



RESPHE: Real lavender essential oil, a solution to reduce young bulls' stress and prevent respiratory diseases ?

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Context

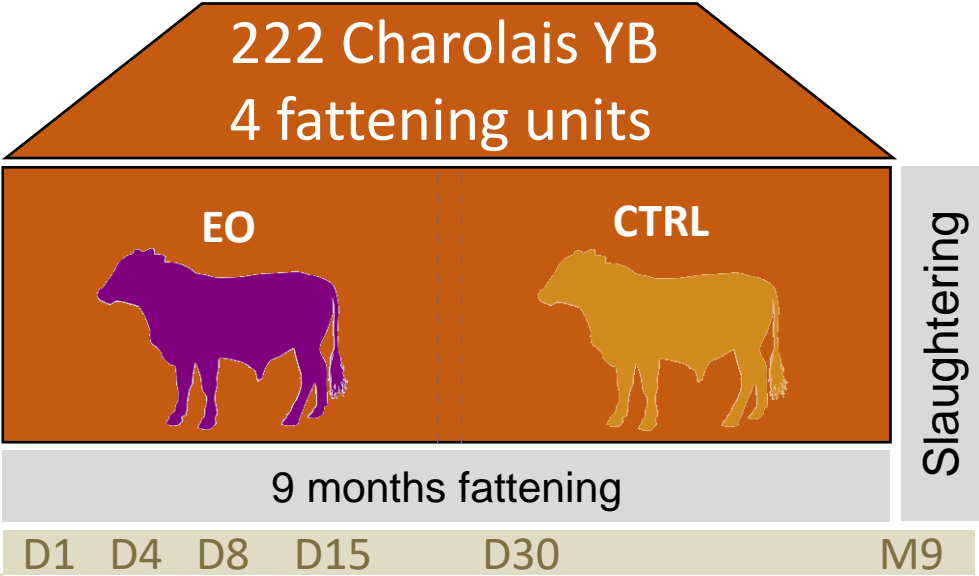
- At sales, calves go through stressful events (weaning, transportation, commingling...) that have negative impacts on their immune system
- Importance of bovine respiratory disease (**BRD**) in young bulls (**YB**) during the 1st month of fattening
($\mu = 25/30\%$ - Up to 80% of YB may be diseased during the 1st month of fattening)
- In the past, antibiotic prophylaxis was common to control BRD. Nowadays, we develop alternatives to reduce the use of antibiotics and preserve the therapeutic arsenal
- Strong focus on essential oils (**EO**)
- Real Lavender EO decrease stress in horses

HYPOTESIS : Anxiolytic properties of Real lavender EO might low the stress of YB and decrease BDR susceptibility

Experimental design

General protocol

Homogeneous groups on weight, origins and transport duration



354 kg / 9 months

	D1	D4	D8	D15	D30	M9
Behaviour and activities	X		X			
BRD clinical signs + PCR on nasal swabs	X	X	X	X	X	
Growth performances	X				X	X

Experimental scheme

Real lavender essential oil protocol

33,03 % linalool - 34,25% linalyl acetate

Sorting centers

Pour-On 10mL of a 20% solution of RL-EO

Fattening units

Spray on a natural string wrapped around the neck bracket

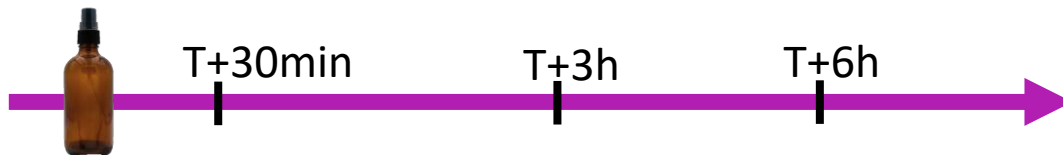
5mL of pure RL-EO, 2 times a day for 1 wk.



Authorized for topical use / Waiting period : 28d for meat

Proof of exposure

- Blood sampling for linalool and linalyl acetate analysis by gas chromatography – mass spectrometry (**GC-MS**) (*Poutaraud et al., 2017*)
To be done
- Air sampling for linalool and linalyl acetate detection by thermodesorption – GC-MS
Air sampling device = constant flow sampling pump (flow rate = 6L/h) + Tenax[®] sampling tube (with absorbent material)



Proof of exposure

Concentrations ($\mu\text{g}/\text{m}^3$)						
	T= 30min		T=3h		T=6h	
	CTRL	EO	CTRL	EO	CTRL	EO
Linalool	<LQ	<LQ	<LQ	0,33	<LQ	<LQ
Linalyl Acetate	<LQ	<LQ	<LQ	0,17	<LQ	<LQ

- Presence of linalool and linalyl acetate in the air YB breathe
- Data to be completed with plasma analysis

Behavior

- 1h30 observations – 30min after feed distribution / spraying in the morning
- Activities : stand, walk, eat, drink, sleep, long fight, prostration
Behavior : agonistic, non-agonistic, self directed, sexual, stereotypies, vocalizations
→ **No difference between CTRL and EO on activities and behavior**
- Feelings that EO YB were calmer than CTRL when they were manipulated – operator bias or real difference to be assessed ?

