Protection of stored food products against depredators of animal origin remains a current problem. Nevertheless, generally speaking, regulations governing the use of agricultural chemicals in the various countries do not take into account the protection of processed foods (and pet-foods) located in storage units whether in the processing plant, or at intermediate storage level or by the distributor, the applications being restricted to some raw materials (cereals for inst.) in the silos.

On the other hand, in France for example, the Departemental Sanitation Regulation makes necessary pest control operations compulsory, all precautions being taken.

Can national regulations be adapted to such situation, and how? This paper will try to describe the conditions in France and some neighbour countries, and will contemplate future developments.

1. Introduction

As soon as man has stored his food, the latter became the prey of depredators, leading to losses thru direct consumption or thru damages and spoilage.

Since that early time, solutions have been found. They are, nowadays, sophisticated and effective, the need for protection being greater now due to the increase of world population and commerce.
2. To-day demands

2.1. Raw materials protection

The fact that five international congresses on this matter have already taken place clearly indicate the above-mentioned need for our modern world, where larger and larger storage units act as lures for depredators and increase the risks.

Among others, chemicals are one of the weapons against pests in stored raw materials. They are effective and can be legally used.

2.2. Finished foods protection

It is this Congress’ merit to have included a Section dealing with consumer goods, generally under the form of prepacked food (and pet-food) products.

As for raw materials, predators’ action leads to losses with pre-packed consumer goods also, and sanitation measures shall be taken at all steps of the process in order to maintain the quality of the food.

Three facts are worth mentioning here:

- there are, more or less, the same pests, although few insects and/or mites accommodate gladly in the packaging material, full or empty;
- same pests lead to same general control methods, but storage conditions may be fully diverse (tiny to huge places, different pre-packed foods stored under the same roof);
- as far as the use of chemicals, the situations are completely different:
  - for stored raw foods, a range of active ingredients (insecticides and miticides) can be used: their activity is well acknowledged, their use is duly authorized under some precise conditions which details can be found in the national regulations,
  - for pre-packed foods it is legally permitted during processing, storing or handling to apply (under certain conditions) chemicals in empty premises, no permission whatsoever exists in case these premises are full of goods.

All this places the producer and the distributor of foods in front of a dilemma as far as regulations are concerned.

In France for instance, the situation is as follows:

1. The Departemental Sanitation Regulation (Réglement Sanitaire Départemental) issued by the Circular Letter dated August 9, 1978 (French Official Journal of
September 13, 1978) contains a Chapter VII dealing with food hygiene, including protection against insects, rodents and other animals. Articles 125.1, 125.2, 129.1, 130 and 130.5 of Section I "makes, if necessary, insect and rodent control compulsory, taking all precautions to avoid foods to be reached by the treatments... and to be spoiled by chemicals". These conditions are valid for transportation, storage and processing of foods.

In the same way, at international level, the Codex Alimentarius Commission has issued an International Recommended Code of Practice in 1988 entitled: "General Principles of Food Hygiene" with the same requirements, insisting upon applications being done by qualified personnel only, and not leading to residues in food.

2. The other point is that, in France as well as in other countries, the regulations on agricultural chemicals deal ONLY with standing crops and some basic raw materials after harvest and before processing.

In addition to these authorizations, the use of insecticides is generally permitted in food storage units, but only if empty.

3. What can be done?

Food industry and food distribution have to face this pretty difficult situation.

3.1. in France

We have initiated a dialogue with the authorities already in 1984, indicating the need for insect control (if necessary) where processed food was stored.

A working group within the French Food Industry Association (ANIA) started its work in January 1985 and prepared, under my chairmanship a Code of Practice on this matter. Another working group (of the French Plant Protection Association ANPP) drew up a list of most damaging insects and mites, together with their biology and possible control methods.

The authorities (Plant Protection Service at the Ministry of Agriculture and Forestry, General Directory for Consumer Affairs and Repression des Fraudes at the Ministry of Economy and Finance, together with the Superior Council of Hygiene and the Pesticide Approval Committee) were kept informed of the progress of both works.
The concept of "empty premises" was first discussed, and we explain to our interlocutors that, in the food and pet-food industry and distribution sector, storage units may easily have volumes of 100,000 cu. metres making impossible to keep them empty, even for a short period of time.

