

TechNote 15

Monitor and mitigate fatty liver

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15.1 Understand what causes fatty liver

Fatty liver is when excess triglycerides (three fatty acids joined to a glycerol backbone) accumulate in the liver.

Some triglycerides accumulate in the liver of all cows when they are in a negative energy balance (e.g. immediately post-calving or during a feed deficit). During this period, fatty acids are mobilised from body reserves and are oxidised in the liver via a process known as β -oxidation to generate energy for the cow. However, when the amount of free fatty acids entering the liver exceeds the rate of the oxidation process, triglycerides begin to build up in the liver. The process of exporting triglycerides from the liver of ruminants is inefficient, and this contributes to the accumulation of triglycerides in the liver of the transition dairy cow.

When triglycerides are greater than 5 mg/100 mg liver tissue, liver function is impaired. The liver's ability to synthesise glucose (the sole source of glucose production in the dairy cow) and to detoxify ammonia is reduced.

Triglyceride accumulation in the liver increases the risk of ketosis, liver dysfunction, and activation of the immune system, and can result in reduced milk production, immunity, and reproductive performance. Fatty liver typically occurs during the first four weeks after calving if the cow is in a severe state of negative energy balance.



For more details see TechNote 7: *Lipid metabolism*, and online eLearning activity: *The role of lipid*; dairynz.co.nz/feedright-module-7.

15.2 Know how to reduce the risk of fatty liver

Fatty liver is sometimes referred to as "fat cow's disease". Cows calving at BCS 5.5 or more have a lower dry matter intake and greater body tissue mobilisation after calving and thus are at a greater risk of fatty liver. Therefore, it is important to manage cows within the herd to ensure they do not exceed BCS targets. Mature cows should be fed to achieve a calving BCS of 5.0 one month before calving (heifers and second calvers BCS 5.5). If cows are at or greater than target BCS prior to calving, then restricting energy to 90% of requirements for two to three weeks pre-calving can help reduce risk of fatty liver (and other metabolic disorders).



For more details see TechNotes 11: *Understand the transition cow*, and 12: *Feed the transition cow appropriately*.

Fatty liver can also occur when there is a sudden drop in feed intake and often occurs secondarily to other metabolic diseases, in particular ketosis. Limited research on fatty liver has been conducted with cows in pasture-based systems. Currently, the occurrence of fatty liver in pasture-fed cows does not appear to be high; however, in systems where higher levels of supplementary feed are used, particularly if cows are above target BCS at calving, an increase in the incidence of fatty liver has been reported.

15.3 Further reading

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