

ANAESTHETICS AND ANALGESICS

WIDELY ADOPTED BY WOOLGROWERS

There has been large scale adoption of post-operative pain relief (Tri-Solfen®) during the past 13 years. Newer products Buccalgesic® and Metacam® were released in 2016 and Numnuts® has recently been made available.



Tri-Solfen®, a topical local anaesthetic and antiseptic gel spray.



Metacam 20®, a subcutaneous injection high on the neck behind the ear.



Buccalgesic® being applied to the internal cheek of a lamb.



Numnuts® provides pain relief during tail docking and castration.

PAIN RELIEF WIDELY ADOPTED

The development of effective and practical analgesic and anaesthetic treatments for lambs has been a critical advance in alleviating the pain associated with husbandry procedures such as mulesing, tail docking and castration. Globally, Australian Merino woolgrowers have been leaders in the adoption of pain relief for husbandry procedures.

FAST FACTS

- There are now a number of anaesthetic and analgesic options available for woolgrowers to use to alleviate pain during marking.
- There are many variables and factors for woolgrowers to consider when deciding which pain relief products are best for their farming system.
- Completing the National Wool Declaration, including for the use of pain relief, allows woolgrowers to transparently inform wool buyers of their animal husbandry practices.
- Consult with your local veterinarian to obtain specific advice for your flock.

Tri-Solfen®, a local anaesthetic, was registered 13 years ago, whilst the Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) Metacam® and Buccalgesic® were registered in 2016 and 2017 respectively.

On-farm adoption of these pain relief options for mulesing has been rapid. AWI's 2017 Merino Husbandry Practices Survey of woolgrowers suggests that by 2017 83% of producers who mules Merino ewe lambs provided pain relief, and the 2018/19 AWI Wool and Sheep Meat Survey reported that 87% of mulesed Merino lambs were treated with pain relief.

Woolgrower adoption of these pain relief options will continue to be monitored over the coming years.

Pain relief with a specific claim for ring castration and ring tail docking has also

now been developed. Numnuts® combines a local anaesthetic (NumOcaine® Injectable Pain Relief) and rubber ring applicator, enabling the operator to inject local anaesthetic whilst simultaneously applying the rubber ring quickly, safely and easily – see page 46 for a case study of a producer that has trialed Numnuts. Numnuts® has been approved for release in Australia and has been made available in limited supply in the latter half of 2019 to support a further trial of the technology on commercial sheep properties. A full commercial release will follow in 2020 when it will be fully available throughout Australia. From the AWI 2017 Merino Husbandry Practices Survey, 95% of producers castrated (and 27% tail docked) with rings. This includes 55 to 61% of non mulesed Merinos, which are tail docked with rings.

HOW DO THE PAIN RELIEF OPTIONS WORK?

The currently available pain relief treatments fall into two broad categories – analgesics and anaesthetics.

Short acting anaesthetics

Anaesthetics block pain and sensory function is lost. There are three main types: local, regional and general anaesthetics, with most local and regional anaesthetics taking from under one to 10 minutes to take effect. They typically do not provide long-lasting pain relief.

Two local anaesthetic products are

available for use at lamb marking: Tri-Solfen® and NumOcaine®.

General anaesthetics create a medically-induced coma (a state of unconsciousness). The animal cannot move, feel pain or remember, and breathing may need to be assisted. General anaesthetics are not considered practical for use at lamb marking under Australian conditions and would be highly unlikely to pass the tight use registration requirements of the APVMA for field use.