To comply with the existing regulations we rather suggested to consider the empty parts of the storage units.

Consumable foods are, nowadays, generally packed in a cardboard box or a plastic sachet, regrouped in a larger cardboard box, regrouped again in loads put together on a wooden palette and wrapped with a plastic (shrink) film of several layers. Under these conditions, an insecticide application on the walls of the premises, turning one's back on the food products stored should enable to avoid any spoilage problems. Furthermore, small-scale preliminary tests confirm this hypothesis.

In agreement with the authorities, the two working groups prepared a testing protocol, selecting few rather safe chemicals, active against most common pests, and some foods. The foods under test will belong to categories which are always prepacked (biscuits, sugar, pet-food, ...). An additional protocol, elaborated with the Central Control Laboratory, describes the sampling methods for residue analysis.

If things go well, these tests will be run beginning of 1991 and, if the results are in line with the starting hypothesis, they may lead to a new regulation permitting the use under strict conditions in this new sector of application of some few pesticides already approved elsewhere.

Among these conditions, it is clear that these treatments will only be done by trained, legally qualified professionals.

While progressing on this road, the working groups also managed to complete the Code of Practice under the form of a 40 pages brochure (+ annexes) which will be available soon. The recommendations contained have been submitted to the French authorities and have received their written laudatory approval.

3.2. In other countries

In Spain, the situation is somewhat similar to the one in France, with a Royal Decree (706/1986 of March 7, 1986) making pest control compulsory in food storage units, and comparable with the French Sanitation Regulation, and another Decree (3349/83 of November 30, 1983) governing the use of pesticides. Some of them are expressly permitted for external applications on processed vegetable foods and storage units, but only in the absence of products (with a 48-hour delay before re-storing the foods).
In Germany there is a special list of pesticides authorized in food storage (Vorratsschutzmittel) but, here again, only in empty premises, on empty bags and in storage units of cereals and other vegetable raw materials.

At Council of Europe level and already in 1977, the possible need for insecticide applications on stored food products (raw materials and finished products) was discussed, and wishes for modified regulations, adapted to new conditions, were expressed. A list of possible pesticides was even set up.

One may express the hope that, if the forecasted tests in France prove to be satisfactory, discussions may start at EEC level, or be re-animated at Council of Europe level, recognizing the need, in some cases, of treatments of open space in premises where prepacked processed foods are appropriately stored. This may, then, open the way to international regulations in this area.


We are very glad that this matter of sanitation methods for processed stored foods is discussed within this international Congress.

Sanitation is a global problem and, in some few cases, it may be necessary to intervene in premises with stored foods, taking all possible precautions (no direct spray on food, duly tested and authorized active ingredients and formulations, duly authorized and well prepacked food products, applications done only by legally qualified specialists).

Food industry is compelled to deliver safe and high quality products to the consumer, by all means.

Each step of the process bears its own risks, and prevention is the safest weapon. Effective methods shall be developed for each case at each step to get the best results, in order to satisfy the consumer, enabling then an increase in the international trade of foods and food products.

But, to conclude, let's recall that protection against pests in stored foods is, before everything else, a matter of hygiene. Any control method, including the ones discussed in this paper can only be complementary to this general obligation of cleaningness which is of prime importance.
La protection des denrées alimentaires entreposées contre les déprédateurs d'origine animale reste une question d'actualité.

Or, en règle générale, la législation régissant l'emploi des anti-parasitaires agricoles dans les différents pays ne prend pas en compte la protection des denrées alimentaires transformées dans les magasins de stockage, chez le producteur, l'intermédiaire ou le distributeur, sauf pour certaines matières premières (céréales par exemple) dans les silos.

D'un autre côté, par exemple en France, le Règlement sanitaire Départemental fait obligation de procéder aux opérations de désinsectisation nécessaires, toutes précaution étant prises par ailleurs pour limiter la présence des insectes dans les denrées.

il reste donc à savoir si et comment les législations nationales peuvent s'adapter à de telles situations.

L'exposé donnera un aperçu en France et fera le point sur les conditions existant dans les autres pays.