

Guidelines to minimise the risk of erucic acid in double-low oilseed rape

Introduction

Most oilseed rape (OSR) varieties grown in the UK are classified as 'double-low' – also called 'double-zero' and '00'. Such varieties have a low erucic acid content, making seeds suitable for both human and animal consumption.

Some OSR varieties grown in the UK have been bred to have relatively high levels of erucic acid – HEAR (high erucic acid rape) and other specialist oil compositions.

Erucic acid is a naturally occurring fatty acid found in both OSR and related species (including several weed species associated with arable systems).

For rapeseed oil to be used in food products, erucic acid levels must, by law, not exceed 5 per cent. The current maximum level in most contracts is set to two per cent – including the Federation of Oils, Seeds and Fats Association (FOFSA) contract 26A, under which most OSR is traded. The European Commission plans to change the legal food standard to 2 per cent, which may come into force as early as autumn 2018.

Over the last three years, elevated (higher than expected) levels of erucic acid have been found in seed grown from double-low varieties, with some deliveries exceeding both the 2 and 5 per cent limits.

With standards becoming tighter, it is essential to minimise erucic acid in double-low OSR to meet standards and avoid penalties or rejections.

These guidelines highlight the key risk points where management can make a difference. They also provide information on record keeping, sampling and the tests required to investigate any exceedance of legal and/or contractual limits.



Risk point 1: seed source

Irrespective of seed source, it is important to keep sealed representative samples for each variety being drilled in each field, in case of dispute.

If erucic acid tests are required, gas chromatography (GC) or Near Infrared (NIR) methods can be used to test samples. GC is the most accurate method, especially for measuring lower levels (below 2 per cent) but it is also more expensive and time-consuming.

Test results may need to be substantially below 2 per cent to minimise the risk. Any elevated levels of erucic acid detected could point to a source of contamination, which will require investigation. **If seed is rejected, based on a high NIR test reading, it is recommended it is retested using GC.**

Representative samples

Good sampling practice must be followed to ensure samples are representative.

See the AHDB 'Grain sampling guide for cereals and oilseeds' for information.

cereals.ahdb.org.uk/grainstorage

Certified seed

For certified seed sources, your merchant should be asked to make a written declaration of the erucic acid content (eg via an email). Representative samples of seed should be kept and the certification number written on the sample label.

The risk of erucic acid contamination from certified seed is likely to be low. A double-low variety can only be added to the National List if seed tests show it has less than 2 per cent erucic acid content – most have less than 0.1 per cent. Low erucic acid content is considered to be a highly stable trait, meaning varieties do not revert to become erucic acid producers.

Seed crops are also inspected in the field for off-types and seed needs to meet minimum standards for purity and germination (as tested by a licensed or an Official Seed Testing Station). Although there is no statutory test for erucic acid in certified seed, AIC and BSPB have agreed a voluntary [code of best practice](#), which includes the use of GC tests on all seed and seed lots.

Double-low varieties

BSPB publishes a list of double-low OSR varieties

[Access the latest list](#)

Farm-saved seed

Seed saved from conventional open-pollinated varieties grown on your own holding can be sown on your own holding – this is known as farm-saved seed. Seed from hybrid varieties must not be saved. For further information, visit bspb.co.uk/farmsavedseed

Seed should only be saved from areas deemed to be at low risk from erucic acid contamination. The following land should not be used for farm-saved seed production:

- Land used previously to grow OSR associated with elevated levels of erucic acid, including HEAR varieties
- Land used previously as set aside

Seed crops should be inspected twice – soon after establishment and during flowering – to rogue out volunteer OSR.

Farm-saved seed must be harvested from parts of the field with sufficient buffer from surrounding fields and stored separately from other seed.

Tests should be conducted on representative samples to determine erucic acid levels (contact a mobile seed processor). Each sample should be labelled, so it can be traced back to an individual field.

If farm-saved seed fails to match the quality of certified seed, it should not be used. Note: FOSFA contract 26A requires that farm-saved seed is used for one generation only.

Risk point 2: pre-planting

To ensure OSR crops maintain low levels of erucic acid, it is important to understand the history of any field used in its production. Due to the routes of contamination, ideally, 15 years' worth of (cropping/weed) data is required.

Short rotations (eg OSR grown more than one in every five years) not only reduce the yield of OSR but are also associated with a build-up of OSR volunteers: potentially including elevated erucic acid type volunteers. Such volunteers can contaminate double-low OSR crops in two ways: directly, through their seed, and indirectly, through cross-pollination. Ongoing AHDB-funded research indicates the primary source of contamination is likely to be from OSR volunteers with elevated levels of erucic acid and cross-pollination, rather than other factors (eg weed seed contamination).

A test is being developed to analyse leaf samples for the presence of the genes responsible for the production of erucic acid.

Most freshly shed OSR seed has low dormancy and will germinate if adequate moisture is available. Under dry conditions, OSR seed develops dormancy in the first month after being shed, especially under cold and dark conditions. Once buried, approximately 5 per cent of seeds will remain viable after a period of three years and some may even be viable for up to 15 years.

Any cultivation should, therefore, be delayed (ideally, by at least four weeks) to allow volunteers and weeds to emerge and be sprayed off with a non-selective herbicide.

