

United Oilseeds & AHDB Joint Seminar Networking lunch

Thursday 21 February 2019

United Oilseeds & AHDB Joint Seminar 2019

Welcome and introduction

Chaired by Andrew Cragg, United Oilseeds

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Minimising the Risk of High Levels of Erucic Acid in Double Low Varieties of OSR

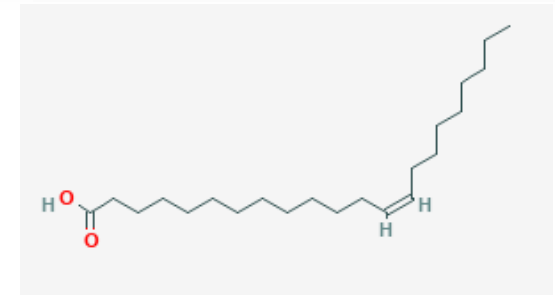
Dhan Bhandari

Crop Production System Team, AHDB



Challenges facing the industry

- There has been a growing occurrence of higher than expected levels of erucic acid within the OSR supply chain in the UK in recent years.
- Currently, food industry will take in OSR at levels of erucic acid of 5% or below. Around 1.5% load rejected for being >5%.
- FOFSA contract 26A requires 2%. The EC is considering a maximum level of 2% erucic acid in 00 varieties.
- An EA Industry Working Group was set up to assess the impact such a change could have on the marketability of the 00 crop and identify action needed.



<https://pubchem.ncbi.nlm.nih.gov/image/imgsrv.fcgi?cid=5281116&t=1>



Challenges facing the industry

The precise cause for the high levels not entirely clear.
Possible causes:

- High EA OSR seed contamination
- Weed seed contamination – e.g. charlock and other wild mustard seeds
- Volunteers from previous crop, especially if these were HEAR varieties
- Cross-pollination of low Erucic Acid “00” varieties from another crop, particularly if it was a HEAR variety
- Contamination of seed by other seed lots
- Poor accuracy of NIR method used by industry?

