

BRIEFING DOCUMENT

Mustard and the wheat supply chain

March 2024

Overview

There have been concerns regarding the risk of adventitious mustard presence in the UK wheat supply chain. These stem from the detection of mustard DNA in a wheat flour sample, which was linked to a farm where mustard is grown for the food market. This was investigated and corrective actions were made on farm. In light of this, enhanced guidance relating to allergen risk assessment and control has been communicated to mustard growers well in advance of the next harvest. UK Flour Millers will carry out monitoring of flour to confirm these enhanced controls are effective. Previous testing of UK flour for mustard has returned negative results.

It remains the case that DNA tests cannot be used to reliably inform the level of mustard protein present and it is difficult to determine whether mustard precautionary allergen labelling (PAL) is needed in the absence of an appropriate test for mustard protein.

Background

In the UK, mustard cultivation for the food market is very limited, with only 3,000 tonnes grown each year – by way of comparison, the average annual UK wheat crop is 14 million tonnes. Two types of mustard are grown for the food market:

- Brown / oriental mustard (*Brassica juncea*)
- Yellow / white mustard (*Sinapis alba*)

As outlined, mustard is not a common crop in the UK and concerns about adventitious presence originally stemmed from reports of potential mustard cross-contamination in the European wheat crop, following testing of durum wheat in Italy. It appears these alerts were linked to false positive results from mustard ELISA test kits which cross-react with oilseed rape protein, a common and known cross-presence in the wheat supply chain. In response to customer concerns, UK Flour Millers commissioned testing of flour samples using mustard DNA PCR tests. PCR tests were used owing to the known issue with false positives linked to mustard protein tests.

The testing initially found that a small proportion of the flour samples contained mustard DNA, but it was not clear which *Brassica* species was responsible for the positive result and follow-up testing to determine the exact species did not return a positive result for mustard or other *Brassica* species.

Since then, in the UK, a test method has been developed that uses Next Generation Sequencing (NGS) to more easily determine the exact species of *Brassica* responsible for a positive DNA result. A wheat flour sample was tested as part of routine monitoring for mustard DNA using a PCR test, and later tested positive for culinary mustard DNA using the NGS method. An investigation was carried out into the wheat blended to make this flour, and a farm that grew mustard for the food market was identified as a wheat supplier. This led to concerns from some customers that there were mustard cross-contamination risks in the UK from farms that grew mustard for the food market.

The farm in question was investigated and the relevant store examined. The farm allergen risk assessment and controls were reviewed and enhanced controls were introduced. This led to a wider update of guidance relating to mustard allergen controls, which is being rolled out to mustard growers now, in advance of the 2024 harvest.

Controls to prevent mustard cross-contamination

English Mustard Growers (EMG) is a mustard growers group and sets out a standard for mustard cultivation, supported by dedicated agronomic advice. This standard includes newly updated guidance around mustard as an allergen, including detailed risk and control points across farm, covering harvest, storage and loading/delivery. These enhanced controls will be in place for the 2024 mustard harvest. The guidance also sets out that the controls should be included in contamination risk assessments required within the Red Tractor Combinable Crops scheme. All EMG farmers are assured under this scheme, for which there are annual audits that include store inspections, as well as examination of risk assessments.

EMG mustard seed is stored in a dedicated central store shortly after harvest, minimising the risk of co-mingling within farm stores. The central store is Trade Assurance for Combinable Crops (TASSC) accredited, which includes extensive standards for allergen control, including a requirement for a HACCP plan to consider allergens.

Haulage from farm to store, and from store to mill is carried out by TASSC-accredited vehicles. Millers require that if a trailer was used to carry mustard, appropriate cleaning measures should be carried out before hauling wheat to a mill. The previous three loads have to be declared for vehicles hauling wheat to a flour mill. Of millers surveyed, none have reported seeing mustard within the previous three loads, likely a reflection of the fact that mustard is a very minor crop in the UK.

In addition to these extensive controls pre-mill, UK flour mills are also equipped with grain cleaning technology that is effective at removing admixture of a different size and shape to wheat kernels, such as mustard seeds.

UK Flour Millers will coordinate testing to confirm the effectiveness of the supply chain controls.

Mustard testing and labelling

Until a reliable mustard protein test is developed, it is difficult to determine whether mustard PAL (i.e. 'may contain mustard') labels are needed. On the basis of the testing evidence gathered thus far, as well as the understanding of the controls in place across the chain to minimise co-mingling, the milling industry holds the view that mustard PAL is not needed for wheat flour or flour-based products.

Action levels for PAL are linked to the level of allergenic protein in a portion of a finished product. It remains the case that the mustard protein test is not fit for purpose in the wheat chain owing to cross-reactivity with oilseed rape protein, which is non-allergenic and a known co-presence. UK Flour Millers is pushing for the development of a mustard protein test that works within the arable food chain, as well as monitoring research in Europe looking at the effectiveness of mustard test kits.

Next steps

As the milling industry, we welcome the enhanced guidance to mustard growers on allergen control. This guidance, coupled with the controls across the chain should be sufficient to address the risk of mustard in wheat. We will monitor flour to confirm this and continue to liaise with English Mustard Growers as necessary. It is understood that food safety authorities in Italy and Spain are carrying out reviews of mustard testing methods, including methods for assessing mustard protein. The FSA is also considering work in this area. Decisions on whether to apply mustard PAL should be on the basis of an understanding of levels of mustard protein. Until a reliable mustard protein test is available, which is specific to allergenic mustard species, it is difficult to justify the inclusion of mustard PAL.