

Pain management in food animals in Europe and impact on productivity

Food animals, by the critical role they play in contributing to feeding the planet, hold a vital place in our lives, especially as global meat and milk production are respectively projected to increase by 19% and 33% by 2030¹.

Achieving this while considering many parameters, whether they are environmental, demographic, or socio-economic, requires the adoption of new approaches in global agrifood systems. Furthermore, **growing considerations** about the **importance of welfare for livestock** and **adequate pain management** and **reduction of suffering** and **discomfort** are also being voiced.

Attitudes towards farm animal pain and its management have considerably evolved in the last decade or so, however there is still lots to be done.

Although pain in food animal is often acknowledged, efficient and pragmatic solutions, if available, are often not effectively put in place, due to their challenging implementation, affecting livestock well-being and ultimately their productivity, and leading to economic losses for farmers.

*How can we **enable new attitudes** towards pain and pain management as well as **setting a vision** that encompasses new alternative and efficient approaches to **reduce food animal suffering** and ensure their welfare, while meeting productivity needs?*

The use of alternative efficacious, safe, and easy to use treatments could be the way forwards.

Pain in food animals: a moral duty to prevent animals from suffering

Pain is a protective biological mechanism alerting to the onset of potential tissue damage, inducing both a sensory and emotional experience significantly affecting animal welfare².

Much **research** has been conducted in the last decade, leading to a **better understanding of pain** pathways and various mechanisms involved in pain expression, as well as the production of many recommendations and pain scoring tools; although there has been speculation about the fact that livestock pain management is far behind their companion animal counterparts.

In **cattle**, **pain** generally results from **infectious diseases**, **injuries** or **lameness**, but is also occasionally caused by humans, especially during routinely performed husbandry procedures.

Pain management, as well as other parameters such as stress and food, plays a **critical role in animal welfare**. As a matter of fact, chronic pain, and to a lesser extent acute pain, result in poor welfare of production animals³.

Being free from pain, injury and disease is a right and requirement for any animal.

There is indeed a moral argument for reducing pain and discomfort in food animals, further highlighted by emerging societal and ethical considerations demanding improvement in welfare of food-producing animals, as well as transparent welfare practices, particularly when it comes to food safety and residue considerations, as sometimes pain management involves the widespread use of antimicrobial substances, with the risks associated with food safety and antimicrobial resistance.

Pain in food-producing animal is also closely intertwined with **loss of productivity** (milk, meat, wool production).

In addition to the moral and ethical considerations of preventing animals from suffering, economic considerations are therefore also at stake.

Pain affects food animal productivity, and therefore pain management has a direct impact on farmers wellbeing and income. An animal in pain won't be able to produce enough, therefore leading to potential economic losses as well as impacting the farming community and potentially also creating psychological issues.



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Existing on-farm pain management protocols for livestock

Pain in cattle **can be managed** by the implementation of **pre-emptive, reactive, or multimodal analgesia**. When conducting painful procedures and when pain is therefore predictable, pre-emptive analgesia is recommended. In theory, the most effective analgesia should be provided through a multimodal approach, using a combination of agents acting on different pathways.

Care must be taken when using pain management drugs in livestock, due to food safety concerns and potential residues in the absence of Maximum Residue Limits (MRLs) for some potent molecules such as opioids, which can't be used for that reason. Other analgesic options like general anaesthesia can't always be used for obvious practical reasons either.

However, some **molecules** are **licensed** in livestock for systemic analgesia such as nonsteroidal anti-inflammatory drugs (NSAIDs) including **meloxicam, carprofen, ketoprofen** and **tolfenamic acid**, and α -agonists like **xylazine** and **detomidine**. For instance, NSAIDs are the most commonly used products to treat lameness⁴.

Epidural analgesia, intra-veinous regional anaesthesia and local nerve blocks are different techniques that can also be used to provide local anaesthesia⁵.

