Biossay Method For Checking the Adequacy of Fungicidal Seed Treatment, Food & Drug Coloration Laws and Federal & State Laws

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BIOASSAY METHOD FOR CHECKING THE ADEQUACY OF FUNGICIDAL
SEED TREATMENT, FOOD & DRUG COLORATION LAWS AND
FEDERAL & STATE LAWS

Charles Hutchinson 1/

We are beginning to realize now one of the reasons why certain
growers have from time to time claimed that "seed treatment does not pay";
in all probability in these instances the seed treatment, whether it was a
fungicide or an insecticide, was not applied at the recommended dosage.
This unhappy circumstance may soon be a thing of the past because the
Association of Seed Control Officials are adopting a method for the detection
of inadequate fungicide treatments, and when this technique has been
further perfected, any seed lot carrying a seed treatment tag, which after
test shows inadequate treatment, or in some cases no treatment, can be
subject to "stop sale".

The primary object in the application of fungicide to seed is to
control disease organisms borne on the seed, and to protect the seed and
the seedling in the soil. To achieve this it has been established that a
certain amount of active ingredient must be applied. This amount appears
on the chemical's label registered with the U.S.D.A. When seed is treated
most states require that it be so tagged, and that the tag state that the
chemical was applied "at the rate recommended by the manufacturer", or
similar phrasing. All treated seed going into interstate commerce must be
identified by tag or other approved marking on the container.

Anyone who purchases seed which carries information to the effect
that it has been treated with a pesticide has every bit as much right to
expect this statement to be true as he has to expect that the germination,
weed seed count, etc., are also true. In the future it is expected that in
instances of gross undertreatment and where no treatment was applied at
all, offenders will be subject to the same laws and regulations as apply
to other seed information.

We certainly want to believe that the majority of processors make
every possible effort to apply the correct dosage, but the evidence that we
have before us, indicates that the practice of undertreatment is much more

1/ Mr. Hutchinson is Marketing Manager, Seed Treatment Products,
widespread than we had previously thought.

In 1964 in one state, we know of at least 20 samples of seed which were drawn from different dealers' premises, and all of which were found to be grossly undertreated. The processor received a warning and was advised that sooner or later he might be called upon to defend himself.

In one province in Canada, 36 samples of alleged treated seed were picked up at random and only one sample carried what was deemed to be full dosage. Six were rated as rejects, and 3 of these showed practically no evidence of seed treatment, although one was highly colored.

The state of Ohio has been conducting tests, and on 20 samples carrying seed treatment tags 10 apparently carried adequate treatment, 2 insufficient treatment, and 8 no treatment at all. They feel that the situation is so serious that they have drawn up a state law, which has passed the House and probably by now will have passed the Senate, and this law states in part, "No person shall sell or offer for sale in this state, seed represented by labeling, advertising, or distinctive coloring, to have been treated, unless the seed actually shall have been so treated in such amount as to be effective for the purposes claimed."

Well, it is one thing to pass a law designed to correct a wrong, but it is something else to develop a technique which is feasible and realistic when it comes to enforcing such a law.

The technique that has been adopted by the Association of Official Seed Analysts is referred to as a microbiological assay of fungicide treated seeds. This is usually abbreviated and referred to as the "bioassay method". I am not going into a discussion on details of the techniques involved, but will cover the method in a general way.

A given number of seeds - for example, 50 or 100 seeds - are placed on the surface of an agar plate containing a suspension of sterile agar and fungal spores. The plate is covered and incubated at room temperature for a period of approximately 48 hours. Seeds that are treated with a pesticide will be surrounded by a zone of inhibition in which the spore growth is inhibited. This zone, or clear halo, is called the Zone of Inhibition.

Qualitative and quantitative tests for the presence of fungicides on seeds can be determined with a degree of accuracy. In both instances, an untreated sample of the same grain should be laboratory treated with the proper amount of fungicide, then plated and used as a reference for the commercially treated sample. There is considerable variation as between fungicides. Some naturally diffuse to better advantage in the agar, therefore, control more of the spores and cause a larger halo. The size of the zone of inhibition cannot be used to judge the effectiveness of the treatment against any certain disease.
For example, seed protectant thiram will create a good sized halo, but this chemical will not control cereal smuts, for example.

