Consumer Advice: Storage of Flour & Mix.

Flour and Mixes, like the grains from which they are milled, are generally regarded as stable and safe food products; retaining their quality and safety for years. However, they are susceptible to degradation through contamination and incorrect storage. For best results, Laucke offer the following advice:

Storage

- When a sealed pack is opened, the contents should be stored in a dry, cool, dark and airy environment.
- Flour has a natural level of moisture at which it can be safely stored. If this natural moisture content is allowed to increase or move around in a container and to concentrate, this will increase the risk of degradation because the extra moisture is likely to support microbiological activity. As a rule, never store flour or a mix in an airtight rigid container that has an air space above the flour: through temperature change, the natural existing moisture level in the flour will migrate to the free space in the container causing humidity to build up and even condensation to form. This local build up of moisture can cause the product to deteriorate or become mouldy, so any part-full rigid container should not be “air-tight”.
- Do not store in humid conditions, such as in tropical environments or in a cupboard above a kettle.
- Direct sunlight and artificial light should be avoided, as should extremes of temperature.
- Because a container may itself cause contamination, ensure any containers used are food-grade.
- Store away from goods with strong odours such as garlic and onions.

Insects - a Pest that is a potential Food Contaminant

Insects are ever-present in our environment. All plant based food such as dried Fruit and Grain-based products are a natural food for insects and insects are attracted to that food, and such products are also a potential source of insects because insect eggs can already be present within that food.
Insect infestation is one of the biggest problems associated with flour and mix storage. Many species of insects such as moths and beetles can and do eat grain-based products, and live and reproduce within them.
Many small insects and most beetles are believed to be “weevils”, but are mostly not. Understanding the life cycle of insects and knowing just what specific insect may be causing a problem assists with it’s elimination as a pest.
Insects have 4 quite distinct stages in their life cycle:

1. Eggs: are normally laid within or adjacent to a food source. Eggs are too small to be seen, can be laid by an unseen and unsuspected insect, and can be present in apparently clean food and clean premises. Eggs are sticky so as to adhere to the food source for the larvae, and can cause visible clumping of flour particles.
2. Larvae: are grubs, and are often confused with the larvae of flies and termed “maggots” in error. Larvae may or may not be mobile, and can produce cocoons.
3. Pupae: are a transition stage to the adult, and can leave visible cast skins which can also contaminate food.
4. Adults: are the most visible stage. They travel readily, can be long-lived, and reproduce in high numbers.

Under optimum conditions, a full life cycle is typically completed in about 20 to 30 days, with a population multiplication rate of between 20 to 60 times (or more) per month depending on species. Thus eggs from a single insect may become millions of adults within 2 to 3 months. Therefore, considering supply chain logistics, it is a fairly safe bet that prolific insect activity which is observed more than 4 weeks after a product has been purchased has originated in the pantry rather than have been within the product at purchase.

Prevention of contamination

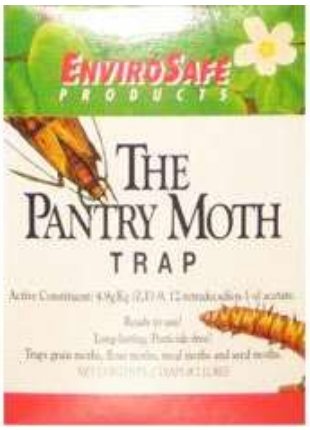
Insects are hardy, persistent, and travel widely in the natural environment, and breed quickly given opportunity. A wide range of insects have become pests, because the environments in which we live and the foods that we utilise are equally available and beneficial to insects. Practically, insects are impossible to eradicate from the world in which we live, and are best controlled by removing them from food storage areas, by seeking to avoid their re-introduction, and by creating an environment that is unfriendly to their existence.

Laucke seeks to ensure that its food products are free from insects at every stage of their life cycle.
We control insects by close inspection of our ingredients, by controlled atmosphere treatment of critical ingredients, by our milling process which destroys insects, by regular cleaning and treatment of equipment and storage areas, and by passing our flours through an 'entoleter’ machine before we pack the products. This machine destroys by mechanical impact any insects or their eggs that may have passed through the flour milling system.

Infestation of packaged flour is most likely to occur at store level or in the home through cross contamination, where insects travel from one infested food product to another. The most common time for infestation to occur is in summer when insects are more active, but heated and air-conditioned premises create an all-year risk.

As a consumer, deter and control insects, do not introduce them, and create an environment unfriendly to them.