Tri-Solfen® is a topical pain relief and

COST OF PAIN RELIEF PRODUCTS

Dose and recommended retail prices for Buccalgesic® (Troy Laboratories – 1.0 mL per kg body weight)

CASTRATION AND TAIL DOCKING	TOTAL DOSE	COST @ 48 CENTS PER ML
Lambs Under 10kg	1.0 ml	\$0.48
Lambs 10.1 - 15.0kg	1.5 ml	\$0.72
Lambs 15.1 - 20.0kg	2.0 ml	\$0.96
Lambs 20.1 - 25kg	2.5 ml	\$1.20

Dose and recommended retail prices for Metacam® 20 (Boehringer Ingelheim – 1.0 mL per kg body weight)

ALL PURPOSES	TOTAL DOSE	COST @ 132 CENTS PER ML
Lambs under 10kg	0.50 ml	\$0.66
Lambs 10.1 - 15.0kg	0.75 ml	\$0.99
Lambs 15.1 - 20.0kg	1.00 ml	\$1.32
Lambs 20.1 - 25kg	1.25 ml	\$1.65

Dose and recommended retail prices for NumOcaine® (MavLab)

HUSBANDRY PRACTICE	TOTAL DOSE	COST @ 45 CENTS PER ML
Tail docking	1.5 ml	\$0.67
Castration	1.5 ml	\$0.67
Castration and tail docking	3.0 ml	\$1.34

The Numnuts applicator retails for \$350 plus GST.

Dose and recommended retail prices for Tri-Solfen® (Bayer)

HUSBANDRY PRACTICE	TOTAL DOSE	COST @ 12 CENTS PER ML
Mulesing		
Lambs 5 - 10kg	6.0 ml	\$0.90
Lambs 11 - 15kg	8.0 ml	\$1.20
Lambs 16 - 20kg	10.0 ml	\$1.50
Lambs over 20kg	12.0 ml	\$1.80
Castration		
Lambs up to 10kg	3.0 ml	\$0.45
Lambs over 10kg	4.5 ml	\$0.68
Tail docking (if not concurrently mulesed)		
Lambs up to 10kg	1.5 ml	\$0.23
Lambs over 10kg	2.0 ml	\$0.30
Combined castration, tail dock & mules		
Lambs 5 - 10kg	9.0 ml	\$1.35
Lambs 11 - 15kg	12.5 ml	\$1.88
Lambs 16 - 20kg	14.5 ml	\$2.17
Lambs over 20kg	16.5 ml	\$2.48

Prices used in tables above are the standard retail price at April 2019 for the product alone. They do not include the cost of labour to administer the products.

antiseptic solution that contains two local anaesthetics (a longer and a shorter acting one), adrenaline (which reduces blood supply to the area, reducing blood loss) and an antiseptic. It is applied as a gel spray directly onto the open wound (so is not appropriate for rings) and provides immediate (within one minute) pain relief that lasts up to 24 hours. It also works to seal and protect the wound, reducing the risk of infection and assisting with healing.

NumOcaine® (via Numnuts®) is an injected local anaesthetic for ring castration and tail docking, that provides immediate pain relief, reaching maximum intensity 15-35 min after application.

Longer acting analgesics

Analgesics provide relief from pain whilst retaining most sensory function. Analgesics can take 10 to 15 minutes to reach optimum blood concentration. Some analgesics, for example NSAIDs require pain enzymes to be created at the site of tissue damage (which can take 10 minutes after the initial damage to be created) before they take effect and the release of pain enzymes – hence the logic in providing the analgesic at or before marking. They last for varying times depending on how quickly the active compound is metabolised and excreted.

WHAT TO USE WHEN MULESING

The combination of both a fast and short acting pain relief and antiseptic (Tri-Solfen®) and a longer acting meloxicam pain relief anti-inflammatory product (Buccalgesic® or Metacam®) provides the most effective pain relief and gives the animal the best chance of recovering faster, addressing both the immediate pain and any pain that might occur during the healing process, as well as reducing the possibility of infection (Small *et al.* 2018¹).

However, there are no black and white answers as to what are the best pain relief options for producers when considering their whole flock.

Consult your local veterinarian as there are many variables and factors to consider when deciding to use anaesthetic or analgesic products, including:

- type of husbandry practice and method used
- availability of a product to livestock producers and veterinarians
- availability of veterinary prescription and oversight
- restraint requirements
- time and method of treatment
- time and supervision required post-treatment
- ability of the lamb to mother up
- likelihood of adverse impact to humans
- degree of pain relief provided
- practicality and cost.

