DETECTING OF GLUTEN (GLADINS) IN FOODS – SLOVANIAN EXPERIENCES

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Introduction

At the Institute of Public Health of the Republic of Slovenia we detect gluten content in foods for official control, from year 2002, as the only laboratory in Slovenia.

Gluten legislation

The new Rules on gluten-free foodstuffs or foodstuffs with very low content of gluten (Off. J. EU 41/2009), will come into force in Slovenia in January 2012. The new EU legislation also covers foodstuffs for normal consumption and foodstuffs for particular nutritional uses provided that the gluten content does not exceed 20 mg/kg in the food as sold to the final consumer.

Analytical methods for gluten determination – history of use

Sekrit ELISA method, introduced in year 2000:
• based on antibodies against heat stable α-gliadins.

R5 ELISA method introduced in year 2005:
• calibrated to the PWG gliadin standard;
• based on R5 antibody (the antibody is able to recognize the potential coeliac-toxic epitope, which occur repeatedly in α, γ and ω-gliadins, hordeins and secalins);
• recommended by PWG (European Working Group on Prolamin Analysis and Toxicity) on the Codex Alimentarius level;
• along with the Mendez’s cocktail extraction procedure, the method is suitable for detection of gliadins from heat treated foodstuffs, too.

Characteristics of current method for gluten determination in our laboratory

R5 Mendez ELISA – R-Biopharm

• Validated and Accredited (ISO 17025)
• for ethanol (60 %) extraction in year 2005;
• for cocktail extraction in year 2007.
• Measurement range: 5 – 400 mg/kg gluten;
• LOD = 3 mg/kg gluten;
• LOQ = 5 mg/kg gluten;
• Measurement uncertainty: ± 30 %.

History of successful attending in interlaboratory proficiency testing scheme FAPAS for gluten

Year 2002 with Topper’s kit: Gluten in Dry Cakia Mix (FAPAS 2706);
• Year 2004 with Topper’s kit: Gluten in Dry Bread Mix (FAPAS 2712)
  – 5 % higher results with Topper’s kit compared with R-Biopharm’s kit;
• Year 2005 with R-Biopharm’s kit: Gluten in Infant Cereal (FAPAS 2719) – the criteria for R-Biopharm’s results was not calculated (labs used either ethanol or cocktail extraction, what lead in too different groups of results);
• From year 2006 with R-Biopharm’s kit: Gluten in Cakia mix (FAPAS scheme)

Analytical results of the past gluten analysis

We analysed over 1400 food samples on gluten content from 2002 until now. The results are not directly comparable, while the method of analysis was changing during this time.

Table 1: Results of detecting of gluten in foods for official control from 2008 to 2010, customer: Health Inspectorate, Inspectorate for Agriculture, Forestry and Food of the Republic of Slovenia

<table>
<thead>
<tr>
<th>Kind of sample</th>
<th>Year 2008 - 2010</th>
<th>No. of samples</th>
<th>No. of samples with gluten</th>
<th>No. of samples with gluten &lt;= LOQ and 20 mg/kg</th>
<th>No. of samples with gluten &lt;= 50 mg/kg, not in accordance with national legislation</th>
<th>Share of samples with gluten &lt;= 20 mg/kg, not in accordance with national legislation</th>
<th>Share of unsuitable labelling**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zestetic foods, gluten free</td>
<td>75</td>
<td>57</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>10 %</td>
</tr>
<tr>
<td>Infant food, gluten free</td>
<td>57</td>
<td>17</td>
<td>16</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>5 %</td>
</tr>
<tr>
<td>Foodstuffs for normal consumption</td>
<td>21</td>
<td>17</td>
<td>16</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>14 %</td>
</tr>
<tr>
<td>All samples</td>
<td>151</td>
<td>119</td>
<td>16</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>7 %</td>
</tr>
</tbody>
</table>

* not in accordance with The Rules on gluten-free foodstuffs (Off. J. RS 26/2007);
** unsuitable labelling: the gluten free label not near the name of the product and/or the term “gluten free” is not stated (Off. J. RS 26/2007, Off. J. EU 41/2009).

Conclusions

Gluten analysis in our laboratory is of high quality:
• Accredited method in accordance with ISO 17025 - Internationally reliable results;
• R5 Mendez ELISA method recommended by Codex Alimentarius.

There were many difficulties with methods for gluten routine analysis in the past, we expect changes in the future – novel developments.

From year 2002 to now - a tendency of reducing the share of unsuitable food samples for gluten content in Slovenia.

We estimate – the purpose of continuous detecting of gluten in Slovenia is achieved – a relative high level of protection for people with coeliac disease.

References

• Ulrike Immer and Sigrid Haas-Lauterbach. The question of extraction procedures; In: Proceedings of the 19th Meeting Working Group on Prolamin Analysis and Toxicity, Martin Stem Ed., Verlag wissenschaftliche Scripten, Zwickau 2005 (ISBN 3-937524-23-1);