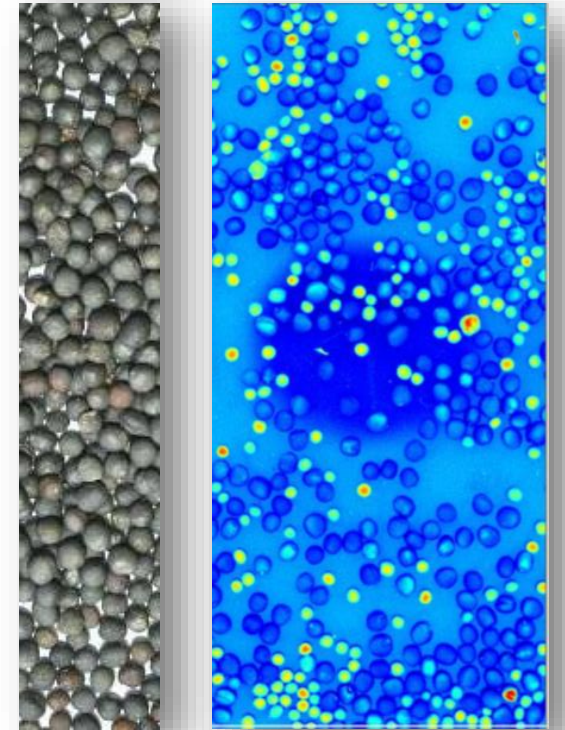


New research project

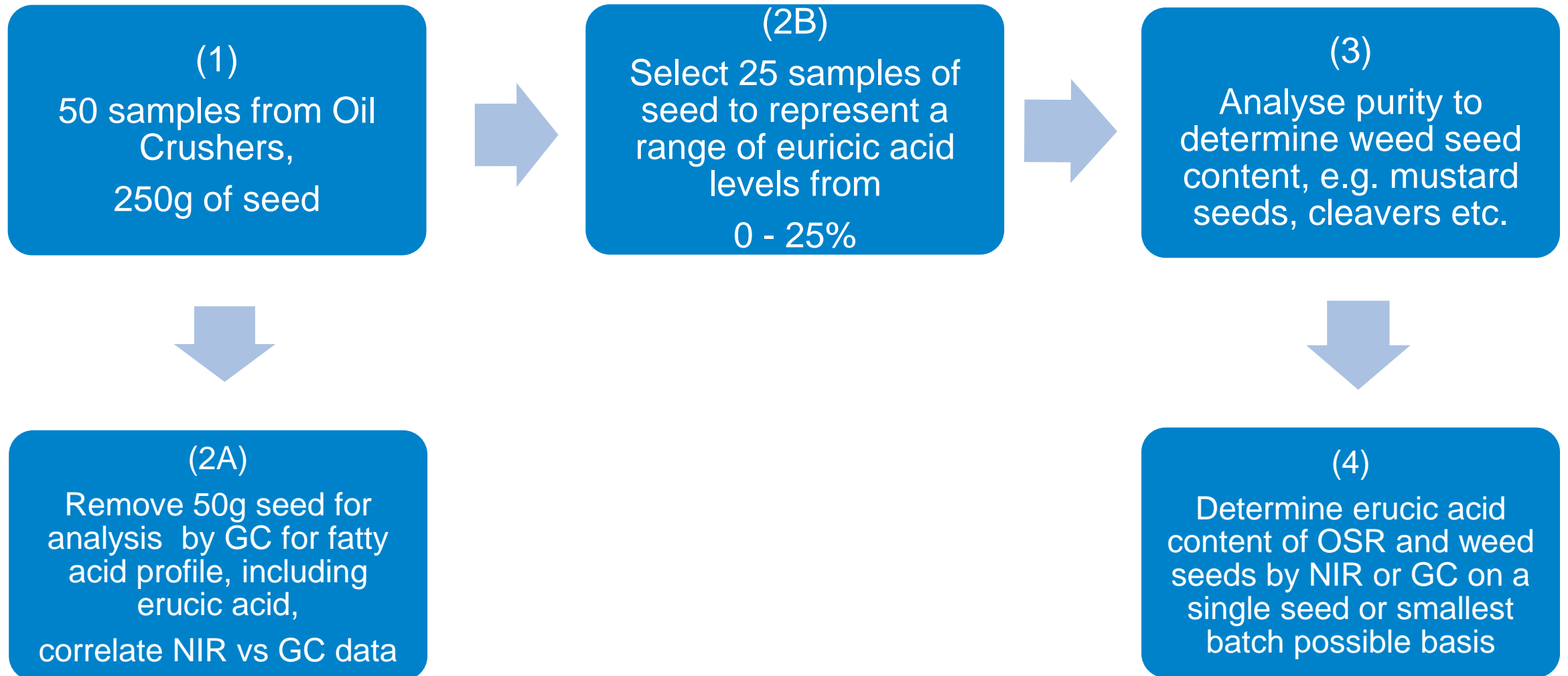
AHDB issued a Call for research to examine the source of this contamination. NIAB was awarded the contract. Final Report due by 1st March 2019. **Findings would ensure that the UK can provide the most relevant evidence and supporting data to the EC.**

The project has 2 Work Packages:

1. Forensic analysis of a set of rejected or accepted samples collected and tested by NIR by the processors. These would have grower data and be re-tested analytically. Determine level of contamination by seeds.
2. Monitoring erucic acid trait presence in OSR volunteers in current season commercial crops with DNA assays. Relating results to erucic acid levels in the harvested commercial crop.



Seed analysis work plan 1



(1)

50 samples from Oil
Crushers,
250g of seed

(2B)

Select 25 samples of
seed to represent a
range of erucic acid
levels from
0 - 25%

(3)

Analyse purity to
determine weed seed
content, e.g. mustard
seeds, cleavers etc.



(2A)

Remove 50g seed for
analysis by GC for fatty
acid profile, including
erucic acid,
correlate NIR vs GC data



(4)

Determine erucic acid
content of OSR and weed
seeds by NIR or GC on a
single seed or smallest
batch possible basis

Progress

- Ex-harvest samples acquired from a crusher, distributors and agronomists
 - 91 tested for erucic acid
 - 50 selected for full investigation
 - 25 samples expressing max range of EA values were selected for grain purity analysis by the Official Seed Testing Station. Effect of cleaning was determined.
 - 12 samples with a range of EA were selected for single-seed analysis on 50 seeds/sample
- Volunteer leaf samples collected from 5 commercial crops for harvest 2018
 - Assays developed and bulks all tested
 - Single leaf test performed for DNA marker for FAE 1.2 gene - high erucic acid trait allele



