# Baypure® - Chemical properties

**Functional Chemicals**
**BL Specialty Products**

Leverkusen, April 2008

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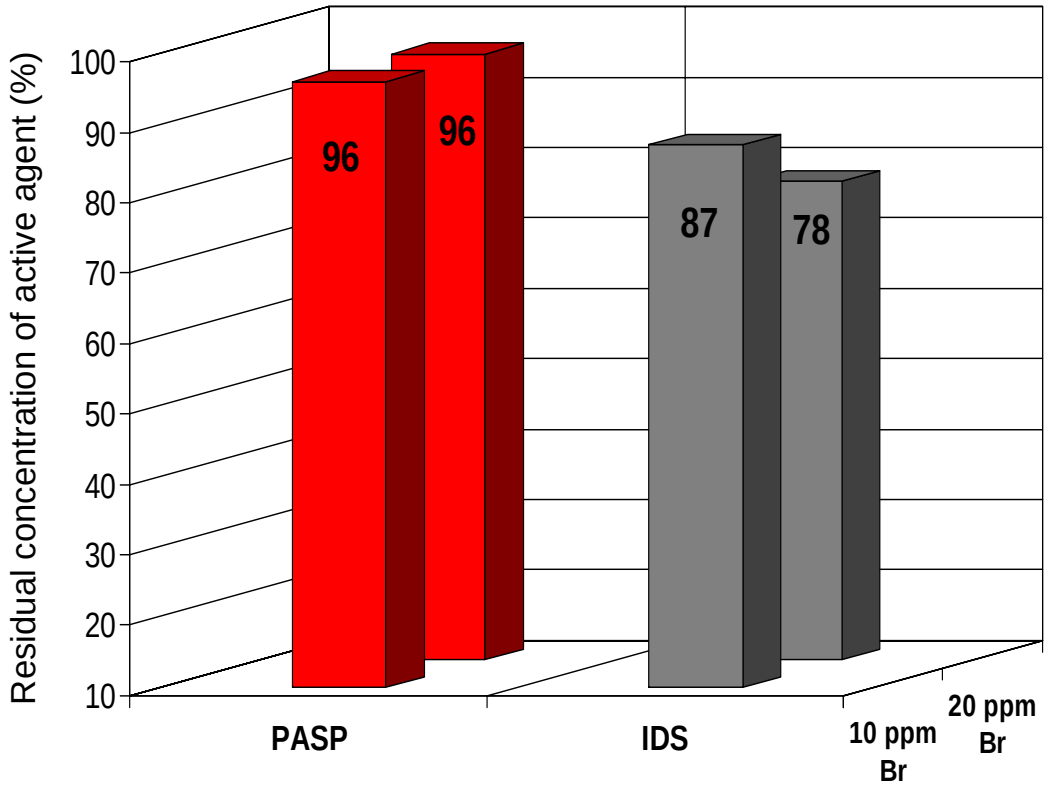
Energizing Chemistry

# Baypure® CX 100 (IDS) is a medium-strong chelant, Baypure® DS 100 (PASP) a weak one but to iron-III

Stability constants of complexes (log K values) at 20°C

| Metal | Polyaspartic acid (PASP) | Iminodisuccinate (IDS) |
|---|---|---|
| Magnesium ($Mg^{2+}$) | 2.0 | 6.1 |
| Calcium ($Ca^{2+}$) | 2,7 | 5.2 |
| Strontium ($Sr^{2+}$) | | 4.1 |
| Barium ($Ba^{2+}$) | | 3.4 |
| Aluminum ($Al^{3+}$) | | 14.1 |
| Lead ($Pb^{2+}$) | | 11.0 |
| Chromium ($Cr^{3+}$) | 7.5 | 9.6 |
| Manganese ($Mn^{2+}$) | 2.1 | 7.7 |
| Iron ($Fe^{2+}$) | 10.0 | 8.2 |
| Iron ($Fe^{3+}$) | 18.5 | 15.2 |
| Cobalt ($Co^{2+}$) | | 10.5 |
| Nickel ($Ni^{2+}$) | | 12.2 |
| Copper ($Cu^{2+}$) | 4.8 | 13.1 |
| Silver ($Ag^{+}$) | | 3.9 |
| Zinc ($Zn^{2+}$) | 2.2 | 10.8 |
| Cadmium ($Cd^{2+}$) | 1.7 | 8.4 |
| Mercury ($Hg^{2+}$) | 2.8 | 14.9 |

