Betafin® natural betaine

- Betacheck® software to calculate the accurate replacement of methionine and choline with Betafin® natural betaine without risk to broiler performance.
- Reassurance and reliability from high quality supporting research and development of Betafin® natural betaine. Over 100 technical reports from independent research organisations.
- Applications expertise of our technical and business support teams.

References supporting Betafin® natural betaine:

Product form and application
Betafin® natural betaine is a multi-species feed additive ideal for mash or pelleted animal feeds or drinking water applications.

Product application
Dry (crystalline) Betafin® natural betaine – for in-feed applications. Available in different grades (S1, S4 and S6) according to humidity conditions during storage. Packed in 25 kg polyethylene lined multi-wall paper bags and 650 kg or 800 kg polyethylene lined polypropylene big bags with bottom valve. Recommended usage rate up to 2 kg/tonne (0.2%) of finished feed.

Dry (crystalline) Betafin® BT natural betaine – for drinking water applications. Packed in 25 kg polyethylene lined multi-wall paper bags. Recommended usage rates available on request.

Liquid Betafin® natural betaine – for drinking water applications. Available in bulk. Recommended usage rate up to 4 kg/tonne (0.4%) of finished feed.

Supporting services for Betafin® natural betaine
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### Betafin® natural betaine

Provides feed cost savings, increased profit and more energy for growth

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<td>Methyl group donor</td>
<td>+ Sparing some added methionine and choline as methyl donors</td>
<td>+ Lower feed costs</td>
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<td>Osmolyte</td>
<td>+ Protects against the physiological effects of production stress</td>
<td>+ Sparing metabolic energy can improve productive performance and carcass lean deposition</td>
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<td>Odour free and palatable</td>
<td>+ Readily accepted by animals</td>
<td>+ Multi-species applications</td>
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<td>No residues such as hydrochloric acid (HCl), trimethylamine (TMA), dimethylamine (DMA) or monochloroacetic acid (MCA)</td>
<td>+ Minimizes any potential health and safety concerns</td>
<td>+ Taint-free meat and eggs – better quality end product readily accepted by customers</td>
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<td>200°C heat stable</td>
<td>+ Suitable for the majority of feed forms and manufacturing processes</td>
<td>+ Confidence in use. Full efficacy after processing leading to growth and feed conversion benefits</td>
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<tr>
<td>Highly water soluble (Betafin® BT natural betaine)</td>
<td>+ Easy use for drinking water applications</td>
<td>+ Rapid osmolytic benefits in stressed livestock</td>
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<td>Stable in premix</td>
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<td>+ Better premix vitamin stability for improved performance</td>
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<td>Contains consistently high levels of pure betaine</td>
<td>+ Betaine concentration up to 97%</td>
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**Betafin® natural betaine for excellent animal productivity**

Betafin® natural betaine can offer greater net value in use than either synthetic anhydrous betaine or synthetic betaine-HCl products.

**Improve productive performance**

- Betafin® natural betaine improved broiler performance compared with diets containing no betaine or betaine-HCl.

**Maintain gut integrity at times of production stress**

Coccidiosis and heat stress negatively affect gut structure and function leading to reduced animal performance.

**Coccidiosis challenge**

Betafin® natural betaine

- Improved amino acid and energy digestibility
- Reduced gut lesion scores and increased gut tensile strength compared with betaine-HCl

**Heat stress**

Betafin® natural betaine improved broiler performance compared with synthetic products under heat stress conditions

- **In vitro intestinal cell model**
  - Betafin® natural betaine increased water holding capacity of broiler intestinal tissue exposed in vitro to hyperosmotic conditions compared with betaine-HCl
  - Betaine-HCl negatively influenced the gut barrier and cellular ATP content compared with Betafin® natural betaine in an in vitro intestinal cell model

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### Betafin® natural betaine significantly (P<0.05) improved average amino acid digestibility during coccidial challenge in broilers

