The Co-operative Difference

Fonterra Dairy for life

# Managing DDE residues in milk

DDT is a synthetic organochlorine pesticide that was applied extensively to pastures in the 1960s and 1970s to control grass grub. DDT and its two metabolites, DDE and DDD, are collectively known as DDTR (total DDT residues).

It takes  years for DDT to half its original concentration in soil so it does not pass through soil quickly and it is not readily soluble in water. Therefore, DDT can be picked up when animals ingest soil.

As DDT is extremely fat-soluble, it accumulates in animal fat, including milk. DDE is the only DDT metabolite that is expressed in milk.

At present, there is no way to speed up the breakdown of DDT residues so ingestion by cows needs to be managed to minimise the amount that gets into the milk.

## What is the downgrade level for DDE?

Downgrade levels are set at 0.3 mg/kg milk fat from 1 June to 30 September and 0.5 mg/kg milk fat from 1 October to 31 May to meet industry milk quality targets.

See the Fonterra Farmers' Terms of Supply for more information about DDE levels, testing requirements and downgrades that you will incur if you supply milk with unacceptable DDE levels.

## What to look for

DDE levels generally peak in the first six weeks of lactation as cows naturally lose body condition. The highest levels usually occur in early lactation as DDE which has accumulated over the dry period is released. Milk DDE levels rise during the season when cows lose condition or graze on paddocks that contain DDT residues.

The level of DDE residues in milk after calving is directly related to the DDE level in body fat at calving. The level of DDE in the cow's body fat at calving depends on:

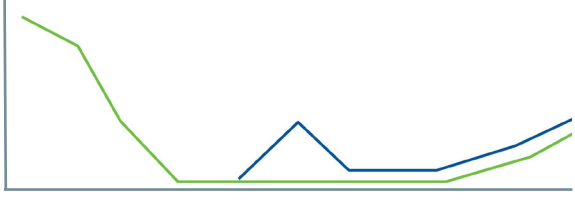
- The concentration of DDE in body fat at drying off
- The intake of DDT over winter
- The body fat content of the cow at calving (Body Condition Score, or BCS. You can find out more about this on the DairyNZ **website**)

## Management

Research undertaken in 1989, 1990 and 1991 by the Ministry of Agriculture and Forestry has shown that management can greatly reduce the levels of DDE in milk. The concentration of DDE in body fat at drying off depends on the level of DDTR in the milking area and cow condition at drying off. The better the cow condition, the lower the concentration of DDE.

The diagram below shows how an increase in cow condition in autumn both reduces DDE levels and increases milk solids production.

Typical seasonal trend of DDE residues in milk



*Typical trend* *Cow condition lost in summer*

To effectively manage DDE residues in milk, you need to know the soil DDT levels of individual paddocks on all your stock grazing areas. If you have high DDT levels on your grazing block, you should test all paddocks.

If soil tests show that DDT levels on all paddocks are above 0.5 mg/kg soil (ppm), it is highly likely that you will see elevated milk DDE levels in spring. The lowest DDE levels in milk usually occur between October and January – the base period. Milk DDE levels during the base period are typically 30 - 60 per cent of the soil DDT levels. If the average soil level is 0.5 mg/kg soil (ppm), then milk levels could be over the 0.3 ppm payment deduction trigger in the spring.

If cows are grazed-off during the winter and/or young stock are grazed off-farm, spring milk DDE levels will be affected much more by soil levels on these off-farm grazing areas. Where there is little or no DDT in the soil where the cows are wintered and where young stock are grazing, higher soil DDT levels may be tolerated on the milking platform.

Weight gain over the dry period on known low DDT soil is critical to reducing post-calving DDE residue problems.

It is important to remember that farms with high DDT soil levels can be successfully farmed with the right management practices in place.

## Best Practice Checklist

The following checklist of best practice is designed to help you reduce the amount of DDE residues found in raw milk, and can remove grazing-off as a cause of high residue levels altogether.

You can use the checklist without DDT soil test results, however test results are useful for benchmarking, particularly early and late in the season.

Each best practice has an importance rating:

**HIGH** - If this practice is not followed, it will be difficult to control DDE residues.

**MEDIUM** - This practice is not essential, but will help improve DDE residue levels.

**LOW** - This practice may help reduce DDE residue levels.

If you answer 'no' to any questions, you should consider changing your management to meet best practice, especially if the question has a high importance rating.