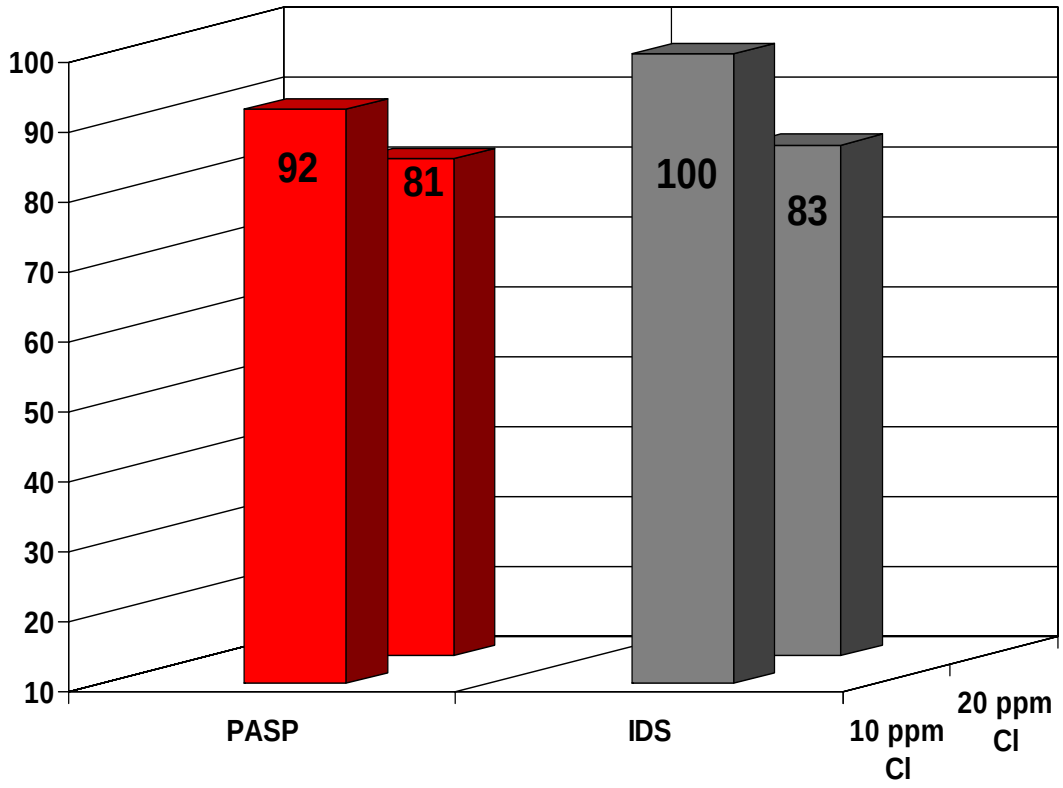
# Baypure® DS 100 and Baypure® CX 100 have a limited stability to bromine




**Trial conditions**:

Baypure DS 100/40% (PASP) and Baypure CX 100/34% (IDS), respectively, were dissolved to a concentration of 1 % of the commercial product in a water of a total hardness of 600 mg/l, calculated as calcium carbonate. The dosages of the halogens, chlorine and bromine, were at 10 and 20 mg/l, respectively. The samples were stored for two hours at a temperature of 40°C

# Baypure® DS 100 and Baypure® CX 100 have a limited stability to chlorine

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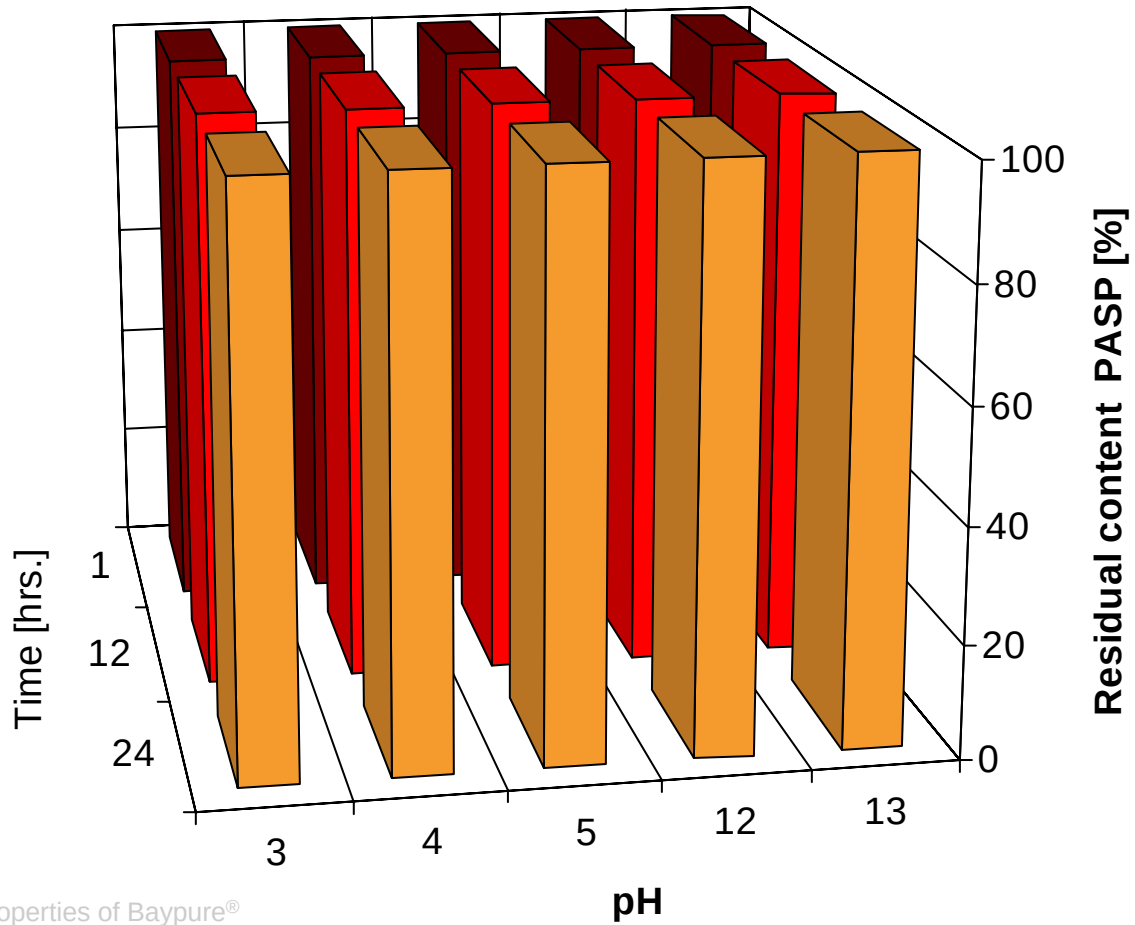
# Baypure® DS 100 has a very good stability under typical cleaning formulation conditions

