
Swedish monitoring studies in cash receipts and toys

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Cash receipts (KEMI, 2012)

◆ Why BPA?

- Developer for dyes
- 1-2% BPA in some products, 1-2 mg BPA/100 mg receipt

◆ Exposure assessment - adults

- 4 hours of exposure (handling of receipts)
- Exposure on both hands
- Worst case absorption through the skin: 1 $\mu\text{g}/\text{kg}/\text{day}$



Cash receipts (KEMI, 2012)

- ◆ Exposure assessment - children
 - Ingestion of receipt (100 mg), 1-2 mg BPA
 - Body weight 10 kg
 - Single exposure of 100-200 μg BPA/kg



Cash receipts (KEMI, 2012)

- ◆ Risk characterization (neurotoxicity)
 - Oral exposure during gestation

NOAEL/LOAEL (µg/kg/dag)	Osäkerhetsfaktorer	Referensdos (µg/kg/dag)	Referens
NOAEL 5	$4 \times 2.5 \times 10 = 100$	0.05	Jones et al, 2011
LOAEL*200 (NOAEL 2)	$3 \times 7 \times 2.5 \times 10 = 525$	0.4	Ryan and Vandenberg, 2006
LOAEL* 500 (NOAEL* 50)	$3 \times 7 \times 2.5 \times 10 = 525$	0.95	Xu et al 2010
NOAEL 5000	100	50	Efsa

Absorption skin: 1 µg/kg/day

Receipt ingestion: 100-200 µg BPA/kg

Cash receipts (KEMI, 2012)

"The assessment indicates that the exposure may reach levels which may have effects on the development of fetuses and small children."



Toys (KEMI, 2012)

- ◆ Survey of BPA in toys and products
 - Pacifiers, swimming goggles, balloons, tooth brushes, toys,
 - BPA content: <1-200 mg/kg
 - BPA migration in artificial saliva: <0.1-2.1 µg/l
- ◆ Exposure assessment
 - Rapid release/acute exposure: 0.06 µg/kg/d
 - Slow release/chronic exposure: 2 h sucking → 0.005 µg/kg/d



Toys (KEMI, 2012)

- ◆ Risk characterization (developmental effects)
 - Oral exposure of pups

Tabell 1 Sammanfattning av de alternativa referensdoser som beräknats utifrån djurstudier där ungar varit direkt exponerade för BPA

Studerad effekt	Exponering av unga djur	LOAEL/NOAEL	Referensdos (µg/kg/dag)	Referens
Utvecklings-neurotoxicitet	Upprepad oral exponering av råttor efter födseln	NOAEL 100	1	Carr <i>et al.</i> 2003
Utvecklings-neurotoxicitet	En oral dos till möss dag 10	NOAEL 320	1,8	Viberg <i>et al.</i> 2011
Bröstkörtel-effekter	Upprepad oral exponering av råttor efter födseln	LOAEL 250	0,8	Jenkins <i>et al.</i> 2009

Exposure toys: 0.005 µg BPA/kg/d or 0.06 µg BPA/kg

Toys (KEMI, 2012)

”Judging from the results of chemical analyses of toys and child care articles carried out for the Swedish Chemicals Agency together with the scientific research study on BPA, no risk could be identified applying the risk assessment method used within the scope of REACH.”