Behavior

- → **No difference between CTRL and EO on activities and behavior**

Result not expected. Could be explained by the late utilisation of the EO at the sorting center (when the stress of weaning and transportation begins at the cow-calf producers')

- Accumulation of stressful events during a long period (~ 2d.)
Pharmacokinetics: persistence of linalool and linalyl acetate in plasma (~1h30)
- Sufficient doses? adapted from horses
Appropriate tool to control YB' stress?

Morbidity (BRD)

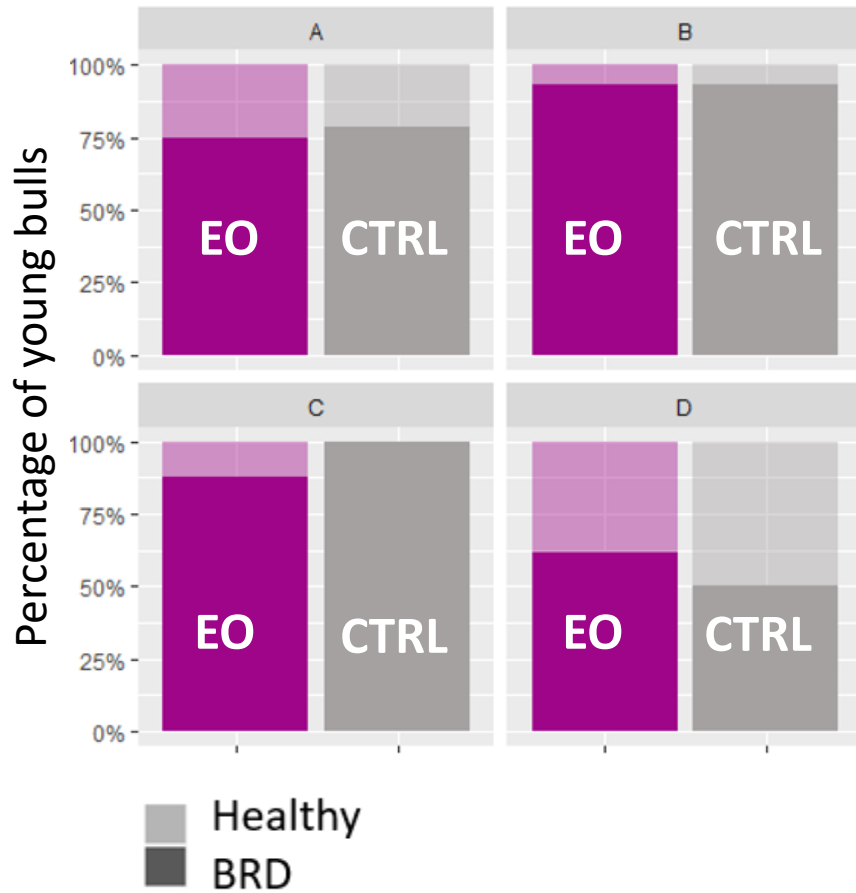
- Global clinical score > 2

OR

- Severe weakness
- Pathogens (PCR on nasal swabs)
*B*CoV ; *Mycoplasma Bovis* ; *BRSV* ;
Mannheimia haemolytica ;
Histophilus Somni ; *Pasteurella multocida* ; *BPI3*

Variable	Modality	Score
Weakness	Absent	0
	Slight	1
	Severe	2
Cough	Absent	0
	Present	2
Nasal discharge	Absent	0
	Serous (+ / ++)	1
	Serous (+++)	2
	Mucosal	2
	Purulent	3
Respiratory rate and amplitude	Normal rate and amplitude	0
	Increased rate Normal amplitude	2
	Increased rate and amplitude	3

Morbidity (BRD)



- → **No significant difference between CTRL and EO on**
 - **BRD incidence**
 - BRD gravity
 - Number of antibiotic treatments

Variance analysis by a generalised linear mixed model :

Behavior/activity = μ + Group + F. Unit + Day_{obs} + Group*F.Unit + Group* Day_{obs} + F.Unit* Day_{obs} + Pen:F.Unit + ϵ

Growth performances

			Effect		
	CTRL	EO	Group	Fattening Unit	Group * Fattening Unit
ADG_{D0-Dslaughter} (g)	1511	1500	0,748	0,107	0,962

- → **No significant difference between CTRL and EO on**
 - **ADG_{fattening period}**
 - Fattening duration (268d vs **276d**)
 - Carcass weight (433kg vs **441 kg**)
 - Conformation

Variance analysis by a linear mixed model :

Behavior/activity = $\mu + \text{Group} + \text{F. Unit} + \text{Day}_{\text{obs}} + \text{Group} * \text{F.Unit} + \text{Group} * \text{Day}_{\text{obs}} + \text{F.Unit} * \text{Day}_{\text{obs}} + \text{Pen:F.Unit} + \epsilon$

Conclusion

- No significant effect of RL-EO on young bulls' behavior, morbidity and performances
- Adapt the protocol of RL-EO administration
 - Starting the administration before the beginning of stressful events, at the cow/calf herds
 - RL-EO diffusion during transportation
 - Increase doses
- Work on a group of preventive measures for stress and BRD, that could include a mix of EO ; husbandry practises ; changes in beef sector organization



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Many thanks



Laure Anne Merle
+ technical staff



Loïc Jouet