The test will, however, give a very good indication as to whether or not fungicide has been applied and as to whether or not it is on all of the seeds.

At this juncture I would like to point out that when using a product with vapor action, Panogen for example, that where some seeds may appear to have much more color on them than others, the bioassay proves that this is no criterion as to the actual spread of the fungicide.

Our research laboratory has worked closely with the Association of Official Seed Analysts and the Association of Seed Control Officials because, although we dislike controls as much as the seed processor does, we have been convinced that this regulation is necessary.

**Labeling Treated Seed**

This is an important item, and we strongly urge all who have any connection with this phase of the seed industry to study your state seed laws and the laws of the states in which your seed may eventually be sold. Under our code numbers C-1 and C-2 we offer fairly detailed information on this subject, and it is available to any who wish it.

**Food & Drug Coloration Law**

Again we urge all processors to be aware of this law, which came into effect January 1, 1965. Under our information code number B we reprint this regulation, and it, too is available to any who request it.

**Feeding of Treated Seed**

We presume that everyone realizes that any seed treated with a chemical that carries the word "poison" and the skull and crossbones should not be used as food or feed. You should also realize that there are many products which it is not necessary to identify as being "poisonous", and yet some of these under the Federal Seed Act are listed as being similarly toxic to mercurials. I refer to the insecticides such as aldrin, dieldrin and heptachlor. The Federal Seed Act also under their paragraph (d) lists other harmful substances, and this includes such things as thiram, captan, etc.

This simply means that any pesticide other than for stored grain insects, which is applied to seed, must carry labels warning against its use for food, feed or oil purposes. Our information bulletin M1-36 covers this subject, and this, too, is available on request.

In summary, may I suggest to those of you who are processors
and to those of you who are in position to disseminate information to processors, that you reacquaint yourselves with the regulations, and rededicate yourselves to the proposition that seed should be well treated at the rate recommended, and that the treatment should be well and legally identified.

Editors Note: The following Federal Seed Act Regulations were furnished thru the courtesy of Morton Chemical Company.

TITLE 21 — FOOD AND DRUGS
CHAPTER I — FOOD AND DRUG ADMINISTRATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
SUBCHAPTER A — GENERAL
PART 3 — STATEMENTS OF GENERAL POLICY OR INTERPRETATION
GRAIN SEED TREATED WITH POISONOUS SUBSTANCES

Following publication in the FEDERAL REGISTER of October 27, 1962 (27 F.R. 10494), of a proposed statement of policy concerning food seeds treated with poisonous substances, many comments and suggestions were received. After review of these comments, it has been concluded that some changes in the statement of policy as proposed should be made. Therefore, pursuant to the authority vested in the Secretary of Health, Education, and Welfare by the Federal Food, Drug, and Cosmetic Act (secs. 402(a), 701(a), 52 Stat. 1046, 1055; 21 U.S.C. 342(a) (371(a)), and delegated to the Commissioner of Food and Drugs by the Secretary (25 F.R. 8625), Part 3 is amended by adding the following new section:

#3.13 Grain seed treated with poisonous substances; color identification to prevent adulteration of human and animal food.

(a) In recent years there has developed increasing use of poisonous treatments on seed for fungicidal and other purposes. Such treated seed, if consumed, presents a hazard to humans and livestock. It is not unusual for stocks of such treated food seed to remain on hand after the planting season has passed. Despite the cautions required by the Federal Seed Act 153 Stat. 1275, as amended 72 Stat. 476, 7 U.S.C. 1551 et seq. in the labeling of the treated seed, the Food and Drug Administration has encountered many cases where such surplus stocks of treated wheat, corn, oats, rye, barley, and sorghum seed had been mixed with untreated seed and sent to market for food or feed use. This has resulted in livestock injury and in legal actions under the Federal Food, Drug, and Cosmetic Act against large quantities of food adulterated through such admixture of poisonous treated seeds with good food. Where the treated seeds are prominently colored, buyers and users or processors of agricultural food seed for food purposes are able to detect the admixture of the poisonous seed and thus reject the lots; but most such buyers, users, and processors do not have the facilities or scientific equipment to determine the presence of the poisonous chemical at the time crops are delivered, in cases where the treated seeds have not been so colored. A suitable color for this use is one that is in sufficient contrast to the natural color of the food seed as to make admixture of treated, denatured seeds with good food easily apparent, and is so applied that it is not readily removed.

