Surveillance of chloramphenicol residues in milk, eggs and chicken meat by LCMSMS

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Residues are the metabolites of veterinary drugs, and their associated parent compounds, that remain in the animal or its produce (eggs, milk and honey) after treatment. Their behaviour depends on the nature of the drug and its metabolites and on the pharmacokinetics of the drug in the animal concerned. Those that are metabolised and excreted rapidly also rapidly deplete in the animal. Those that are slowly metabolised may also deplete rapidly if their excretion is not dependent on metabolism. Others may be subject to slow excretion, especially those that bind to macromolecules and are thus not available for metabolism and/or excretion.
Humans health and veterinary drugs: A variety of animal species, including cattle, sheep, goats, pigs, horses, fish, birds and bees, are kept for the purpose of providing food for the human population. In order to maintain their wellbeing, it is sometimes necessary to treat these animals with pharmaceutical products and such treatments can result in residues of the active ingredients, or their metabolites, entering the human food chain. The European Union, for example, in 1999 banned all antibiotics used on humans from being used on animals as growth promotants (AGPs), and similarly the EU has banned the use of hormonal growth promotants (HGP) on cattle. The USA, Canada and Australia allow such hormone use (subject to maximum residue levels)
The growing food safety concerns call for intensive surveillance of chloramphenicol in food products. The objective of the study was to assess whether milk, eggs and chicken meat produced by the livestock farmers in TamilNadu state of India were contaminated with chloramphenicol residues.
Chloramphenicol has been banned for use in all food-producing animals by the European Union (EU), and Most of the developed countries. The EU recently set a minimum required performance limit (mrpl) for chloramphenicol determination at 0.3 µg/kg (ppb) in all foods of animal origin.
Liquid chromatography/mass spectrometry (LC/MSMS) method was employed for the determination of chloramphenicol (CAP) residues in milk, eggs, chicken muscle and liver, and kidney.
MATERIALS AND METHODS

✓120 samples – milk, eggs, chicken meat, milk powder and egg powder were analysed during 2011 to 2012.

CAP was extracted from the samples with acetonitrile and defatted with hexane. The acetonitrile extracts were then evaporated, and residues reconstituted in 10mM ammonium acetate--acetonitrile mobile phase and injected into the LC system, and detection was by a triple quadrupole mass spectrometer operated in selected reaction monitoring (SRM) mode.
Instrument Setup - Define Instrument Methods

<table>
<thead>
<tr>
<th>Accelea AS Method</th>
<th>Sample Preparation</th>
<th>Reservoir Content</th>
<th>Timed Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection volume (μl)</td>
<td>10.0 μl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needle height from bottom (mm)</td>
<td>2.0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syringe speed (μl/s)</td>
<td>0.0 μl/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flush volume (μl)</td>
<td>2000 μl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flush/Wash source</td>
<td>bottle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wash volume (μl)</td>
<td>2000 μl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flush speed (μl/s)</td>
<td>100.0 μl/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-injection valve switch time (min)</td>
<td>0.0 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loop loading speed (μl/s)</td>
<td>0.0 μl/s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Injection Mode**
- Partial loop
- Full loop
- No waste

**Tray Temperature Control**
- Enable tray temperature control
  - Temperature (°C) | 10.0 °C

**Column Oven Control**
- Enable column oven control
  - Temperature (°C) | 200.0 °C

[Help]
Linearity, $R^2 = 0.9986$
The method studied was sensitive enough to detect and quantify 0.050 μg/kg (ppb) chloramphenicol for screening purposes, much lower than the Minimum Required Performance Limit (MRPL) of 0.3 μg/kg imposed by European Commission's regulation. The study revealed that most of the samples were in compliance with MRL and growing awareness amongst farmers to avoid banned antibiotic CAP.
Remembering Gandhi

Thank You

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