Ploughing prior to drilling brings old seed to the surface and increases the number of volunteers. As seeds can remain viable for many years and because a single volunteer OSR plant can produce around 2,000 to 10,000 seeds, it is clear to see why management of them is essential.

Risk point 3: established crop (weeds and volunteers)

It is important to manage volunteer OSR in the rotation. In cereal crops, volunteers can be controlled effectively with many commonly used herbicides, such as pendimethalin, diflufenican, flufenacet and ALS-inhibitors. Controlling volunteers and many erucic acid producing weeds in OSR crops is more challenging.

Growing OSR on wider rows can allow for inter-row hoeing and inter-row spraying (eg with some products containing diquat, subject to renewal), if suitable equipment is available.

Clearfield® varieties, which have tolerance to specific imidazolinone herbicides, also provide an opportunity to manage weeds and volunteers. If full control is not achieved, there is a potential risk of volunteers developing with high erucic acid and herbicide tolerant traits in the future. Clearfield® varieties also tend to be lower yielding, compared with other varieties without the Clearfield® trait (see the [AHDB Recommended Lists](#) for information).

The full rotation should be used to manage weeds and OSR volunteers. In fields where double-low OSR crops with elevated levels of erucic acid have occurred previously, alternative break crops should be considered.

Risk point 4: harvest

OSR should be harvested at the optimum stage of maturity, as overripe crops will shed more seed and increase volunteer number. A note of any excessive pod shatter, which may increase seed shed in fields, should also be made.

Double-low varieties must be segregated from HEAR varieties at all times. Machinery, trailers and stores must be cleaned thoroughly. Farm-saved seed should also be separated from the rest of the crop. Weed seeds can be a source of erucic acid contamination, so ensure the crop is not contaminated.

Examples of key erucic acid producing weeds and crops

- Bittercress (46%)
- HEAR OSR (>45%)
- Charlock (42%)
- Black mustard (37%)
- Hedge mustard (24%)
- Wild radish (27%)
- Cranes-bill (10%)



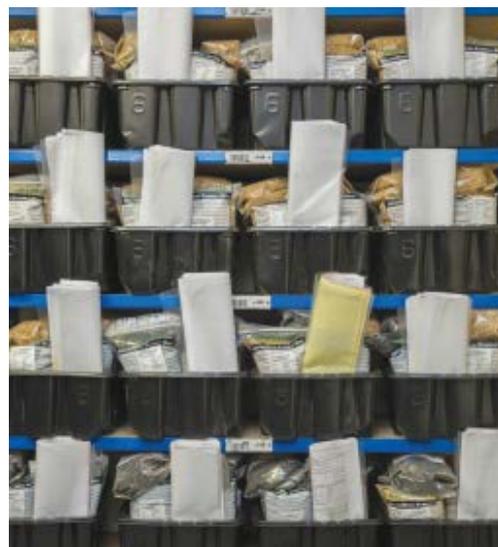
A representative sample of each variety by field or, ideally, by trailer should be retained. A representative sample of each load of seed leaving the farm should also be kept. If erucic acid results are obtained, they should be written on the appropriate field and seed records.

Risk point 5: contracts

Retaining representative samples provides an opportunity for retesting in case of any dispute and to identify specific fields where a problem has been identified.

It is essential to read and understand any contract before it is signed. It is also important to keep records of all contracts.

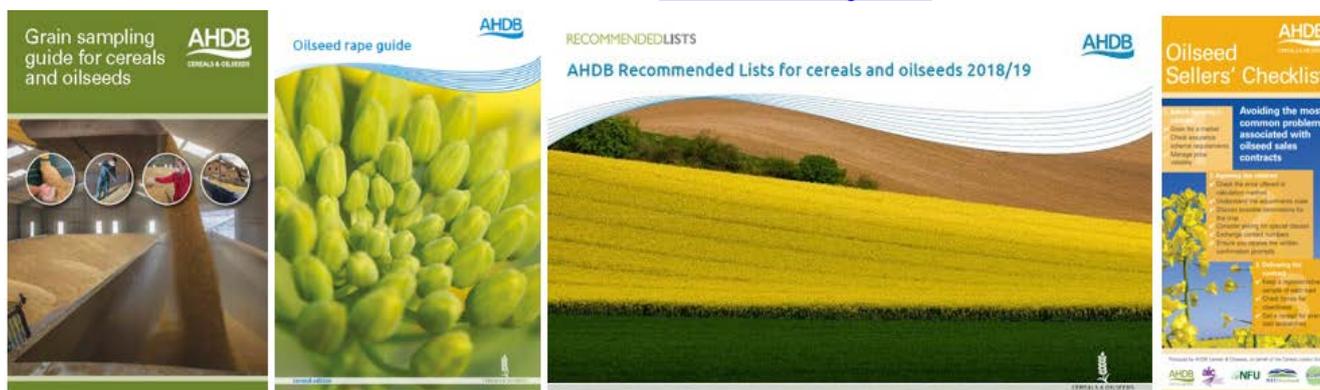
To avoid the most common problems associated with oilseed sales contracts, read the AHDB 'Oilseed sellers' checklist'.



Further information

Publications referred to within this guide can be accessed from cereals.ahdb.org.uk/publications

Further information on erucic acid can be accessed via cereals.ahdb.org.uk/ea



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*Erucic acid values in seeds courtesy of Monsanto Technical Development Research and NIAB TAG.
OSR harvest image © Gary Naylor Photography.

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