



The use of glycerol in diets for finishing pigs

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Biodiesel use

- ◆ Renewable transport fuels obligation (RTFO) - fuel suppliers must source proportion of fuel from biofuel:

2.5% by 2008

3.75% by 2009

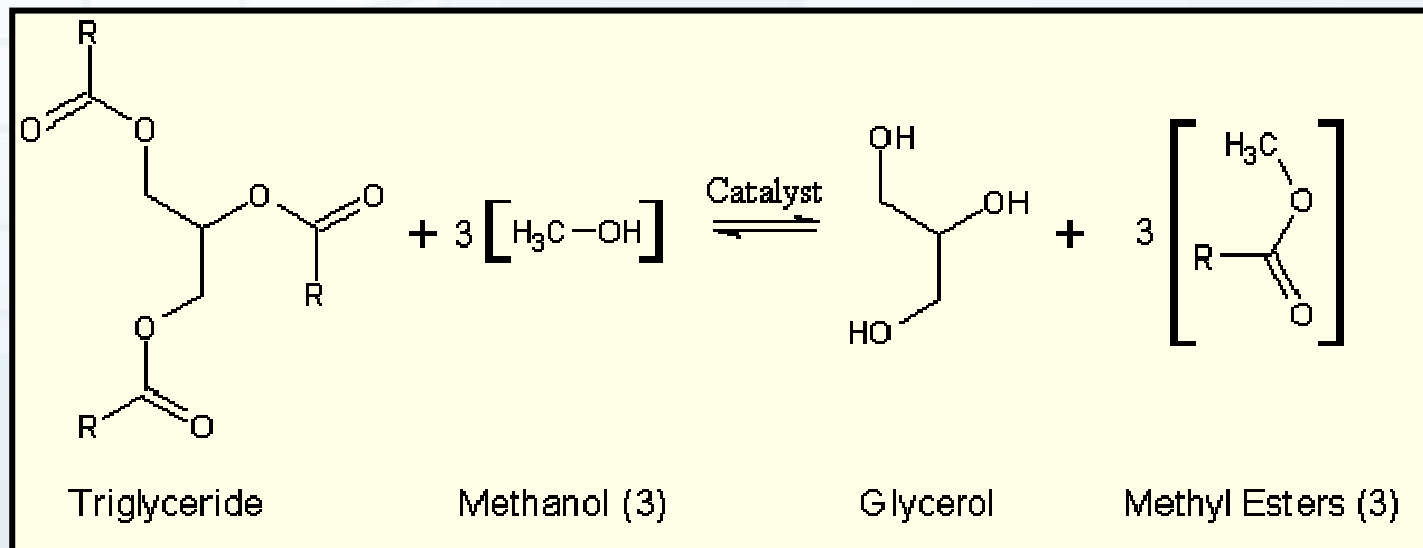
5% by 2010



- ◆ Oilseed rape main source for biodiesel in UK
- ◆ Estimated that 2.7million tonnes required to meet targets
- ◆ One acre of oilseed rape yields 102 gallons of biodiesel
- ◆ For every 1 tonne of biodiesel produced, 100kg of glycerol produced

Glycerol

- ◆ By-product of biodiesel production
- ◆ Transesterification of vegetable oil to biodiesel + glycerol



Glycerol in diets for pigs

- ◆ Few studies in the literature
- ◆ Lammers *et al.* (2007) from USA concluded that:
“crude glycerol can be used as an excellent source of energy for growing pigs”
- ◆ DE content = 14.0 MJ/kg ?

