal/g for energy.

In 1945 a U.S. patent was approved for its fungistatic properties. Several years earlier a German patent had been approved for its synthesis method. Germany and Japan are now the largest producers of sorbic acid. England, China and many other countries produce and use the compound in minor amounts. The U.S. is the world's 3rd largest producer.

Following its discovery as a fungistat, it was approved by the U.S. Food and Drug Administration for use in food as GRAS (Generally Regarded As Safe). Approval was at a level (0.3% w/w) near to that which I and others (Burkholder et al. 1973, Baker & Mabie 1973, Boush et al. 1968, Dunkel et al. 1982, Dunkel unpubl.) have since found it to be an effective insecticide. Long term mammalian toxicity studies detected no carcinogenic effect at levels of 10% w/w in diet (Gaunt et al. 1975) --a value 400 x in excess of the level set by the Joint FAO/WHO committee on Food Additives in 1967.

Sorbic acid is now used in cheese, baked goods, medium moisture processed foods, and liquids around the world. Today we are going to explore the possibilities it has as an insect growth regulator in stored grain, pulses and milled products and its potential as a stored grain fungal growth regulator.