(b) On and after December 31, 1964, the Food and Drug Administration will regard as adulterated any interstate shipment of the food seeds wheat, corn, oats, rye, barley, and sorghum bearing a poisonous treatment in excess of a recognized tolerance or treatment for which no tolerance or exemption from tolerance is recognized in regulations promulgated pursuant to section 408 of the Federal Food, Drug, and Cosmetic Act, unless such seeds have been adequately denatured by a suitable color to prevent their subsequent inadvertent use as food for man or feed for animals.

(c) Attention is called to the labeling requirements of the Federal Hazardous Substances Labeling Act, where applicable to denatured seeds in packages suitable for household use.


George P. Larrick,
Commissioner of Food and Drugs

Dated: November 4, 1963

(Published in Federal Register of November 8, 1963)
FEDERAL AND STATE REGULATIONS REGARDING
TAGGING OF TREATED SEED

Federal Law.

State Law.
All seedsmen, whether they process seed or not, are advised to have an up to date copy of the seed law of each state in which they intend to do business. It is usually sufficient to address an inquiry to the State Department of Agriculture, Seed Control Official, and they are usually located in state capitols.

An alternative is to study the detailed information that is published annually in both the Seed Trade Buyers Guide and the Southern Seedsmen’s Association Directory and Buyers Guide.

An Interpretation of the Federal Regulation as Published in the Federal Register of May 15, 1959.
Seed treated with any type of mercurial or with an insecticide such as aldrin, dieldrin, heptachlor, lindane, or any chemical, the label of which carries the word “poison”, which will leave a residue on the seed that can be harmful to animals, must be tagged with a skull and crossbones and the words “Poison Treated” or similar. The wording must be in red on a distinctly contrasting background. See paragraph below for type size requirements.

Seed treated with any chemical commonly referred to as a “seed treatment”, whether labeled “poisonous” or not, must be tagged to show name of substance used, and this statement must appear — direct — eg. Arasan, “This seed treated with thiram”, or eg. Panogen, “Mercury treated”, or “This seed treated with methyl-mercury dicyandiamide”. The trade name can be shown but it must not appear in direct connection with the “treated with” statements above.

All seed treatments should be labeled with the words: “Do not use for food, feed or oil purposes”, or similar. Requirements as to size of type, etc.: “This seed treated with_________________________” not smaller than 8 point type.

(name of substance—not trade name)

“Skull and Crossbones” at least twice the size of the type used on the “substance” statement.

“Poison Treated” — not less than 8 point.

“Do not use for food, etc.” — not less than 8 point.

Sample Tags.
Refer to sheet #14-ST-21 attached. These seven tags have been approved by USDA and by all states except as listed below.

State Tagging Requirements.
Many states wish to follow the federal regulation, and some of those which do not have indicated their complete willingness to accept the federally approved tag, even though it may not always conform with their own state seed law. States that take exception to the attached sample tags are as follows:

Florida — insists that the actual rate of application of fungicide or insecticide be shown on the tag.

Georgia — state law requires rate of application, but we were advised that it was unlikely that they would do anything other than accept the federally approved tag.

Louisiana — state law requires rate of application, but we have been advised that the state wishes to accept the federally approved tag as correct.

Many individual states do not include reference to seed treatment tags in their seed law, but whether they do or not, seed coming across the state line is, of course, subject to the federal act.

Numerous control officials on the state level are seriously considering declaring seed improperly tagged if it is claimed that the treatment is applied at the rate recommended by the manufacturer, if subsequent bio-assay tests prove that the rate was substantially less.
201.31a LABELING TREATED SEED
(Reprinted from Federal Register of May 15, 1959)

Title 7—AGRICULTURE
Chapter 1 — Agricultural Marketing Service (Standards, Inspections, Marketing Practices), Department of Agriculture.

