Workgroup/Department: Commodity Protection & Quality Research Unit

USDA-ARS
San Joaquin Valley Agricultural Sciences Center

PROJECT PLAN/RESEARCH GRANT PROPOSAL

Project Year 2008 Anticipated Duration of Project: 2 years

Project Leader James G. Leesch Location: USDA-ARS-SJVASC, Parlier, CA

Cooperating Personnel: J. Steven Tebbets

Project Title: A Comparison of Methyl Bromide and Profume® Efficacy Against the Eggs of Navel Orangeworm and the Diapausing Larvae of Codling Moth in Walnut Fumigations Conducted at NAP and Under Vacuum

Keywords
Commodity(s) walnuts, fumigation, codling moth, navel orangeworm, methyl bromide, Profume®

Relevant Project No.

Problem and its Significance:
Walnuts are marketed in Europe and Japan during the holiday season in November and December. Since this occurs immediately following harvest, it is important that the whole nuts be fumigated quickly in order to be processed for this market. Fumigation with methyl bromide occurs in chambers for a matter of hours to rid the whole nuts of live diapausing Codling moth larvae that are hidden within a few intact nuts. It also is effective in ridding the nuts of any viable eggs of the Navel orangeworm that may be present. Up to now, methyl bromide has been the fumigant of choice because of its rapid efficacy and economic feasibility. With the discovery that methyl bromide is an ozone depletory, alternatives are being sought to replace it as a fumigant. One promising candidate is Profume® (sulfuryl fluoride) which is now registered in California for use on dried fruit and nuts. This research is directed at determining if Profume® can replace methyl bromide in its efficacy against the diapausing larvae of codling moth and the eggs of Navel orangeworm. If Profume® is efficacious and proves to be an economically feasible alternative, then it can replace methyl bromide in the fumigation of inshell walnuts and no further Critical Use Exemptions will be necessary and methyl bromide use will be eliminated.

Objectives:
Objectives of the research are 1) determine the efficacy of methyl bromide and Profume® against eggs of the Navel orangeworm, 2) determine the efficacy of methyl bromide and Profume® against diapausing larvae of the codling moth in inshell walnuts 3) determine if the fumigation can be conducted at normal atmospheric pressure (NAP) and/or under vacuum conditions and 4) determine the effective fumigation parameters at 3 temperatures.

Plans and Procedures:
Hartley walnuts will be infested with eggs of the Navel orangeworm or diapausing larvae of the codling moth and placed in 1-cu. ft. chambers at 50% load and exposed to various concentrations of either methyl bromide or Profume® and one of 3 temperatures and at normal atmospheric pressure (NAP) or under vacuum. Each chamber will be monitored for concentration at various times throughout the fumigation. Each set of fumigation conditions will be replicated at least 3 times for statistical validation. Mortality of the exposed insect stages will be mad e following treatment and concentration-verses-mortality curves prepared. From the curves, the LD50 and LD99.9 will be determined so that a direct efficacy comparison of the 2 fumigants can be made at each temperature and pressure.

	BUDGET REQUEST (2008-2010)		Budget for 2 Years
Funding Source			
Salaries and Benefits			
Postdocs/RA's	0		$
SRA's	0		$
Lab/Field Assistance	$ 5000.00		$ 5,000.00
Subtotal		Sub 2	$ 5,000.00
Employee benefits		Sub 6	$ 0
		SUBTOTAL	$ 5,000.00
Supplies and Expenses		Sub 3	$ 7,000.00
Equipment		Sub 4	$ 0
Travel		Sub 5	$ 2,000.00
	2 YEAR TOTAL (2008-2010)		$ 14,000.00
	1 YEAR TOTAL (2008-2009)		$ 7,000.00

Department account number _____

_____ Date _____

Originator's Signature

Research Leader _____ Date _____

Center Director _____ Date _____