**Thermal stability of Polyaspartic acid sodium salt (active ingredient in Baypure® DS 100) at 20 °C in a 3 % aqueous solution at different pH values**



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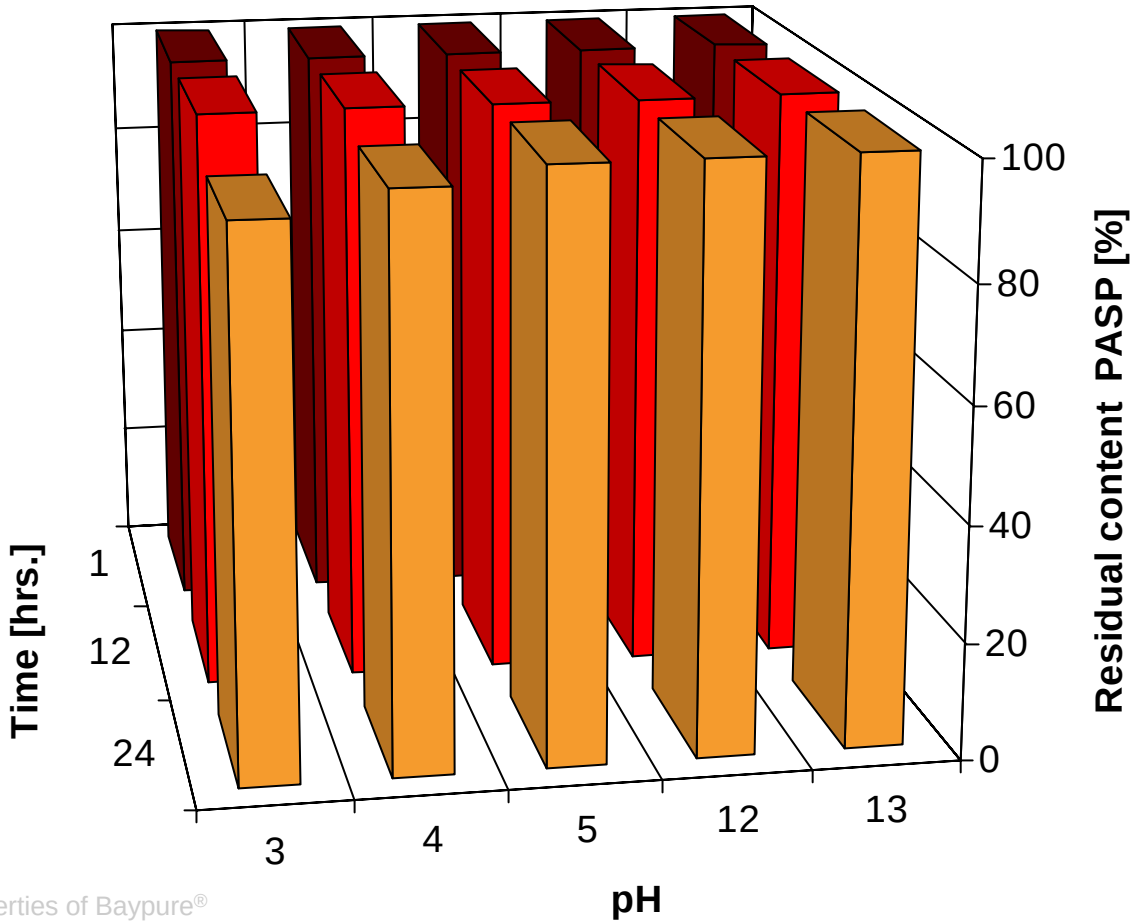
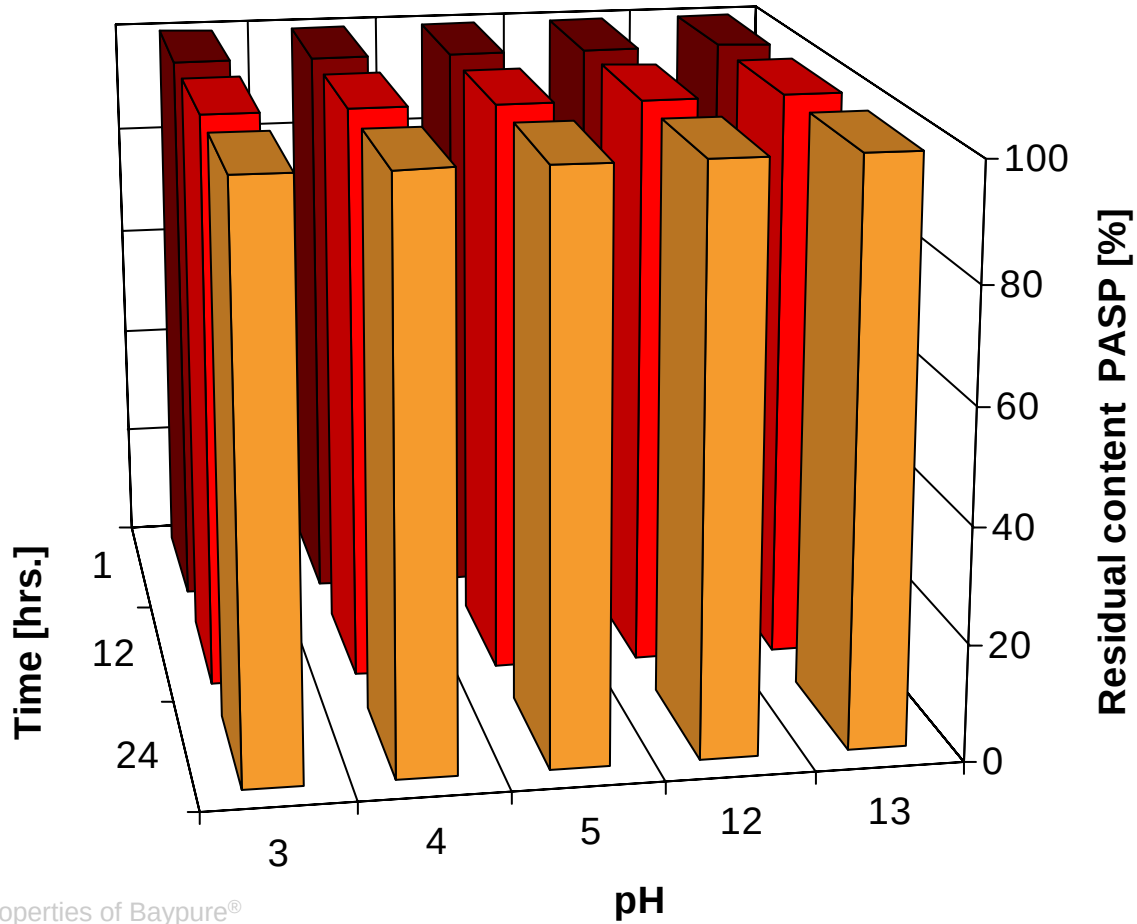
# Baypure® DS 100 has a very good stability under typical cleaning formulation conditions