In theory, for livestock undergoing routine husbandry procedure, implementing a **multimodal pain relief strategy** is advised. The use of multimodal analgesia incorporating both local anaesthesia, to address nociception, together with NSAIDs to manage sensitisation, is recommended as best practice, with recognition of the provision of greater amelioration of the pain response than the use of a single agent alone.



Photo 1. While pain is often recognised and acknowledged in livestock, pain management plans are sometimes not systematically put in place.

Meloxicam is the most advocated molecule; it seems to be preferred over other available NSAIDs because of its **prolonged half-life**, enabling a duration of action up to 72 hours².

In reality, **implementing pain management on farms can be a challenge**. Firstly, attitudes and approaches towards pain scoring and pain management in farm animals vary from one individual to another, therefore affecting the perception of pain and the subsequent implementation of pain management plan choices.

Commonly performed husbandry procedures, such as isbudding (calves), dehorning, castration (piglets), calving, and tail docking (lambs), are often performed without the provision of any pain relief, despite the fact it is commonly acknowledged that such procedures cause acute pain.

Providing **pain relief** during and **after** such **husbandry procedures** can be challenging for several reasons, including time, cost, safety and public health issues.

It is now increasingly recognised that provision of pain relief for surgical husbandry procedures is required, or even mandatory in some countries, calling for an **urgent need** for the **implementation of systematic adequate pain relief protocols**.

So, while pain is often recognised and acknowledged in livestock, pain management plans are not systematically put in place. Costs, ease of use and administration of drugs, as well as legal restrictions specifically for the use of pain relief products in foodproducing animal and who, whether it is the vet or the farmer, can administer these pain relief products, may be important factors preventing the use of analgesia in livestock⁶.

Is there a way to find new approaches to pain management in farms and identify possible transformative patterns for pain management towards a more welfare centred approach?



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Welfare considerations and improvement of on-farm pain management

Adopting an animal-welfare strategy to manage treatments of farm animals, especially pain management therapies, either in the context of treating debilitating infectious diseases or following aversive husbandry procedures, **could have important benefits for both the animals as well as the farming community**, in addition to its obvious ethical considerations of preventing animals from unnecessary suffering, by significantly reducing morbidity periods and therefore improving livestock production efficiency. **Providing efficacious on-farm pain management is required**, as well as rationalising the necessity to continue or not painful aversive husbandry procedures. It is critically important for the sustainability of livestock production that improved animal welfare happens on farms⁷.

An important milestone in **improving food animal welfare** would be to **rationalise the need for aversive husbandry procedures** and to significantly reduce them or improve them by systematically using adequate pain management protocols in order to reduce suffering. In the last decade, much research has been conducted on that specific matter.

Do we really need such procedures? Can we provide adequate pain relief and pain mitigation strategies for these common husbandry procedures?

Tail docking in piglets, which is the cutting or cauterizing of a part of the tail in the first week after birth to prevent tail biting in their later life, is a commonly performed husbandry procedure. Research has suggested that tail biting can be avoided by providing pigs with enrichment materials such as straw, and that tail docking is not necessary^{8,9}. Despite this knowledge and a **ban on tail docking** according to European legislation dating from 2008¹⁰, **many piglets are still routinely exposed to the painful procedure of tail docking**, in many European countries except Finland and Sweden.

This procedure is often performed without the provision of any pain relief, posing obvious welfare issues. Enforcing legislation on pig welfare is one of the European Commission's priorities in terms of animal welfare, although there are still lots to be done to achieve this. Netherlands plans to end routine piglets tail docking by 2030 with the Dutch pig sector. It is interesting to note that **countries that have stopped routine tail docking** seem to **invest more in training for veterinary practitioners**⁹.

Is there a way to mitigate pain in such situations?

So, while it is often acknowledged that husbandry procedures such as tail docking are painful and should effectively be banned, these are still routinely performed, most often without any pain relief.



Photo 2. Tail docking in piglet is a painful procedure banned in Europe, although routinely performed without any pain relief.