Unchallenged control | Challenged control (CCI) | Betafin® (CCI) | Synthetic anhydrous betaine (CCI) | Betaine-HCl (CCI)
---|---|---|---|---
Unchallenged control | 62.64 | 62.64 | 72.9 | 72.9
Challenged control - reduced methionine (CCI) | 60.84 | 60.84 | 72.9 | 72.9

**Values without a common superscript are significantly different (P<0.05)**

Technical report: Betafin.NZ.B.13.54

### Betafin® natural betaine significantly (P<0.05) improved FCRs during heat stress in broilers

<table>
<thead>
<tr>
<th>Control no heat stress</th>
<th>Control under heat stress (HS)</th>
<th>Betafin® (HS)</th>
<th>Synthetic anhydrous betaine (HS)</th>
<th>Betaine-HCl (HS)</th>
</tr>
</thead>
</table>
| Control no heat stress | 1.66 | 1.66 | 1.64 | 1.61
Control under heat stress (HS) | 1.66 | 1.66 | 1.64 | 1.61

**Values without a common superscript are significantly different (P<0.05)**

Technical report: Betafin.NZ.B.13.55

### Betafin® natural betaine significantly (P<0.001) decreased TEER-value

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<th>Challenged control (CCI)</th>
<th>Betafin®</th>
<th>Betaine-HCl</th>
</tr>
</thead>
</table>
| Unchallenged control | 81.1 | 81.1 | 81.1 | 81.1
| Challenged control - reduced methionine (CCI) | 62.64 | 62.64 | 62.64 | 62.64

**Values without a common superscript are significantly different (P<0.001)**

Technical report: Betafin.NZ.B.13.55

### Gut tensile strength of coccidia-challenged broilers (grams force/mm intestine)

<table>
<thead>
<tr>
<th>Betaine g/t</th>
<th>0</th>
<th>375</th>
<th>750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchallenged control</td>
<td>228</td>
<td>228</td>
<td>228</td>
</tr>
<tr>
<td>Challenged control - reduced methionine (CCI)</td>
<td>265</td>
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Technical report: Betafin.B.USA.99.31

### Gut lesion scores of coccidia-challenged broilers

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<td>310</td>
</tr>
<tr>
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<td>81.1</td>
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</tr>
</tbody>
</table>

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Technical report: Betafin.B.USA.99.31

### In vitro intestinal cell model showed betaine-HCl negatively influenced the gut barrier of cells compared to Betafin® natural betaine

<table>
<thead>
<tr>
<th>Betaine-HCl</th>
<th>62.4</th>
<th>76.4</th>
<th>73.5</th>
<th>72.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betaine-HCl significantly (P&lt;0.001) decreased TEER-value</td>
<td></td>
<td></td>
<td></td>
<td></td>
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TEER – Transepithelial electrical resistance

Technical report: Betafin.PHL-LAB.13.53
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<th>Betaine-HCl (HS)</th>
<th>Synthetic anhydrous betaine (HS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchallenged control</td>
<td>76.4±</td>
<td>73.5±</td>
<td>72.9±</td>
</tr>
<tr>
<td>Challenged control (CC)</td>
<td>76.4±</td>
<td>73.5±</td>
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**Betafin® natural betaine significantly (P<0.05) improved FCRs during heat stress in broilers**

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<th>Synthetic anhydrous betaine (HS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (CC)</td>
<td>1.66±</td>
<td>1.63±</td>
<td>1.61±</td>
<td></td>
</tr>
<tr>
<td>Challenged (CC)</td>
<td>1.66±</td>
<td>1.63±</td>
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TEER – Transepithelial electrical resistance

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<td>Unchallenged control</td>
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<td>62.4±</td>
</tr>
<tr>
<td>Challenged control (CC)</td>
<td>81.1±</td>
<td>62.4±</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Unchallenged control</td>
<td>3.84</td>
<td>2.64±</td>
</tr>
<tr>
<td>Challenged (CC)</td>
<td>3.84</td>
<td>2.64±</td>
</tr>
</tbody>
</table>

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Technical report: Betafin.NZ.B.13.54

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