- Be aware that any plant based food or adjacent structures could harbour insects. Moths lay sticky eggs that present as dusty/sugary accretions. In the normal cycle of reproduction, larvae spin silk for cocoons (termed "webbing"). These larvae are perceived as grubs and maggots, and can readily penetrate packaging.
- When purchasing flour or a mix from a Store, check the product and its storage area for any obvious signs of infestation. Look for eggs, webbing, and live insects. Inspect particularly around the seal of the packaging. Also consider the available Shelf Life as indicated on the packaging, because the longer the period of storage, the greater the risk of infestation. Stores are perfect breeding grounds for insects - they have an abundance of food; are warm, bright and sometimes humid environments. Decline to purchase if necessary, and advise the storekeeper.
- When at home, check more thoroughly for any signs of infestation. If any are seen, remove the product from the storage area, and if recently purchased (within a week) return it to the place of purchase. This will identify an issue for the store to address.
- Practice good housekeeping.
    - Provide insects no ready access to food such as crumbs and flour dust.
    - Do not leave any food product uncontained and undisturbed for a lengthy period.
    - "Rotate" stock. Separate and use older stock first.
- Eliminate insects from your food storage areas.
    - Discover and discard food sources that are harbouring insects.
    - Any safe haven such as cracks and crevices within food storage areas should be eliminated or at least regularly cleaned and treated with a residual insecticide.
    - A domestic insecticide can be used to kill exposed insects within an enclosed area such as a pantry, cupboard or drawer, provided no exposed foodstuff will be negatively affected. Use one of several brands of automatic Pyrethrum aerosol spray units to kill exposed insects as and when they travel. These units are typically timed to continuously provide small doses of spray at pre-set intervals.
- Deter insects.
    - Remove lighting that attracts insects.
    - Insects are normally active above 18°C and increasingly active up to 38°C, and at medium to high humidity. All insects are less active at lower temperature and humidity, so reduce both. Reducing the temperature below 18°C inhibits insect activity and progressively halts their reproduction.
      Storing products in a household freezer for over 20 days is a natural and effective way to kill insects at all stages of their life cycle.
    - Use natural deterrents such as bay leaves, which for centuries have been placed in grain-based foods and dried fruit to deter beetles and moths.



Warehouse Moth, Mediterranean Flour Moth, Indian Meal Moth

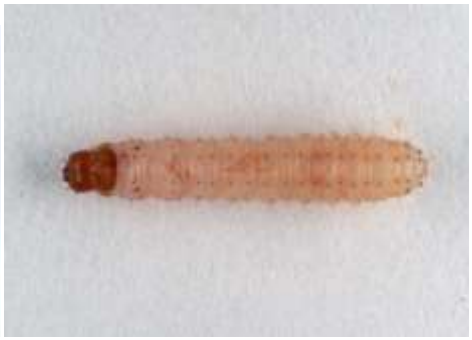
Moth larvae create the most common forms of contamination. The Warehouse or Pantry Moth (Ephestia species) creates webbing, cocoons and grubs. These pests can be found in areas other than the kitchen, such as in dried flowers, dry pet foods, seeds (including bird seed and dried beans), nuts, chocolate, and dried fruit. As an insect group, pantry moths can also be found in rice, pasta, cake mixes, rat or mouse bait, breakfast cereals, children's art work (containing pasta, corn, etc.), herbs, spices -- any grain, feed, seed, and dried vegetables (decorative or edible).

Moth adults are more active at dusk and dawn, are short-lived and do not feed, but are very prolific breeders. They lay eggs in flour dust or on the surface and closures of packaging, which creates sugary clumping. Very young larvae are tiny and cream coloured but grow to about 13 mm. As they prepare to pupate they spin a fine silken thread to make a

cocoon. In severe infestations the entire surface of the food may be covered with the silken webbing and discarded cocoons. The adults are grey in colour and have a wingspan of approximately 15mm.

Specific to moth control are Knockdown sprays such as timed Pyrethrum sprays, and Pantry Moth Traps. Moth traps contain a pheromone that attracts male moths to the trap, thus interrupting the breeding cycle. The traps are food-safe and can be placed adjacent to food. They are extremely effective and have a life of approximately 3 months. There are two traps in each packet and therefore provide up to 6 months protection for a small purchase price.