**Thermal stability of Polyaspartic acid sodium salt (active ingredient in Baypure® DS 100) at 50 °C in a 3 % aqueous solution at different pH values**



# Baypure® DS 100 has a very good stability typical cleaning formulation conditions

**Thermal stability of Polyaspartic acid sodium salt (active ingredient in Baypure® DS 100) at 20 °C in a 5 % aqueous solution at different pH values**



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# Baypure® DS 100 has a very good stability under typical cleaning formulation conditions

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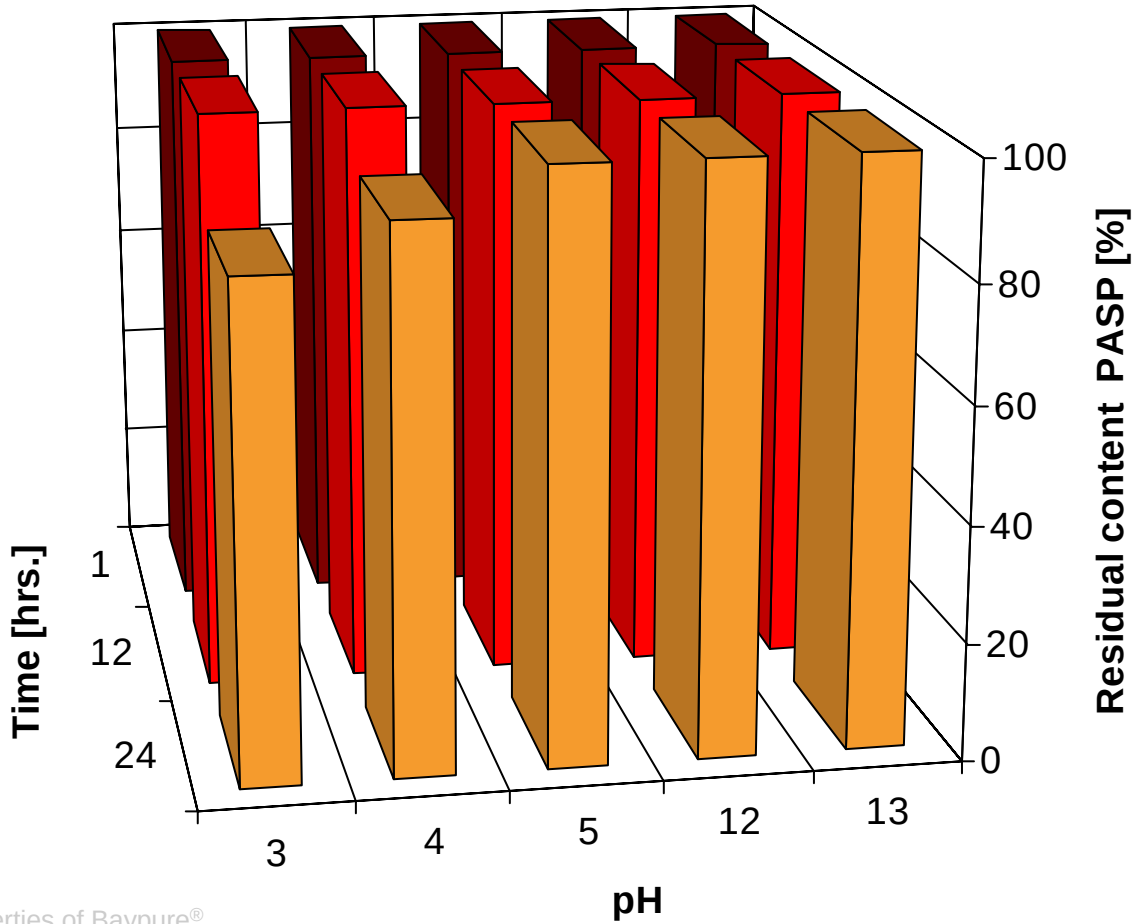
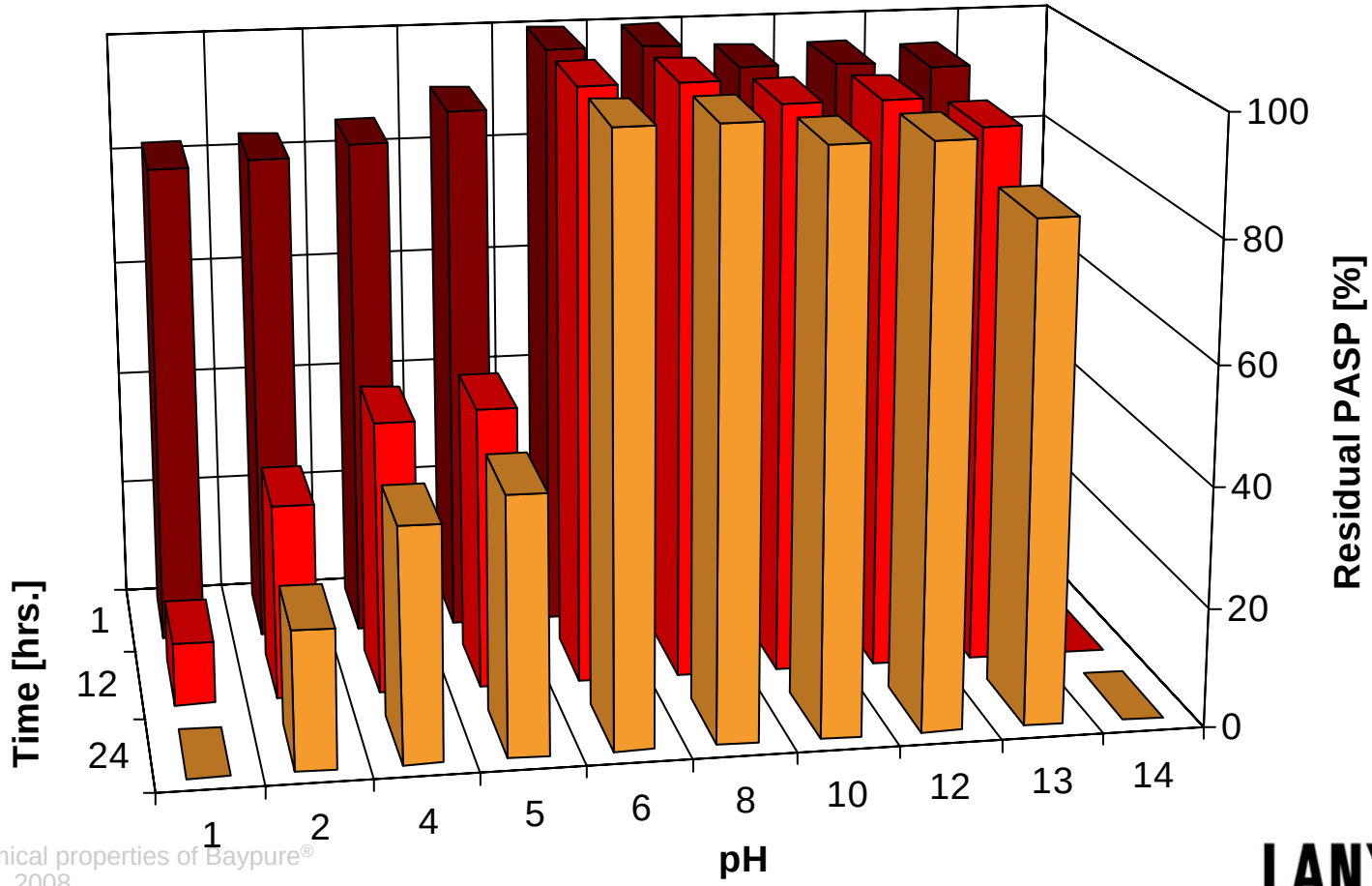


# Baypure® DS 100 has a sufficient stability under extreme cleaning formulation conditions

**Thermal stability of Polyaspartic acid sodium salt (active ingredient in Baypure® DS 100) at 95 °C in a 1 % aqueous solution at different pH values**



