

Summary of the dossier (18.10.05)

Applicant: Belgian Insect Industry Federation (BiiF), 15 rue Fernand Bernier, 1060 Saint-Gilles, Belgium

Food category: *Tenebrio molitor* for consumption as a food and as an ingredient in additional food groups

The application of this novel food is submitted pursuant to Regulation (EC) No 2015/2283 of the European Parliament and of the Council of 25th November 2015 on novel foods

By introducing this dossier, the BiiF is requesting a EU authorization for the following product categories including heat-treated yellow mealworm larvae for human consumption:

- 100% packaged whole heat-treated *T. molitor* larvae
- 100% dried *T. molitor*
- 100% *T. molitor* flour
- 100% sterilized *T. molitor*
- 100% fresh *T. molitor* dough
- 100% roasted *T. molitor*
- Canned mealworm (100% of drained mealworm)
- Flours and other milled products and starches (until 50% of dried *T. molitor*)
- Pasta (until 50% of dried *T. molitor*)
- Protein products excluding dairy analogues (until 50% of fresh *T. molitor*)
- Confectionery (until 10% of dried *T. molitor*)
- Salads and savoury based sandwich spreads (until 20% of fresh *T. molitor*)
- Bakery wares (until 80% of dried *T. molitor*)
- Nut spreads (until 10% of fresh *T. molitor*)
- soups and broths (until 25% of dried *T. molitor*)
- sauces (until 50% of fresh *T. molitor*)
- Ready-to-eat savouries and snacks (until 50% of fresh *T. molitor*)

The yellow mealworm (*Tenebrio molitor* L. 1758) is a Coleoptera belonging to the Tenebrionidae family. Yellow mealworm beetles are indigenous to Europe and now distributed worldwide. *Tenebrio molitor* is a pest of grain, flour and food stores (Ramos-Elorduy et al., 2002). Yellow mealworms, in particular in the dried form, is a foodstuff of high nutritional value. It presents high amounts in mono- and polyunsaturated fatty acids, including oleic, linoleic and α -linolenic acids, in vitamins especially B1, B12, and C, in minerals especially magnesium and in essential amino-acids, without leading to deficiency in other nutrients.

Microbiological, chemical and heavy metal analyses have demonstrated the compliance of this insect species with guidelines proposed by FASFC (Federal Agency for the Safety of Food Chain in Belgium), EU food safety regulations and criteria defined by FAO respectively. The production system put in place ensures the safety of the commercialized products by respecting Good Hygiene and Good Manufacturing Practices, traceability, compulsory notification and labelling requirements as well as a management of chemical and microbiological hazards and a self-checking system based on the HACCP-principles.

Moreover, the traditional consumption of yellow mealworms in developing countries as well as the growing commercialization in Europe of food products containing *T. molitor* larvae (thanks to

transitional authorizations given by some European countries for the commercialization of this insect species under certain conditions) with no negative consumer health impact reported support the absence of detrimental effects on human health. This product could then be considered as a valuable proposition of meat alternatives by providing more sustainable proteins.

No negative effect from chitin has been reported after the consumption of Yellow mealworms. However, the recommendation of not exceeding a consumption of 143g of dried *T. molitor* larvae can be made in order to comply with the amount daily consumed reported as safe for human health by EFSA (5g of chitin/day). Even if this value does not represent a maximum, as the maximum is not yet defined, it can be used to mitigate the risk to its minimal. On the other hand, because of the prevalence of cross-reactions, people allergic to shellfish, crustaceans and mites should avoid consuming products containing *T. molitor* larvae. This warning has then to be clearly mentioned on the labelling of products containing this insect species. The existence of mealworm (food) allergy without shrimp allergy was also demonstrated. However, to date, only one anaphylaxis case due to the ingestion of *Tenebrio molitor* has been reported in a patient with a known inhalant allergy to this insect and the patient responded positively to treatment with antihistamines. A specific labelling could nevertheless be considered.