¹ Small, A.H., Marini, D., Dyall, T., Paull, D. & Lee, C. 2018. A randomised field study evaluating the effectiveness of buccal meloxicam and topical local anaesthetic formulations administered singly or in combination at improving welfare of female Merino lambs undergoing surgical mulesing and hot knife tail docking. *Research in Veterinary Science*, 118, 305-311.

ARTICLE CONTINUES OVERLEAF

Two NSAID products (Buccalgesic® and Metacam®) are registered for use in sheep in Australia. Both products contain the same active (meloxicam). Meloxicam alleviates pain and inflammation and reduces fever and fluid production caused by tissue damage. Pain relief from meloxicam products take effect within 10 to 15 minutes of application. It is available either orally (Buccalgesic®), where the dose is administered inside the mouth between the gums and cheek, with no needles required, or as a subcutaneous injection (Metacam®) administered high on the neck behind the ear.

NATIONAL WOOL DECLARATION PROVIDES CLARITY TO BUYERS

The supply chains for both wool and meat are increasingly interested in their suppliers' animal husbandry practices. Australian Wool Exchange (AWEX) created a Mulesing Status section of the National Wool Declaration (NWD) in 2007 and the number of bales being declared by woolgrowers is steadily increasing.

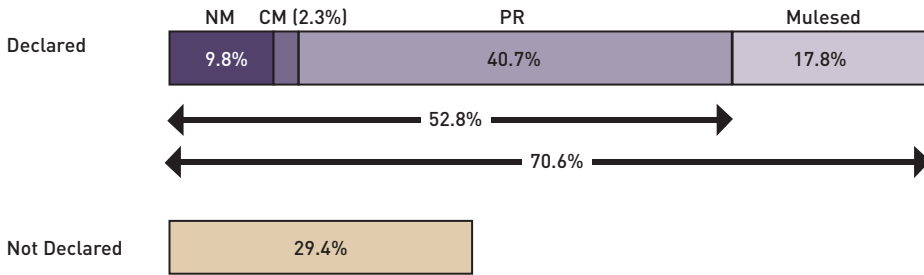
Declaring your use of pain relief on the NWD transparently informs wool buyers of your animal husbandry practices, backed by an independent integrity program. The voluntary NWD is managed and audited by AWEX and is available for all wool sold by auction in Australia. It is relatively low cost and focuses on specific wool contamination and mulesing practices. Increasingly, clients are asking for wools of certain NWD categories, so producers are encouraged to declare their wool regardless of whether they

mules, with or without pain relief, or not. There are variable, small but increasing premiums for all categories compared to Not Declared.

There are other more detailed programs that woolgrowers can also choose, run by wool brokers and businesses providing quality assurance schemes.

By 2018/19, ten years after the Mulesing section was added to the NWD, out of over 1.1 million bales sold, 9.8% were declared **Non Mulesed (NM)**, 2.3% **Ceased Mulesed (CM)**, 40.7% Mulesed with **Pain Relief (PR)**, a total 52.8% of the wool clip. 17.8% were declared **Mulesed** and 29.4% were **Not Declared**. (Ceased Mulesed status means no lambs born on the property in the preceding 12 months have been mulesed and no purchased ewes or wethers are mulesed).

Australian wool sold at auction 2018/19 (Source: AWEX)



SUMMARY OF AVAILABLE PAIN RELIEF PRODUCTS

BRAND NAME:	TRI-SOLFEN®	NUMOCAINE® (WITH NUMNUTS® DELIVERY)	BUCCALGESIC®	METACAM 20®
Type of drug	Local anaesthetic	Local anaesthetic	NSAID	NSAID
Alleviates pain caused by	Castration with knife and tail docking with knife and hot knife, dehorning, mulesing	Castration, tail docking with ring	Castration, tail docking, dehorning, mulesing	Castration, tail docking, dehorning, mulesing
Time to start of effective pain alleviation	< 1 min	< 1 min	From 10 mins	From 10 mins
Application method	Fan spray applicator	Injection with Numnuts® device	Oral with custom applicator	Subcutaneous injection
Availability	S5 - Over the counter	S4 - Vet prescription	S4 - Vet prescription	S4 - Vet prescription
Meat Withholding Period	90 days	0 days	10 days	11 days

*Growers must follow all label directions and veterinary instructions when using pain relief products.