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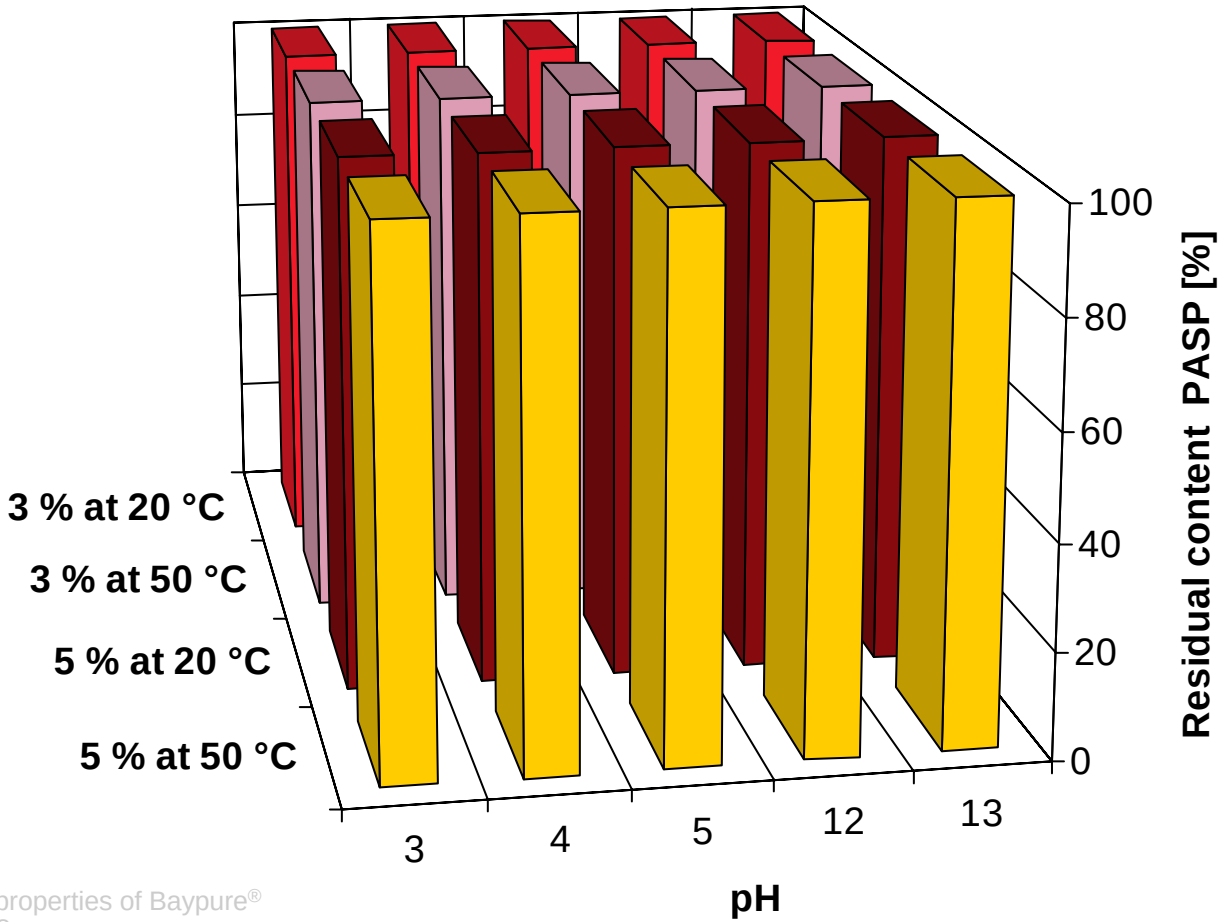
# Baypure® DS 100 has a very good stability under typical cleaning formulation conditions

**Summary: Thermal stability of Polyaspartic acid sodium salt (active ingredient in Baypure® DS 100) at 20 and 50 °C, respectively, in a 3 or 5 % aqueous solution at different pH values**



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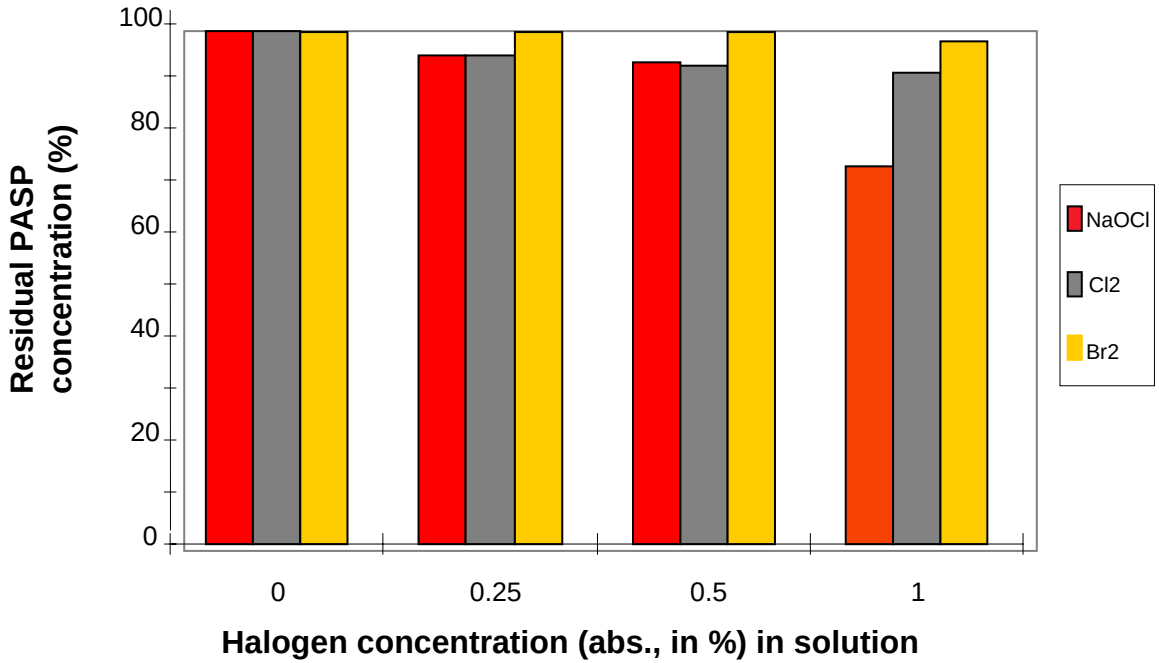
# Baypure® DS 100 is reasonably stable to bromine, but shows a limited resistance to chlorine