The effect on performance

- ◆ Mouro *et al.* (1994) reported no significant effect of glycerol inclusion on pig performance
- ◆ Kijora (1996) - inclusion at 10% improved LWG (782 vs. 690 g/d)
- ◆ BUT inclusion of glycerol at greater than 10% reduced performance

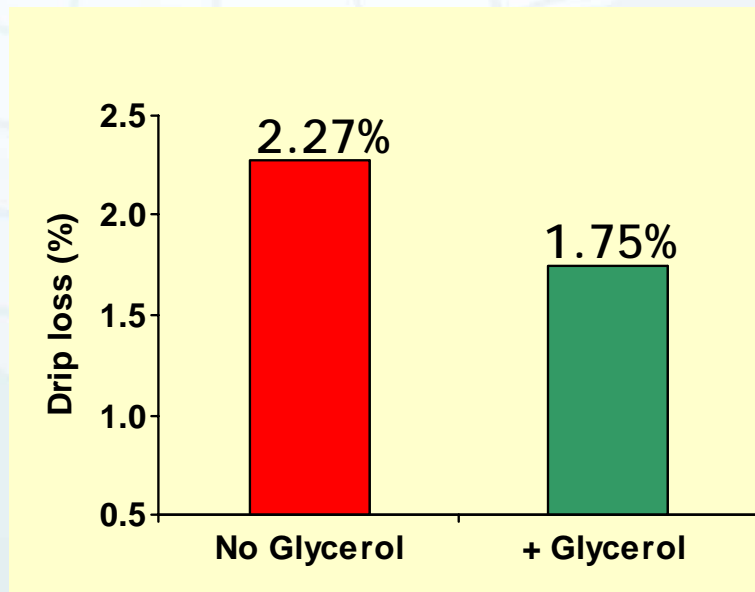


The effect on meat quality

- ◆ Mouro *et al.* (1994) - reduced drip loss and cooking loss with glycerol inclusion

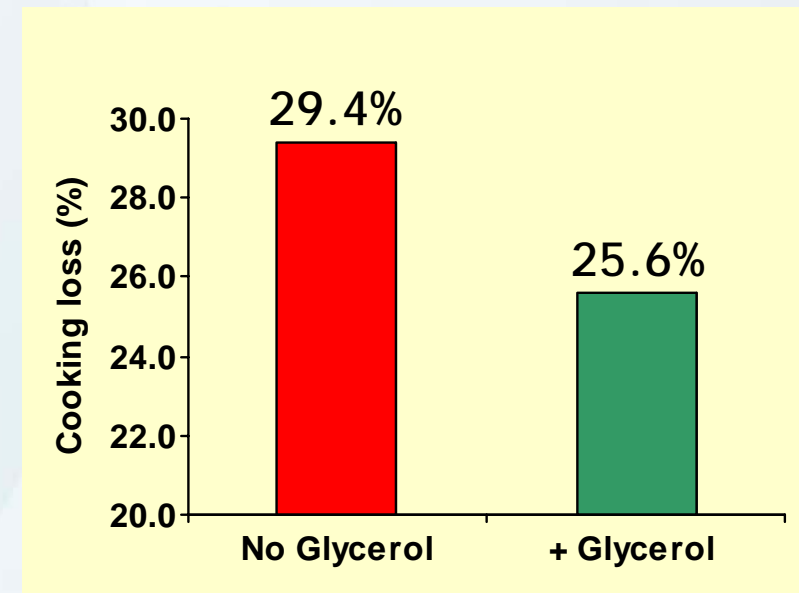
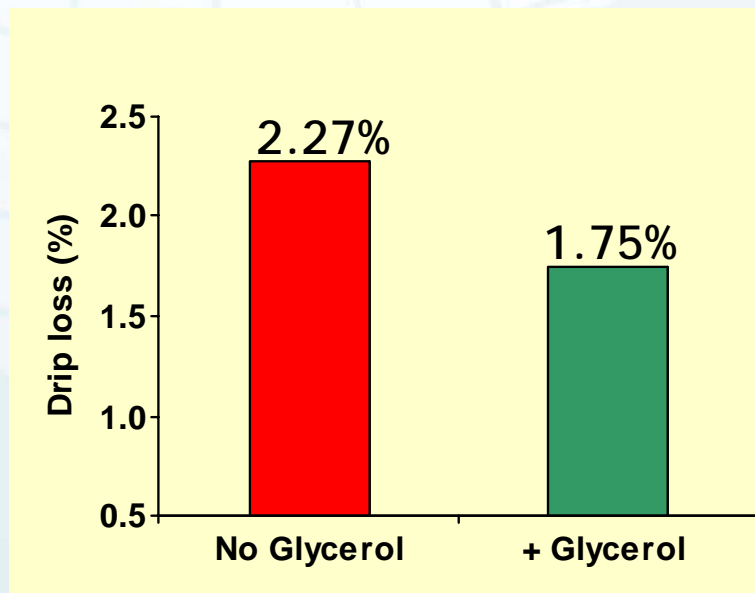
The effect on meat quality

