Bacterial water quality

Waterborne pathogen bacteria as E. coli, Salmonella spp., Shigella sp., Vibrio cholerae and others are isolated from water samples by cultivation on special selective nutrient media in the IMPETUS laboratory in Parakou. Positive samples are differentiated by serological, biochemical and genetic methods at the Institute of Medical Microbiology, Immunology and Hygiene in Cologne.

Bacteriological analysis of water samples show following results:

- **Water source**
  - Wells, margots
    - 75% contaminated by E. coli or other coliform bacteria
    - 8% contaminated by Salmonella
  - Pumps: 1 Pump contaminated by coliform bacteria

Noticeable contaminations by non-typhoid Salmonellae could be observed in 8% of open drinking water sources. These Salmonellae which may be responsible for enteric fever, gastroenteritis and septicaemia are found to be rarely known serotypes in Germany.

A hitherto unknown serotype with the antigen formula 1,4,2:le:25 could also be isolated and will be designated <Salmonella Parakou>. Salmonellae serve as indicator organisms for the evaluation of epidemiologic data.

Comparison of Salmonella-Serotypes in Germany and Benin

<table>
<thead>
<tr>
<th>Serotypes most frequent in Germany</th>
<th>Serotypes isolated in Benin</th>
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<tbody>
<tr>
<td>S. Enteritidis (6,3%)</td>
<td>S. Infantis (1.1%)</td>
</tr>
<tr>
<td>S. Typhimurium (25.9%)</td>
<td>S. Muenster (6,3%)</td>
</tr>
<tr>
<td>S. Infantis (1.1%)</td>
<td>S. Postock (4.7%)</td>
</tr>
<tr>
<td>S. Bénin-microflora (0.6%)</td>
<td>S. Vechot (4.7%)</td>
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<tr>
<td>S. Viboch (3.0%)</td>
<td>12 other rare Serotypes (&lt; 3%) and one new serotype</td>
</tr>
</tbody>
</table>

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Water sources found to be unacceptably contaminated were subject of disinfection by application of chlorine dioxide - which are used to scoop water and not stored properly after usage. This in contrast to public village wells and house wells which are usually dugged into the saprolite, boreholes for pumps are drilled into the saprolite and to evaluate water quality in Benin.

### Methods

- **Capacity building** through education of Beninese lab technicians.
- **Monthly analysis** of the drinking water reservoir of Parakou in consultation with the local SONEB.
- **Support of decision making for restoration of defected wells** in cooperation with the Swiss project HELVETAS: after publication of the above mentioned data, HELVETAS mainly restoring defective wells so far is now converting them into pumps by central insertion of a drill and to evaluate water quality in Benin.