## Drying off period (late lactation)

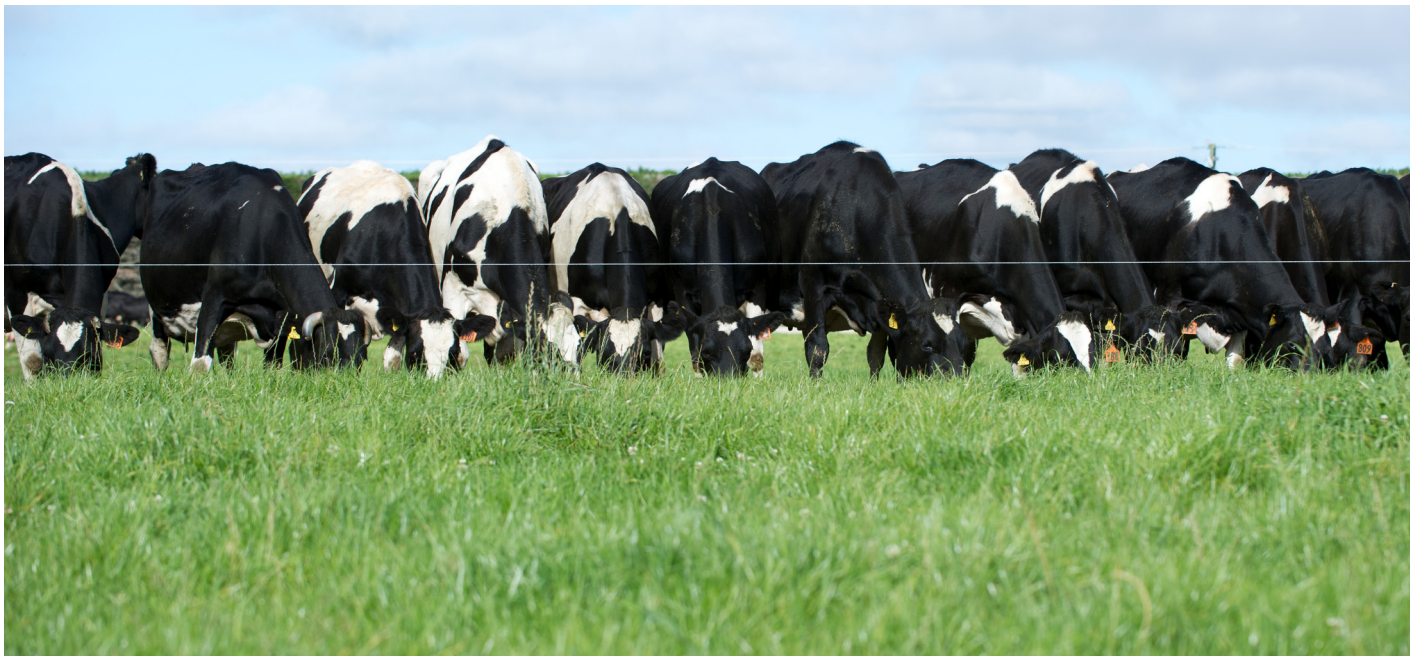
| | Yes/No |
|---|---|
| **Are cows dried off with a body condition score (BCS) of greater than 4.5?**<br>*Feeding to increase BCS by 0.5 units in autumn prior to drying off reduces milk DDE levels and increase milk solids production in the next lactation.*<br>**Importance - HIGH** | |
| **If autumn crops are sown for winter grazing, are they sown on known DDT soil paddocks (<0.1 mg/kg)?**<br>*In trial work, wintering cows on known low DDT soils reduced DDE levels in spring milk by 35% compared with high soils. Cows eat three to four times the amount of soil on a feed crop compared with pasture, so where possible winter crops should be avoided. This especially applies to root crops.*<br>**Importance - HIGH** | |
| **Will you avoid known high DDT soil paddocks in wet conditions or when grass cover is at a low dry matter residual?**<br>*Tip: This will help avoid excess soil intake.*<br>**Importance - MEDIUM** | |