AHDB guidelines

- 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 points

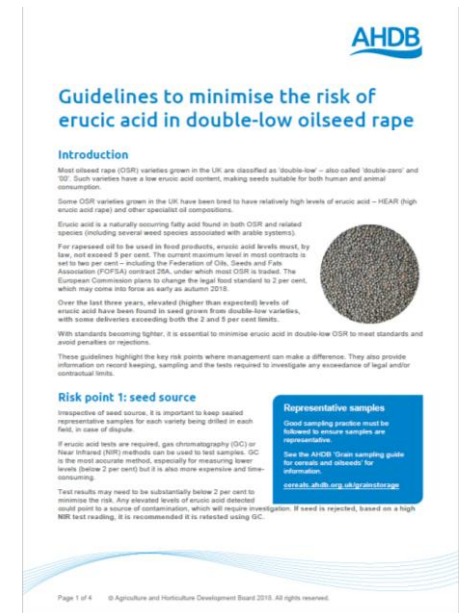
#1 – Seed source

#2 – Pre-planting

#3 – Established crop (weeds and volunteers)

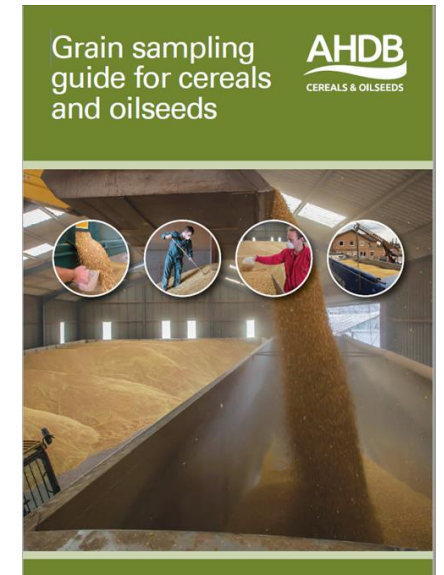
#4 – Harvest

#5 – Contracts



Risk point 1: seed source

- Keep sealed representative samples for each variety being drilled in each field
- Follow the **AHDB Grain Sampling Guide**
- Gas chromatography (GC) or NIR test methods should be used
 - GC more accurate for measuring low levels <2%
 - If seed is rejected based on high NIR test reading, re-test using GC
- **For certified seeds**
 - Risk of EA contamination is likely to be low – most National List 00 varieties <0.1%
 - Obtain written declaration of EA content from merchant and keep representative sample



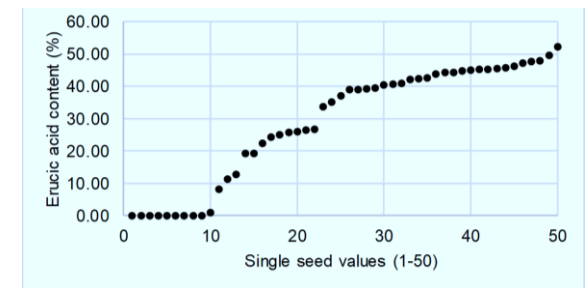
Risk point 1: seed source

- **For farmed saved seeds (FSS)**
 - Seed from hybrids must not be saved
 - Don't use land previously used for growing HEAR or OSR varieties with high EA
 - Don't use land previously put as set aside
 - Seed crops must be inspected twice to rogue out volunteers – 1) soon after establishment and 2) during flowering
 - Must be harvested from parts of the field with buffer from surrounding fields and stored separately
 - Tests should be conducted on representative samples to determine EA
 - If it fails to match the quality of certified seed, then it must not be used
 - FOFSA contract 26A requires that FSS is used for one generation only



Risk point 2: pre-planting

- Important to understand the history of any field used in the production of low EA OSR
- Ideally, 15 years' worth of cropping/weeding data is required
- Short rotations – e.g. OSR grown >1:5 years reduce yield and associated with build-up of volunteers, including those with elevated EA
- Such high EA volunteers can contaminate 00 OSR crops
 - **Directly**, through their seed
 - **Indirectly**, through cross-pollination
- Freshly shed OSR has low dormancy and will germinate with adequate moisture
- Dormancy develops under dry, cold and dark conditions – once buried, ~5% of seeds will remain viable 3-15 years
- Cultivation should be delayed by at least 4 weeks to allow volunteers and weeds to emerge
- Ploughing prior to drilling brings up old seed to the surface; increases volunteer numbers