SUBCHAPTER K—FEDERAL SEED ACT
PART 201—FEDERAL SEED ACT REGULATIONS

Miscellaneous Amendments

On November 14, 1958, there was published in the Federal Register (23 F.R. 8867) a notice of rule making and hearing with respect to proposed amendments of the regulations under the Federal Seed Act. After consideration of all relevant matters presented at the hearing, or in writing, pursuant to said notice, and under authority of section 402 of the Federal Seed Act (7 U.S.C. 1592) the regulations of the Secretary of Agriculture in 7 CFR Part 201, as amended, are hereby further amended as follows:

§ 201.31a Labeling treated seed.
(a) Contents of label. Any agricultural seed or any mixture thereof or any vegetable seed or any mixture thereof, for seeding purposes, that has been treated shall be labeled in type no smaller than 8 point to indicate that the seed has been treated and to show the name of any substance or a description of any process (other than application of a substance) used in such treatment, in accordance with this section; for example,

Treated with .........................................................
(Name of substance or process)

or ......................................................... treated.
(Name of substance or process)

If the substance used in such treatment in the amount remaining with the seed is harmful to humans or other vertebrate animals, the seed shall also bear a label containing additional statements as required by paragraphs (c) and (d) of this section. The label shall contain the required information in any form that is clearly legible and complies with the regulations in this part. The information may be on the tag bearing the analysis information or on a separate tag, or it may be printed in a conspicuous manner on a side or top of the container.

(b) Name of substance. The name of any substance as required by paragraph (a) of this section shall be the commonly accepted coined, chemical (generic), or abbreviated chemical name. Commonly accepted coined names are free for general use by the public, are not private trade-marks, and are commonly recognized as names of particular substances; such as thiram, captan, lindane, and dichlof. Examples of commonly accepted chemical names are: bluestone, calcium carbonate, cuprous oxide, zinc hydroxide, hexachlorobenzene, and ethyl mercury acetate. The terms "mercury" or "mercurial" may be used in labeling all types of mercurials. Examples of commonly accepted abbreviated chemical names are: BHC (1,2,3,4,5,6-Hexachlorocyclohexane) and DDT (dichloro diphenyl trichloroethane).

(c) Mercurials and similarly toxic substances. (1) Seed treated with a mercurial or similarly toxic substance, if any amount remains with the seed, shall be labeled to show a representation of a skull and crossbones at least twice the size of the type used for information required to be on the label under paragraph (a) and shall also include in red letters on a background of distinctly contrasting color a statement worded substantially as follows: "This seed has been treated with Poison," "Treated with Poison," "Poison treated," or "Poison." The word "Poison" shall appear in type no less than 8 point.

(2) Mercurials and similarly toxic substances include the following:
Aldrin, technical.
Dieldrin.
Endrin.
Heptachlor.
O,O-diethyl S-(ethylthiomethyl) phosphorodithioate.
O,O-diethyl S-2-ethylthio ethyl phosphoro-Phenyl amine diacrylate.
Mercurials (all types):
Ethyl mercury acetate.
N-ethylmercury-1, 2, 3, 6-tetrahydro-3, 6,-endo-methano-3,4,5,6,7,8-hexachloro phthalimide.

(d) Other harmful substances. If a substance, other than one which would be classified as a mercurial or similarly toxic substance under paragraph (c) of this section, is used in the treatment of seed, and the amount remaining with the seed is harmful to humans or other vertebrate animals, the seed shall be labeled with an appropriate caution statement in type no smaller than 8 point worded substantially as follows: "Do not use for feed," "Do not use for feed," "Do not use for food," "Do not use for food," or "Do not use for food." Any amount of any substance, not within paragraph (c) of this section, used in the treatment of seed, which remains with the seed is considered harmful within the meaning of this section.

Aldrin—2 p.p.m.
Malathion—8 p.p.m.
Methoxychlor—2 p.p.m.
Piperonyl butoxide—8 p.p.m.
Pyrethrins—1 p.p.m.