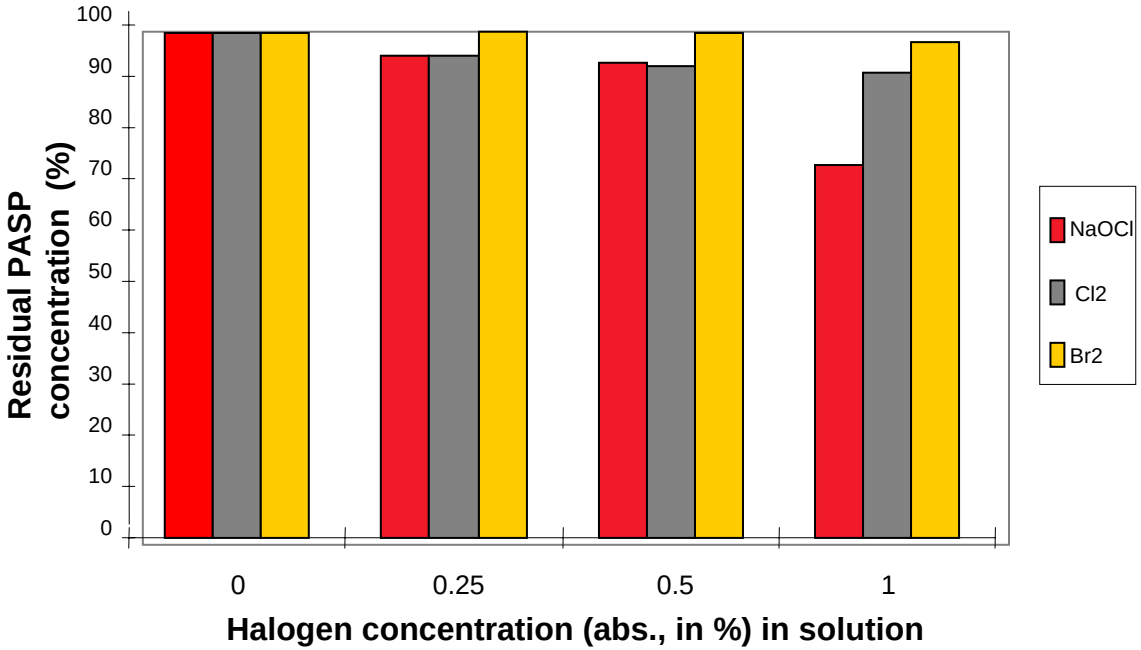
**Stability of Polyaspartic acid sodium salt (PASP) to bromine, chlorine, or sodium hypochlorite at a temperature of 20°C and after 24 hours**




**Trial conditions**:
Baypure® DS 100/40% (PASP) was dissolved in water (1 % solution of active agent) and mixed with a 1 % solution of chlorine or bromine, respectvely, in synthetical tap water (total hardness: 250 mg/l as calcium were dissolved to a concentration of 1 % of the commercial product in a water of a total hardness of 600 mg/l, calculated as calcium carbonate. The dosages of the halogens, chlorine and bromine, were at 10 and 20 mg/l, respectively. The samples were stored for two hours at a temperature of 20°C

# Baypure® DS 100 is reasonably stable to bromine, but shows a limited resistance to chlorine

**Stability of Polyaspartic acid sodium salt (PASP) to bromine, chlorine , or sodium hypochlorite at a temperature of 50°C and after 24 hours**

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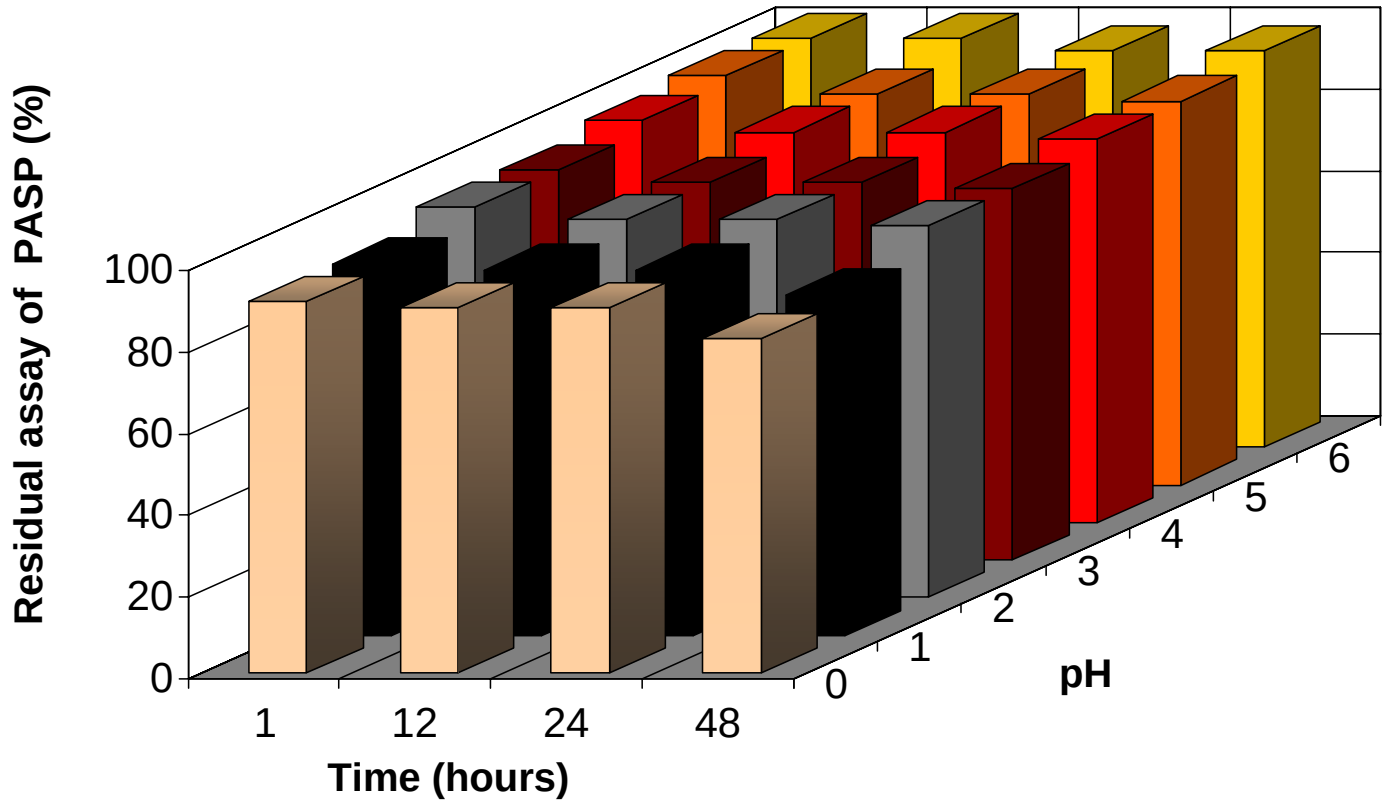
# Baypure® DS 100 (Polyaspartic acid sodium salt, PASP) is stable to chlorine dioxide in acidic solution

