142,935

TSS/IRB PERFORMANCE REVIEW January 16, 1984

TO: PM 17

SUBJECT: 45167-1
Margosan-O
Vikwood, Ltd.
Sheboygan, WI

IN TSS: 01-14-84
RN: 142935
DUE: ASAP
AC: 136
ACCN: 252097
OLTS: 11

[redacted]

BACKGROUND

These data are submitted in support of efficacy claims for a new active ingredient. Submitted data are supposed to support the presumption that the product is a biorational pesticide. The applicant asserts that the material is an insect growth regulator. Subpart M of the guidelines indicates that biochemical pest control agents may be considered as biorational pesticides on a case by case basis. To be a biochemical pest control agent, a product must be either a semiochemical, a plant regulator, a hormone, or an enzyme. An IGR may be a hormone or even an enzyme in unique situations.

The common name of the material in much of the public literature is azadiractin.

USES

Experimental Label is incomplete for sites and pests.

SUBMITTED DATA

1. Accession number 252097 contains several reports concerning efficacy data. Most of these are small plot field studies which are summarized later. Of special interest are laboratory studies by Coudriet (CA) where the material was fed to Cabbage Loopers (Trichoplusia ni), and the Beet Armyworm, (Spodoptera exigua). In these studies, larval development was arrested at concentrations between .02-.20%, and the researcher indicates that the material behaves as a moulting inhibitor.

On the other hand, Cantelo(USDA,MD) reports that the material acts as a feeding deterent to the Colorado Potato Beetle. No mortality occured to either adults or larvae when exposed to dried residues on treated potato leaves, but damage was greatly reduced.

2. As the submitted data were sketchy, we also consulted Insecticide and Acaricide Tests, Vols 8 & 9, and the Journal of Economic Entomology. From the Journal, there were reports that the material acted as both an antifeedant AND as an ecdysal inhibitor for leafhoppers and planthoppers on rice. The control was also judged to be at an acceptable level.

3. Weidhaas, (USDA IAMA FL) evaluated the compound and determined that it is: not a mosquito repellent; not a cockroach repellent; not a sterilant for houseflies; and is ineffective for the control of fire ants.

4. The following table summarizes the results of available data derived from small-plot field studies:

Pest	Site	Rate	Location	% Control/Damage Reduction
H. zea	Corn	1.00%	GA	58
		0.20	GA	28
		0.20	IN	59
		0.40	IN	63
	Tomato	0.10	FL	04
S. frugiperda	Corn	0.10	GA	26
		0.40	GA	26
Col. Pot. Beetle	Potato	0.20	IN	66
Alfalfa Looper	Spinach	0.2	WA	33
		0.40	WA	39
		0.80	WA	47
Bertha Armyworm	Peas	0.20	WA	0
		0.40	WA	0
		0.80	WA	63
Cabbage Looper	Cabbage	0.20	WA	68
		0.40	WA	62
		0.80	WA	74
	Tomato	0.10	FL	0
S. Armyworm	Tomato	0.10	FL	10
Leafminers	Tomato	0.10	FL	64
		0.10	FL	85
Citrus Red Mite	Grapefruit	2.00	FL	100
	Orange	0.25	FL	66

CONCLUSIONS

1. The efficacy of the product is highly variable. Variations between site/pest combinations are great. Several researchers also mentioned excessive phytotoxicity with the most recent formulation.

2. From the limited amount of data submitted and from the readily available data in the public literature, the method of action of azadiractin is not adequately defined. Most researchers appeared only to be searching for initial activity. This compound has been described as; a) a feeding deterrent, b) a toxicant, and c) an ecdysal inhibitor. For some species there was no activity at all. In many cases, biological activity was demonstrated, but at a low level. It should be noted however, that the control of leafminers, planthoppers, leafhoppers, and mites described in the submitted and open literature studies appeared to be adequate for preliminary dose-finding research.

3. At this point we cannot confirm that the material is indeed an insect growth regulator. None of the work to date indicates when the compound acts as an ecdysal inhibitor, and if so, how the material affects the ecdysal process. It remains unexplained why the compound would have such effects on one species but not on others. Similar mystery surrounds the use of the product as an antifeedant. The kinds of data necessary to determine the status of the product as an insect growth regulator have not been submitted. For the purposes of registration, the property of ecdysal inhibition must be furthur researched. Additionally, the mechanism of such inhibition needs additional study to determine if the compound indeed acts as a hormone (or analog, or mimic), as an enzyme, or in some other manner (as a blocker or perhaps replacer) At present we would describe azadiractin as a potential ecdysal inhibitor, and/or antifeedant, and/or toxicant, that appears to have a certain degree of undesirable phytotoxicity associated with broadcast applications.

4. As the most success with this compound appears to have been with leafminers and mites, we would suggest that the applicant consult with Dr. Hiram Larew (USDA, Beltsville MD) on the method of action for leafminers and Dr. Carl Childers (FL AREC, Lake Alfred FL) for the method of action against mites. These individuals may be able to provide additional supporting data.

5. We cannot recall a situation where a product had potential biorational properties for some pests and traditional toxicant properties against others (and in some cases, both). This unique situation may make the determination of the compound as a biorational difficult, even if the insect growth regulating properties of the material are better defined.

Phil Hutton
TSS/IRB