APVMA FORMAL APPROVALS

The Australian Pesticide and Veterinary Medicine Authority (APVMA) has registered products for the following purposes:

- Ilium Buccalgesic® OTM for the alleviation of pain associated with the routine husbandry practices of castration, tail docking and mulesing of lambs.
- Metacam® 20 mg/mL Solution for injection for single dose use in sheep or lambs more than 14 days of age for the alleviation of pain and inflammation (ie a broad pain relief claim for alleviation in all conditions, including mulesing, castration and tail docking).
- Tri-Solfen® Topical Anaesthetic & Antiseptic Solution for Pain Relief in Lambs and Calves for pain relief following mulesing and tail docking and during and following castration.
- NumOcaine® Injectable Pain Relief local anaesthetic injection for sheep and cattle.

FREQUENTLY ASKED QUESTIONS

One of the biggest changes in animal husbandry in the sheep industry in recent years is an increased understanding of reducing and assessing stress on animals and in particular the introduction of pain relief medication for lamb marking husbandry practices. Research has confirmed that sheep do feel pain from some husbandry practices and that this pain can be alleviated using drugs that are now available for use on sheep.

It is important when using pain relief medication to carefully read the label instructions and only apply it in the method and situation described. Medications should not be used at dosages or in applications that are not covered by the label recommendations. If in doubt, consult your veterinarian or animal health consultant.

The following FAQs are offered as a guide only and specific advice should be sought as appropriate from your veterinarian.

What is best practice pain relief for lamb marking?

Research has shown that mulesing, castrating and tail docking lambs are stressful procedures. This can be reduced or alleviated with the appropriate use of a pain relief product(s), whether that be an anaesthetic or analgesic product or preferably a combination to give multimodal effect. Reducing haemorrhage and post-surgical infection are also important animal welfare concerns.

What is the difference between the pre-operative pain relief products (meloxicam) and post-operative pain relief products?

The theory of pre-operative pain relief is based on the concept that given at or before the time of a painful procedure there is already a circulating level of pain relief product within the body of the animal.

Some pain during surgical procedures comes from the release of inflammatory chemicals from the site of tissue damage, ie mulesing wound or tail stump. If circulating levels of anti-inflammatory drugs are present in the body at the time of tissue damage, the amount of inflammatory chemicals that are released from wounds is greatly reduced, resulting in reduced levels of pain.

It takes around 10 minutes post marking for the compounds that cause inflammation to build up and anti-inflammatory drugs to have effect. If given at or before the time of the procedure, the compounds are absorbed and reach therapeutic levels at the same time the inflammation starts to occur.

Anaesthetic products act more quickly. NumOcaine® numbs the site of ring application during castration or tail docking. Tri-Solfen® numbs the surgical site during (surgical castration) and immediately after (mulesing and tail docking) the procedures.

What are the benefits of combining meloxicam (Buccalgesic® or Metacam®) with Tri-solfen® or Numnuts®/ NumOcaine®?

Analgesics and anaesthetics manage pain differently. Targeting different parts of the pain pathway can lead to better overall pain relief than using just one type of product and controlling only one part of the pain pathway. Multi-modal pain relief is commonly practiced across human and veterinary medicine for the management of painful conditions.

The easiest way to think of this is by comparing it to a visit to the dentist. While you are in the dentist's chair, getting your tooth drilled, the local anaesthetic prevents you feeling the pain associated with the procedure because it numbs the area; it stops you feeling sensation in the area. Later, the local anaesthetic wears off and you are left with an ache due to the inflammation which is part of the healing process but generates pain. At this stage, an anti-inflammatory drug will help to take the edge off the pain as the wound heals.

Transferring this analogy to the sheep undergoing husbandry procedures, the local anaesthetic (ie Tri-Solfen® or NumOcaine®) provides relief by stopping pain in the area, NumOcaine® before the tissue damage and Trisolfen® within a minute of it being applied. After the procedure, the anti-inflammatory (meloxicam) dulls the

pain as the wound heals.