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The effect on meat quality

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Aim of research

To investigate the effect of inclusion rate of glycerol in diets for finishing pigs on:

- ◆ Performance
- ◆ Meat quality



Treatments

1. Control - 0 g/kg glycerol
2. 40 g/kg glycerol
3. 80 g/kg glycerol
4. 120 g/kg glycerol

Performance trial

- ◆ Newly installed research facility
- ◆ 48 pigs - 12/treatment
- ◆ 14-21 weeks
- ◆ Individual intakes and LWG recorded
- ◆ Individual FCR determined



Meat quality

- ◆ Pigs slaughtered over 2 weeks
- ◆ P_2 , cold weight and killing out percentage recorded
- ◆ Meat quality assessments - drip and cooking loss, colour, pH, and tenderness

Performance (14-21wks)

	<i>Level of glycerol (g/kg)</i>				<i>SEM</i>	<i>P</i>	<i>P=Lin</i>
	<i>0</i>	<i>40</i>	<i>80</i>	<i>120</i>			
Intake (g/d)	2527	2286	2528	2395	119.7	NS	NS
LWG (g/d)	1031 ^b	927 ^a	995 ^{ab}	905 ^a	33.9	<0.05	NS
FCR	2.45	2.47	2.55	2.66	0.103	NS	NS

Carcass quality

	<i>Level of glycerol (g/kg)</i>				<i>SEM</i>	<i>P</i>	<i>P=Lin</i>
	<i>0</i>	<i>40</i>	<i>80</i>	<i>120</i>			
Killing out %	74.6	76.8	76.3	76.4	0.79	NS	NS
Backfat (P ₂) (mm)	13.8	14.0	13.6	13.6	1.16	NS	NS

Meat quality

	Level of glycerol (g/kg)				SEM	P	P=Lin
	0	40	80	120			
Cooking loss (%)	28.8	30.3	28.8	29.1	1.19	NS	NS
Drip loss (%)	4.7	3.8	4.9	4.6	0.64	NS	NS
Sarcomere length (mm)	2.0	1.9	1.9	1.8	0.05	NS	NS
Shearforce (kg/cm ²)	3.6	4.1	3.8	3.7	0.19	NS	NS

Feeding behaviour

	<i>Level of glycerol (g/kg)</i>				<i>SEM</i>	<i>P</i>	<i>P=Lin</i>
	<i>0</i>	<i>40</i>	<i>80</i>	<i>120</i>			
Number of visits (pig/24hr)	4.9 ^a	16.0 ^b	14.3 ^b	20.9 ^b	2.80	<0.01	<0.001
Total time (pig/24hrs)	2.82 ^b	1.39 ^a	1.89 ^a	1.34 ^a	0.260	<0.01	<0.01

Conclusions

- ◆ Glycerol inclusion at 40 and 120g/kg lowered ADG but no difference between 80g/kg inclusion and the control
- ◆ At 120g/kg inclusion the glycerol kinase enzyme may be saturated meaning that glycerol cannot be metabolised to energy and must be excreted via the urine

Conclusions

- ◆ No effect on carcass and meat quality
- ◆ Glycerol inclusion increased feeder visits but decreased total time spent at feeder - palatability effect?
- ◆ More work required on the effect of glycerol on nutrient digestibility and digestible energy content

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