## Dry period

| | Yes/No |
|---|---|
| **Will you graze cows on known low DDT soils over the dry period (<0.1 mg/kg)?**<br>*Ensure your cows are grazed-off on low DDT soils. Ask to see independent soil testing results. These should include maps of paddocks referenced to laboratory results.*<br>**Importance - HIGH** | |
| **Do you plan to increase BCS by 0.5 units over the dry period?**<br>*Ensure your replacement stock is grazed on low, but preferably nil DDT soils. Ask to see independent soil testing results. These should include maps of paddocks referenced to laboratory results.*<br>**Importance - HIGH** | |
| **Are replacement stock grazed on low or nil DDT soils?**<br>*Tip: This will help avoid excess soil intake.*<br>**Importance - HIGH** | |
| **Will you winter graze early calving cows and cows in poor condition on known low DDT soils?**<br>*It is preferable for all cows to be grazed on low DDT soils over the dry period. Where this is not possible, it is important that priority is given to early calvers and cows in poor condition. This will help reduce DDE levels present in milk at the start of supply. This lower DDE milk will also help dilute any higher DDE levels coming in from cows that calve later.*<br>**Importance - MEDIUM** | |
| **Does the use of supplementary feed minimise the cow's soil intake?**<br>*If supplementary feeds are fed out, this should be done so as to reduce cow soil intake. Some options could be to use a feed pad or feed bins and feed out on known low DDT paddocks.*<br>**Importance - LOW** | |

## Calving / Spring Period

| | Yes/No |
|---|---|
| **Are cows calved onto known low DDT soil paddocks?**<br>*Cows are often calved onto paddocks with a low pasture residual therefore soil intake will be high. If the soil ingested has low DDT levels, this will be obviously be more beneficial than the ingestion of high DDT soil.*<br>**Importance - MEDIUM** | |
| **Are rotation rounds designed to ensure that pasture DM residual post-grazing is high throughout the spring?**<br>*The higher the pasture residual left after grazing, the less soil will be consumed. Leaving higher residual pasture levels will also increase cow intake, therefore increasing production.*<br>**Importance - LOW** | |
| **Does the use of supplementary feed minimise the cow's soil intake?**<br>*If supplementary feeds are fed out, this should be done so as to reduce cow soil intake. Some options could be to use a feed pad or feed bins and feed out on known low DDT paddocks.*<br>**Importance - LOW** | |
| **Is supplementary feeding used to increase post-grazing pasture cover?**<br>*Good quality supplementary feed can be used to increase post-grazing pasture residual levels and therefore reduce soil intake. It will also mean that cows use less of their own body fat for production, reducing DDE levels in milk, and increasing production and/or the length of lactation. Make sure soil is minimised when feeding supplements.*<br>**Importance - LOW** | |
| **Is the supplementary feed in use of good enough quality to ensure that condition scoring is not compromised?**<br>*If poor quality supplementary feed is used, cows will use more of their own body fat to produce milk. If the cow's body fat contains high levels of DDE, the level of DDE in milk will also increase.*<br>**Importance - LOW** | |



## Prevention

The following summarises the most important best practice steps for helping to reduce milk DDE levels:

- Winter graze cows on soils with the lowest possible DDT levels
- Knowing the amount of DDT at a paddock level gives you the best information to manage your levels of DDE. The level of DDT in soils can be highly variable across a single block of land. Because of this Fonterra recommends soil testing be completed by an approved tester. You can contact Fonterra for an updated list of approved DDT soil testers in your region.  Take a test or request results if sending cows to grazing
- Calve your cows in good condition by:
  - Drying off at BCS 4.5. or better
  - Put condition on in winter by feeding well
- Graze replacements on low or nil DDT soils
- Select a low DDT property when purchasing/leasing additional land for milking on or using as a grazing block
- Grow green feed crops on low DDT residue soils. No root crops unless DDT is very low (0.1. mg/kg soil or less)
- Develop a good relationship with your grazier and manage your grazing
- Avoid your highest DDT paddocks at calving and drying off
- Priority graze early calving cows and young low condition cows on your lowest winter DDT grazing. Lower priority can be given to older and late calving cows

## Support

Your milk quality results are available daily on your tanker docket or on the Farm Source website. If you have any questions about these results or managing DDE residue on your farm, call the Farm Source Service Centre on 0800 65 65 68.

In some situations, the DDT levels present in soil on the milking platform may be so high that you require specialised management. Fonterra has expert help available for such situations. Contact the Farm Source Service Centre on 0800 65 65 68 if you think this situation applies to you.