**Stability of PASP to chlorine dioxide at pH 0 to 6 and a temperature of 40 °C**



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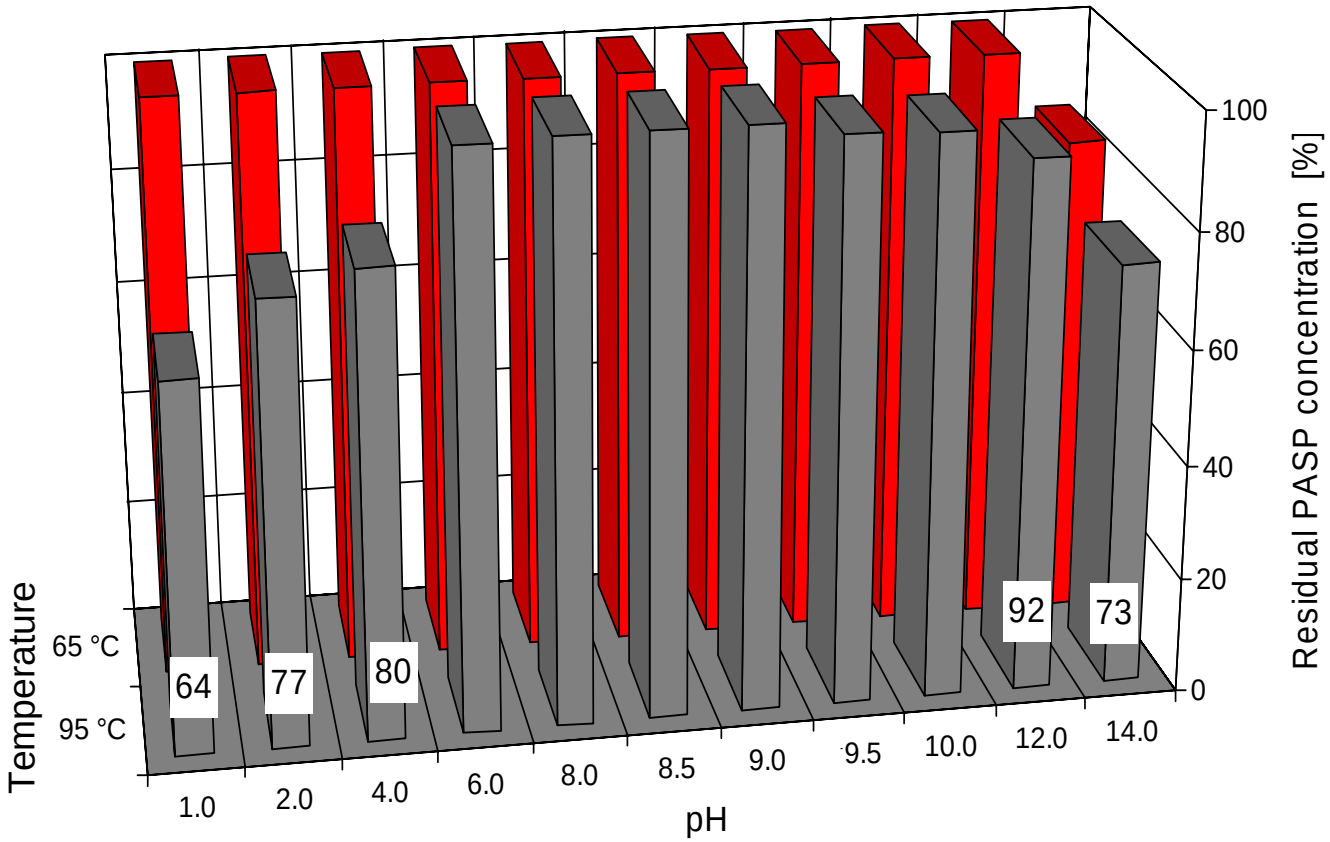
# Baypure® DS 100 is stable to hydrogen peroxide in most conditions of application




**Trial conditions**: Baypure® DS 100/40% (PASP) was dissolved in water (1 % solution of active agent) and mixed with an aqueous solution of hydrogen peroxide (in total 4 mol equivalents of $H_2O_2$ versus PASP). The mixture was kept at 65 or 95°C, respectively, for one hour. After the cool-down, the residual assay of PASP was determined by complexometric titration with $FeCl_3$ solution.



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