Ephestia Moth | Ephestia Larvae | Ephestia Webbing

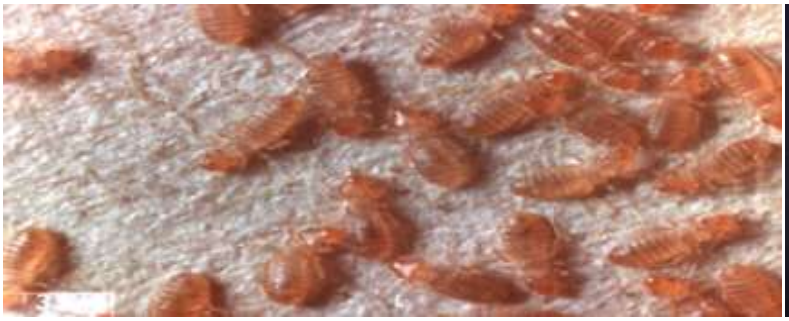




Mites

Mites are technically arachnids, not insects. There are many species, and all are tiny– sometimes microscopic. They feed on any food or dust. They mostly go about their business unnoticed, which is fine for the majority of their kind. However, the activities of some kinds of mite can affect us very directly – either in the garden, home or kitchen – and then it may take a bit of effort before we finally overcome this near-invisible foe. Poor hygiene is not normally the culprit. Mites are attracted to damp, warm, and dark places. Kitchen cupboards are ideal environments especially in summer, as are warm bedrooms in the winter.

Of the many types of Mites, the most likely to contaminate flour are less than 1 mm in size, pale, and translucent. Food-contaminating mites are more often than not introduced in to the house through a contaminated source from the supermarket. Once a few mites are in place, their numbers can grow prodigiously because they have an optimum population multiplication rate of 500 times per month.

The surface of lightly infested flour will take on a greyish tan colour and a slightly clumpy feel. The dough will not feel “right”, and baking performance will be degraded.
Infested food may develop a sickly-sweet smell and the flavour tainted. Heavily affected food may be unsafe to eat, so any contaminated foodstuffs must be discarded and ideally destroyed. Any affected cupboards should be thoroughly cleaned to remove remaining insects.
Once these immediate steps have been taken, storing vulnerable types of food in dry, cool conditions offers the only really effective long-term method to control these pests.




Beetles

There are several types of grain Weevils and Borers. These species are well known to farmers but rarely infest processed food because they require an intact whole grain for protection and reproduction of the larvae and pupae.

Many species of apparently similar beetles feed on almost any plant product, and several beetle species are particularly attracted to processed grain, and are consequently named “flour” beetles. The species that commonly infest flour products are the “Tribolium” family of flour beetles and the Cigarette beetle, Drugstore beetle, Warehouse beetle, Sawtoothed grain beetle, Flat grain beetle, and Dried Fruit beetle.

Virtually all such beetles appear similar to the naked eye, are 3 to 5 mm in length when adult, and are dark or reddish brown in colour. Common species are typically long lived as adults, can walk long distances and fly, can enter readily packaging, and can multiply at a rate of 50 to 70 times per month.

All types of beetles are long-lived and travel widely and well, and so are often found not only in the foods both we and they consume, but in crevices in pantries and cabinets as well.
Beetles are very mobile, and typically lay their eggs at random, so the source of an infestation may also occur at random, however the risks of an infestation increase dramatically if beetles are allowed entry to or safe harbour in the vicinity of food. Beetles are typically capable of laying up to 450 eggs at a rate of 2-10 per day, depending on temperature. The white eggs are sticky and rapidly become coated with food particles and other debris. At 22-27°C they hatch in 6-14 days. The larvae are initially white, but gradually darken in colour prior to adult emergence after 9--17 days. Adults feed on the same food as the larvae and live for 15-20 months. There may be five or more generations per year.

Unless there is infestation, the safety of food is not necessarily compromised by the presence of a few beetles. Damage to infested food is mainly caused by their dead bodies, by faecal pellets, and by foul-smelling secretions. In addition to creating an objectionable odour, the beetles' metabolic activity increases local heat and humidity, and so may also encourage the growth of mould and increased insect activity.
Apparently sound food with suspected insect activity may be frozen to kill all insects and their eggs.

Beetles are best controlled by their elimination from the storage area and especially from cracks and crevices by using insecticide; and then by ensuring that none may re-enter the area.

Flour Beetle Life cycle
Eggs, Larvae, Pupae, Adult

Tribolium confusum
Confused flour beetle

Tribolium destructor
Dark flour beetle

Tribolium castaneum
Red flour beetle

Booklice

Booklice (Psocids) are scavenger feeders that are very small - up to 1.5 mm, living in a wide variety of habitats, preferring moist environments. The majority can be found on vegetation, including plant foliage, branches and bark or amongst leaf litter. A few species are found in association with humans and occur in processed cellulosic material such as paper and cardboard or in food products. Psocids are long lived, travel readily, and will survive in the dust in a pantry and even damp paper. They will then, with access to food, rapidly create an infestation.

Eliminate resident populations using good housekeeping and an automatic pyrethrum sprayer, and prevent further infestations by removing any local damp cardboard and by maintaining a dry, cool and clean food storage area.

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