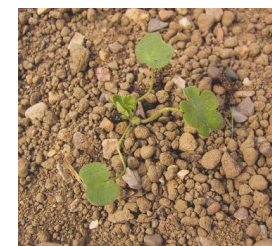
Risk point 3: established crops (weeds & volunteers)

- Important to manage volunteer OSR in rotation. In cereal crops, these can be controlled by herbicides – *pendimethalin*, *difufenican*, *flufenacet* and *ALS-inhibitors*
- More challenging in OSR crops. Growing on wider rows – inter-row hoeing and spraying (e.g. with products containing *diquat*)
- Clearfield® varieties, which have some tolerance to certain *imidazoline* herbicides, also provide opportunity to manage weeds and volunteers.
- If full control is not achieved, potential risk of volunteers developing with high EA and herbicide tolerant traits.
- Full rotation should be used. In fields where 00crops with elevated EA levels have occurred previously, consider alternative break crops



Risk point 4: harvest

- Harvest at optimum stage of maturity – overripe crops will shed more seed and increase volunteer number
- Maintain good stubble hygiene, volunteers tend to germinate with cultivation
- Note any excessive pod shatter – may increase seed shed in fields
- Segregate 00 from HEAR (high erucic acid rapeseed >45%) varieties
- Thoroughly clean machinery, trailers and stores
- FSS should be separated from the rest of the crop
- Weed seeds could cause EA contamination, eliminate contamination by bittercress, charlock, black mustard, hedge mustard, wild radish and crane's-bill



Risk point 5: contracts

In case of disputes:

- Essential to read and understand any contract before it is signed.
- Keep records of all contracts
- Retain representative samples – important for retesting and identifying specific fields where a problem has arisen
- To avoid the most common problems associated with oilseed sales contracts, read the **AHDB Oilseed sellers' checklist**

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Oilseed Sellers' Checklist

Avoiding the most common problems associated with oilseed sales contracts

- 1. Before agreeing a contract**
 - ✓ Grow for a market
 - ✓ Check assurance scheme requirements
 - ✓ Manage price volatility
- 2. Agreeing the contract**
 - ✓ Check the price offered or calculation method
 - ✓ Understand the adjustments scale
 - ✓ Discuss possible destinations for the crop
 - ✓ Consider asking for special clauses
 - ✓ Exchange contact numbers
 - ✓ Ensure you receive the written confirmation promptly
- 3. Delivering the contract**
 - ✓ Keep a representative sample of each load
 - ✓ Check lorries for cleanliness
 - ✓ Get a receipt for every load despatched

Produced by AHDB Cereals & Oilseeds, on behalf of the Cereals Liaison Group

The FOSFA 26a Contract sets out the rights and obligations of buyers and sellers. Buyers are obliged to make available the terms and conditions on which the contract is made. Additionally, NFU and NFUS members can view the FOSFA 26a Contract at www.nfuonline or www.nfus.org.uk



Erucic acid risks

For rapeseed oil to be used in food products, erucic acid levels must, by law, not exceed 5%. The current maximum level is set to 2% in most contracts.

AHDB has worked with industry to issue a set of guidelines to help farmers maintain low levels of the acid in their crops.

The guidance is centred on five ‘risk points’.

1. **Seed source:** Farm-saved seed carries a risk as it can become contaminated with seed from volunteers. Erucic acid tests should be conducted on all seed sources before drilling
2. **Pre-planting:** After harvest, cultivations should be delayed (ideally, by at least four weeks) to allow OSR volunteers to germinate and be controlled
3. **Established crop:** Fields with OSR volunteers and erucic acid-producing weed populations should be identified, as they are at higher risk

4. **Harvest:** Poor segregation of crops also increases risk. Double-low OSR must be segregated from HEAR OSR and weed-prone crops at all times

5. **Contracts:** It is essential to read and understand any contract before it is signed. Sealed and labelled representative samples of all seed should be retained in case of any dispute

ahdb.org.uk/erucic-acid



Image credit: Gary Naylor Photography

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Thank You

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