MINERALS

- 7 major minerals
  - Ca, P, Mg, K, Na, Cl, S
- 8 Trace minerals
  - Se, Cu, Zn, I, Mg, Mo, Co, Fe

Vitamins

- B, C, K – can be synthesised by ruminants
- A, D, E – need supplementation

Major Minerals

- Ca – Milk yield, bones growth, milk fever, muscle function, enzyme systems
- P – Milk yield, bone growth, fertility
- Mg – Milk, bone formation, enzymes, grass tetany
- Na – Reduced appetite, milk yield

Trace Minerals

- Cu – swayback, ↓ LWG, infertility, scouring, retained placenta, hair colour
- Zn – ↓ LWG (↓ appetite, ↓ FCE), lameness
- Mn – ↓ Fertility, ↓ LWG, leg deformities, delayed oestrus
- I - ↓ Fertility, abortions, retained placenta
- Co – pinning, loss of BW, Vit B12
- Se – Retained Placenta, reproduction, muscle degeneration
- Mo & Fe – Cu antagonists

Mineral Interaction
**Why are minerals important for the individual animal Nutrition**

- They support production, milk and meat,
- Help maintain a healthy animal,
- Involved in reproduction,
- Ensure energy and protein are metabolised efficiently.

**Pre Calver Mineral**

- Building the cows body reserves of essential trace elements quickly
- Arming cow against calving difficulties
- Preparing defence against metabolic disorders during lactation
- Ensuring adequate supply for transfer to unborn calf

- **Magnesium** – Commonly added at 15 grams per cow per day (15% in a 100gram feeding rate).
- **Sodium** – 15 to 20%.
  - To improve palatability
  - Improve absorption of magnesium
- **Phosphorus**
  - Target level in the total dry matter is 0.25%. Most silage's contain this in background.
  - Addition may have a negative effect where hypocalcaemia is an issue

**Role of Vitamins and minerals**

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>Foetal development, immunity</td>
</tr>
<tr>
<td>Vitamin D3</td>
<td>Calcium metabolism</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Immune function</td>
</tr>
<tr>
<td>Selenium</td>
<td>Peroxydases – anti-oxidant’s, reproductive disorder’s, disease Resistance. Conversion T4 to T3</td>
</tr>
<tr>
<td>Iodine</td>
<td>Controls metabolism and other hormones (T3)</td>
</tr>
<tr>
<td>Copper</td>
<td>Many enzyme/hormone systems – Fertility, health metabolism</td>
</tr>
<tr>
<td>Zinc</td>
<td>Many enzyme/hormone systems, Appetite, Skin, reproduction, Immune system</td>
</tr>
<tr>
<td>Manganese</td>
<td>Many enzyme/hormone systems, Lipid metabolism, reproduction, cartilage development, blood clotting</td>
</tr>
<tr>
<td>Cobalt</td>
<td>Metabolism (B12), appetite suppression, lipid metabolism,</td>
</tr>
</tbody>
</table>
Pitfalls Pre-calving

- Not feeding a pre-calver mineral
- Not being properly fed
- Not feeding minerals for long enough
  - Feed for at least 8 weeks
  - Longer may be desirable if addressing a specific problem
  - Argument for feeding some level through out a long dry period
- Poor quality mineral
  - Bioplex
- Hypocalcaemia – calcium deficiency (usually as a result of high Potassium)
- Not addressing historical problems in a systemic matter, not properly diagnosing the problem, not implementing the solution.

Post calving

Grass as a source of minerals
Pitfalls Post Calving

- Adequate trace elements not fed at grass
- Poor supplementation of macro’s when using alternative forages
- Mineral level does not match the feeding rate.
- Molybdenum toxicity – spring grass is high in molybdenum, need to make sure we have adequate copper in the diet to prevent absorption.
- Systematic thought not given to how minerals are going to be fed from drying off to late summer.

<table>
<thead>
<tr>
<th>Silage + Concentrates</th>
<th>Alternative Forages</th>
<th>Grass Based system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macros well Balanced</td>
<td>Macros often meet only 50% of requirements</td>
<td>Macros O.K.</td>
</tr>
<tr>
<td>Trace elements OK where 6KG + Concentrate fed</td>
<td>Trace elements O.K</td>
<td>Trace elements usually low- low level of concentrate being fed</td>
</tr>
<tr>
<td>Check Magnesium Where using TMR</td>
<td>Where used get a printed diet sheet showing levels in the total diet fed</td>
<td>Consult your feed supplier re feeding rate</td>
</tr>
</tbody>
</table>