THE POSSIBLE USE
OF BETA AGONISTS IN
SMALL STOCK FEEDLOTS

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Change in economical and political environment of livestock production

Questions: How can enough protein be produced? How can production be made more cost effective? How do we ensure consumer safety?

Much research in intensive beef production high quality
SMALL STOCK FEEDLOTS:

- RELATIVELY UNPOPULAR IN SOUTH AFRICA

- TRADITIONALLY – LAMBS FINISHED EXTENSIVELY OR ON HARVESTED CORN FIELDS = INEXPENSIVE

- PROBLEM: SEASONAL AVAILABILITY

- PRICE FLUCTUATIONS IN LAMB MEAT MARKET
CHALLENGES:

- Decrease in national sheep herd due to predators, stock theft, drought

- Dwindeling animal numbers → shortage of product

- Escalation of prices

- Lamb has become an expensive source of protein
WHAT IS NEEDED:

- CONSTANT SUPPLY OF PRODUCT
- PRODUCT THAT MEETS MARKET SPECIFICATIONS
- STABLE MARKET PRICES

= SHEEP FEEDLOTS
IDEAL WORLD:

BALANCED RATION + OPTIMAL FEEDING CONDITIONS

+ OPTIMAL HOUSING CONDITIONS =

HIGH VOLUNTARY INTAKE =

OPTIMAL GROWHT =

PROFIT
**HIGH COST**: FEED AND LAMBS

**FEEDLOTS = LABOUR INTENSIVE**

**RESULT**: SMALL PROFIT MARGIN

- COST TO FINISH A LAMB IN 70 DAYS: R300.00 (FEED + PROCESSING)

- TOTAL PROFIT: AS LOW AS R50.00
PROFIT MARGIN

= MEAT : FEED PRICE

FCR CRITICAL: lamb that converts feed into muscle in the most efficient way

MOST PROFITABLE LAMB
FOCUS ON MORE EFFICIENT MEAT PRODUCTION

RESEARCH  RESPONSIBLE,  
EFFECTIVE USE OF  GROWTH ENHANCERS
GOAL OF GROWTH ENHANCERS:

1) FEEDING TIME

2) PRODUCE ANIMALS WITH \text{LIVE MASS}

3) PRODUCE ANIMALS WITH HIGHER MEAT : FAT

4) MAINTAIN OPTIMAL CARCASS GRADING
STEROID HORMONE IMPLANTS:

- OESTROGEN - GROWTH HORMONE AXIS
  - INSULIN
  - THYROID HORMONE

- TESTOSTERONE - DIRECT ANABOLIC EFFECT
  - CATABOLIC EFFECT OF STRESS

- OESTROGEN / TBA - EFFECT

- PROTEIN ACCRECTION = GROWTH
**BAR**
*(BETA ADRENERGIC RECEPTOR AGONIST)*

- **USE OF BETA AGONISTS** → **PART OF HEATED DEBATES**
- **REASON: POSSIBILITY** → **INAPPROPRIATE USE**
  - **ADVERSE EFFECTS FOR HUMAN AND ANIMAL CONSUMERS**
BETA AGONIST MODE OF ACTION:

- MUSCLE HYPERTROPHY + REDUCTION IN BODY FAT
- NO SIGNIFICANT ALTERATION IN BONE AND ORGAN MASS

REPARTITIONING AGENT

- REPARTITIONING = CHANNELING OF ENERGY AWAY FROM STORAGE CELLS IN LIVER AND ADIPOSE TISSUE TOWARDS MUSCLE TISSUE
EFFECT:

- ADG (average daily gain)
- FCR (feed conversion ratio)
- WCM (warm carcass mass)
- DP (dressing percentage)
- CARCASS COMPACTNESS
- MAINTAIN MEAT QUALITY – LAMB
- NO SUBSTANTIAL FEED INTAKE
WHICH ANIMALS BENEFIT:

- AGE COMPARISON STUDIES: MATURETY OF MUSCLE – CRITICAL
  = RECEPTOR PRESENCE AND AVAILABILITY
- NO OR LIMITED RESPONSE IN YOUNG ANIMALS - YOUNG MUSCLE LACK ENOUGH BETA ADRENERGIC RECEPTORS
- LIMITED TIME OF RESPONSIVENESS: DOWN REGULATION OF RECEPTORS
- FED TO ANIMALS WITH OPTIMAL CONDITIONING SCORE DUE TO LIPOLITIC EFFECT
- SHEEP LAST 18 - 25 DAYS
SAFETY:

- Important to know and observe withdrawal periods
- Found by various researchers – Min 48 hours withdrawal – MRL in cattle
- Sheep: Same withdrawal time used
- Research - Laboratory tests: 48 hrs = MRL
- 72 hrs = No detectable residues (1 p.p.b)
<table>
<thead>
<tr>
<th>TREATMENT</th>
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<th>ZERANOL</th>
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<th>OESTRADIOL/TBA</th>
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<td>ADG</td>
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<td>0.210</td>
<td>0.274</td>
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**POSSIBLE EFFECT: GROWTH DATA**
IMPROVEMENT:

- FCR: 10% - 20%
- ADG: 12% - 23%
### CARCASS DATA OBTAINED AT SLAUGHTER:

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<td>CC</td>
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IMPROVEMENT:

► WCM : 4% -14%
► DRESSING % : 4%
► CC : 6%
FINANCIAL GAIN:

DEPENDING ON HORMONAL IMPLANT COST - UP TO 5 % NETT GAIN (R/c)
CONCLUSION:

- **APPROPRIATE USE** - OBSERVING DOSAGE AND TREATMENT DURATION RESTRICTIONS

- **OBSERVING ADEQUATE WITHDRAWAL TIMES** – CONSUMER SAFETY

POSSIBLE SHORTENED FEEDING TIME = REDUCED CARBON FOOTPRINT

- IMPROVED FCR
- INCREASED WCM
- INCREASED DRESSING %

SIGNIFICANT FINANCIAL GAIN FOR PRODUCER WHICH EXTENDS TO MORE AFFORDABLE PRICES FOR THE CONSUMER
Win-Win Situation