The **development of easy to use, affordable and safe pain management strategies** that would achieve **rapid and sustainable uptake**, and that could be voluntarily repeated by farmers even under financial restrictions, is challenging but of critical importance². **Time, cost, safety and public health considerations** should therefore be **kept in mind** while designing pain management protocols for **on-farm husbandry procedures** on food-producing animals. These pain management strategies should take into consideration potential residue concerns, especially the adequation of withdrawal periods with production goals, and ideally contribute to **improved antimicrobial resistance stewardship** by not systematically including antimicrobials in the overall treatment of affected cattle. Actually, the use of topical antiseptics could be part of such non-antimicrobial pain management strategies; topical antiseptics traditionally used in cattle include povidone iodine, chlorhexidine, hydrogen peroxide and cetrimide.

Research suggests that the use of **topical or local anaesthesia**, ideally **combined with NSAIDs** for analgesia, **reduces pain** during and after husbandry procedures and is therefore a **robust and affordable strategy**^{2,3,11,12}. Recent research has shown that the **use of a spray-on topical anaesthetic formulation*** containing lidocaine, bupivacaine, adrenaline as well as an antiseptic (cetrimide) **successfully mitigated the pain in lambs after tail docking**⁷. This non-antimicrobial wound treatment, ideally administered in conjunction with parenteral or oral administration of an NSAID such as meloxicam, constitutes an affordable and efficacious method for farmers to improve animal welfare². The wound treatment has also been demonstrated to be safe and efficacious in pain management and wound healing incurred during surgical castration and tail docking of lambs^{2,7,13}, surgical castration and dehorning of calves^{14,15}, and debridement of hoof lesions in cattle to reduce lameness¹⁶.

This product is licensed and used for anaesthesia and analgesia of aversive husbandry procedures in Australia and has been considered since as a pain management revolution in that country⁷.



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Recently, the role of pain management to reduce suffering in animals affected by debilitating infectious diseases has also received some attention, shedding light on the benefits of using topical anaesthesia for these conditions¹².

Farm animals suffering from painful oral lesions inflicted by insect-borne viral diseases such as bluetongue (BT) and haemorrhagic epizootic disease (EHD) **could benefit from non-antimicrobial alternative treatments to reduce unnecessary suffering**, support recovery and help getting back rapidly to good levels of productivity.

Recent research suggests that the use of a spray-on topical anaesthetic formulation containing lidocaine, bupivacaine, adrenaline as well as cetrimide (antiseptic) could be a promising pain relief therapy for oral lesions of EHD. This wound treatment has been successfully used to treat buffalo and cattle affected by foot and mouth disease (FMD), where oral lesions are similar to EHD and BT, showing promising results of enhanced recovery and wound healing, as well as significant reduction in pain and suffering^{2,17,18}.

With increasing societal and ethical considerations on animal welfare accompanying the deployment of new sustainable agrifood systems to feed the planet in the years to come, implementing in-farm animal welfare strategies, especially in pain management, is of critical importance. Whilst this appears as an incredibly complex challenge, this could be achieved through finding a **multimodal approach**, where the veterinary profession would have a significant role to play in raising awareness, facilitating knowledge transfer and identifying risk factors and solutions on farm level for the benefit of livestock health and welfare.

This approach would include **establishing further protocols to properly assess and score pain**, as well as **finding new ways of mitigating pain more efficiently** on farms, which could potentially involve the use of alternative efficacious therapies and improve the way common painful husbandry procedures are performed.

NOTES

*The cutaneous solution is currently registered by Dechra in Europe under the commercial name of Multi-Solfen® in Portugal, where it is licensed for treatment of pain and acceleration of wound healing in disbudding wounds by thermocautery in calves and for local anaesthesia and antiseptics in non-sterile skin lacerations in piglets up to 7 days of age. This product is also registered under the name of Tri-Solfen® in the United Kingdom for local anaesthesia during and following castration of piglets and provision of castration wound antiseptics. Tri-Solfen® is also registered in Australia and New Zealand for use in cattle and small ruminant husbandry.

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