Can we use less or more than the recommended dose of a pain relief product and still get an adequate effect?

No. All veterinary medications should be used strictly in adherence with label directions. This includes applying at the recommended dosage and for recommended practices only.

If in doubt, consult your veterinarian or animal health advisor.

Why don't some people mules?

Most Merinos in Australia are mulesed, with 70% of producers reporting they mulesed Merino ewe lambs and 63% Merino wether lambs in 2017, according to the AWI Merino Husbandry Practices Survey.

Of the producers not mulesing in 2017, one third had never mulesed while the other two thirds had chosen to stop mulesing. Over the past 15 years, there have been several specific periods (2005, 2009, 2015) when large numbers of producers have stopped mulesing. Those that have ceased mulesing cited being in low flystrike risk areas, access to chemicals, lack of necessity, breeding less wrinkled sheep, and industry or consumer pressure as the main drivers.

Among producers that do still mules, around half have decreased their mules size in the past 10 years.

Is there a difference in response between animals given pain relief? Is there compensatory gain? If so, how long does it take?

Research has shown that animals treated for pain before or during tail docking return to normal behaviours earlier than animals not treated for pain. While weight gain differences have yet to be recorded, differences in behaviour of animals indicates benefits of treating for pain.

Why don't some people use pain relief?

The AWI 2017 Merino Husbandry Practices Survey reported that 42% of producers used pain relief for tail docking and castration, and that 83% used pain relief for mulesing. Tri-Solfen® is the most widely used form of pain relief, with producers choosing it because it was readily available and found to be effective. The most common reason for producers not using pain relief was that they did not see it as beneficial.

Is meloxicam (Buccalgesic® or Metacam®) a sedative?

No, meloxicam is not a sedative. Meloxicam is an NSAID. It is an analgesic and helps to reduce pain in much the way ibuprofen or paracetamol do in humans; it provides pain relief but is not a known mechanism for sedation.

Can I give meloxicam (Buccalgesic® or Metacam®) to animals with flystrike,

foot abscess etc?

Metacam® has a broad claim for the alleviation of pain and inflammation – this includes any conditions causing pain and inflammation in sheep. So, it can be prescribed by a veterinarian to animals with flystrike, foot rot, shearing cuts, dog bites etc.

Buccalgesic® is approved for the alleviation of pain associated with the routine husbandry practices of castration, tail docking and mulesing of lambs.

Is Buccalgesic® too viscous to use in cold climates?

In cold conditions it is recommended to elevate the bottle to allow a better flow of Buccalgesic®.

What is the best method to apply Tri-Solfen® to knife castration and tail docking wounds?

Hygiene is a very important consideration when castrating and tail docking.

The Tri-Solfen® applicator nozzle should be kept clean; disinfectants such as chlorhexidine can be used to clean the external surfaces of the nozzle between applications when knife castrating. Carefully follow the label directions for the application of Tri-Solfen® during knife castration.

Tri-Solfen® is applied as a spray through the applicator nozzle to tail docking wounds. The nozzle itself therefore does not touch the animal during this procedure; overall hygiene should be kept to a high standard.

Does Tri-Solfen® work with rings?

No. Tri-Solfen® is a topical anaesthetic and needs to be sprayed on exposed nerves to work.

Does Tri-Solfen® work on hot knife docking wounds?

Yes. Tri-Solfen® contains anaesthetic (Lignocaine and Bupivacaine) which numbs the area, adrenaline which restricts bleeding and increases the anaesthetic's effectiveness, and an antiseptic to help prevent infection. It will reduce the pain associated with tail docking carried out surgically or with a hot knife.

What is the status of Numnuts®?

Numnuts® is a new tool developed for lamb tail docking and castration. It combines a local anaesthetic (NumOcaine®) and rubber ring applicator, enabling the operator to inject local anaesthetic and the apply rubber ring quickly, safely and easily.

Numnuts® has completed a successful Australian pilot launch during 2019 with 250,000 doses being used by wool and lamb producers. Full availability of the device including listings of vets who stock NumOcaine® can be found at the website www.numnuts.store.