The assimilation of dioxins and PCBs into chickens and eggs through contaminant transfer and uptake

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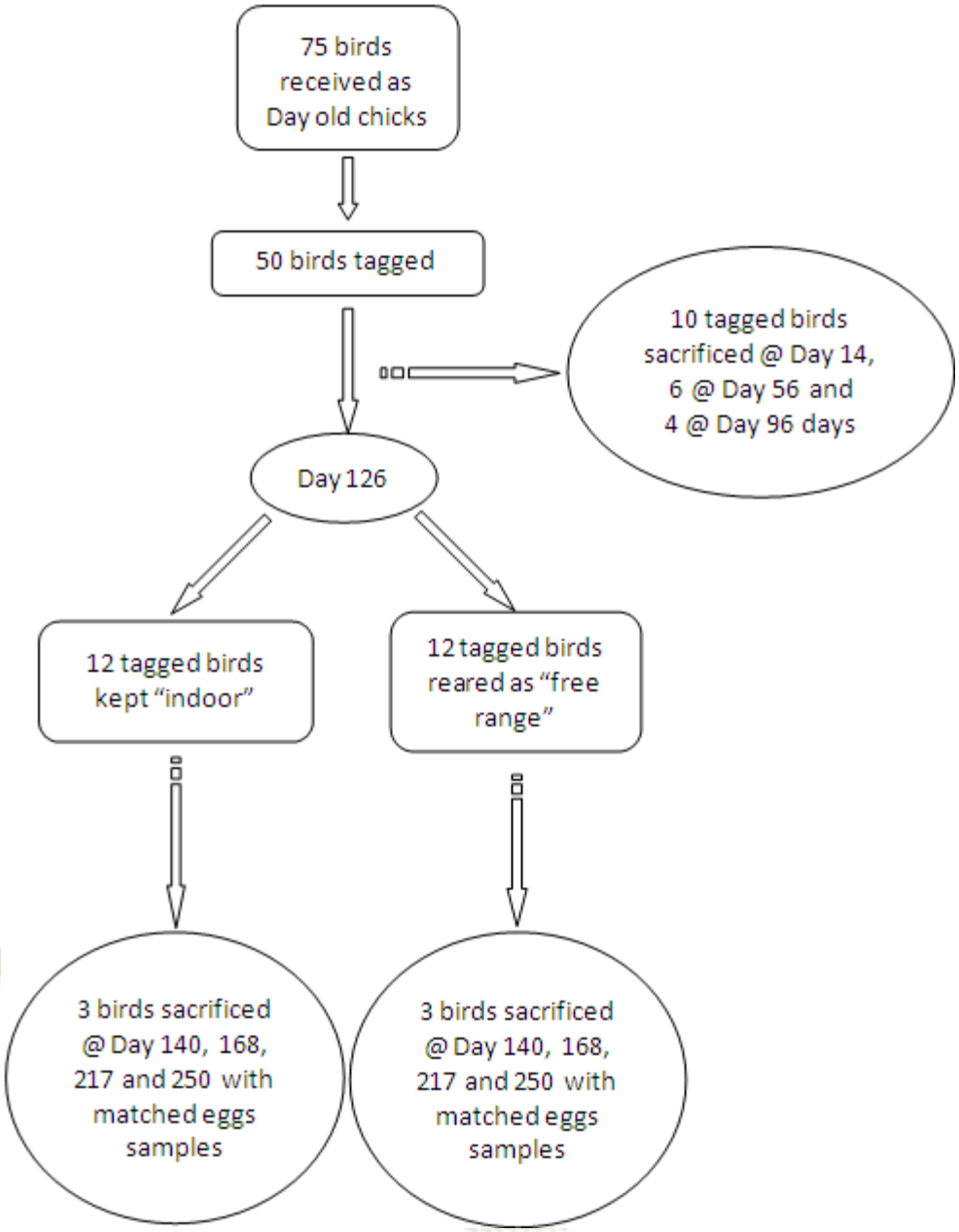
Background

- Part of study on the transfer and uptake of contaminants into farm animals used for food
  (Fernandes *et al.* (2011) *Chemosphere* 83: 815-822)
- What did we analyse?
  - Broilers from DOC to market ready
  - Layers from DOC onwards
  - Eggs from layers
  - Feed, bedding and soil


75 birds received as Day old chicks
50 birds tagged
10 tagged birds sacrificed @ Day 14, 6 @ Day 56 and 4 @ Day 96 days
Day 126
12 tagged birds kept "indoor"
12 tagged birds reared as "free range"
3 birds sacrificed @ Day 140, 168, 217 and 250 with matched eggs samples
3 birds sacrificed @ Day 140, 168, 217 and 250 with matched eggs samples

Indoor vs. Free range?

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Study conducted using typical commercial husbandry practices (2002)

Indoor

Spend all of their lives indoors with no access to outside range, can be caged

Free range

Must spend at least 50% of there lives with access to an outdoor range

Law changed from Jan 2012- “Enhanced cages”

Fera method of analysis for PCBs and Dioxins

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- Fernandes *et al*. (2004) Chemosphere 83:815 - 822
- Uses HRGC LRMS as a method of detection for NDL and mono- *o*-PCBs
- Uses HRGC HRMS for detection of non- *o*- PCBs and PCDD/Fs
- Isotope dilution for quantification using $^{13}C_{12}$ labelled internal standards
- 47 PCBs and 17 PCDD/Fs + 4 PCBs currently covered
- UKAS Accredited to ISO 17025 standard for all foods

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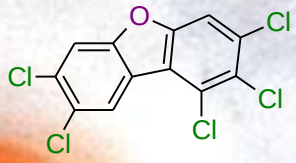
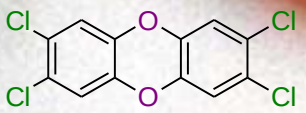
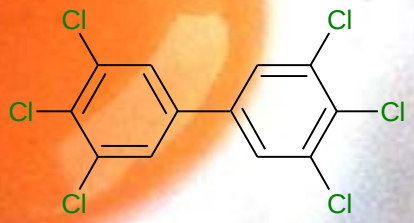


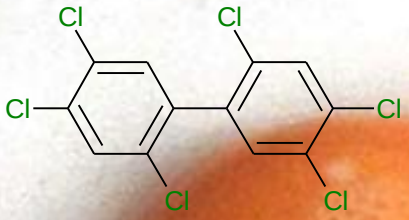
1,2,3,7,8-PeCDF



2,3,7,8-TCDD



PCB169



PCB153

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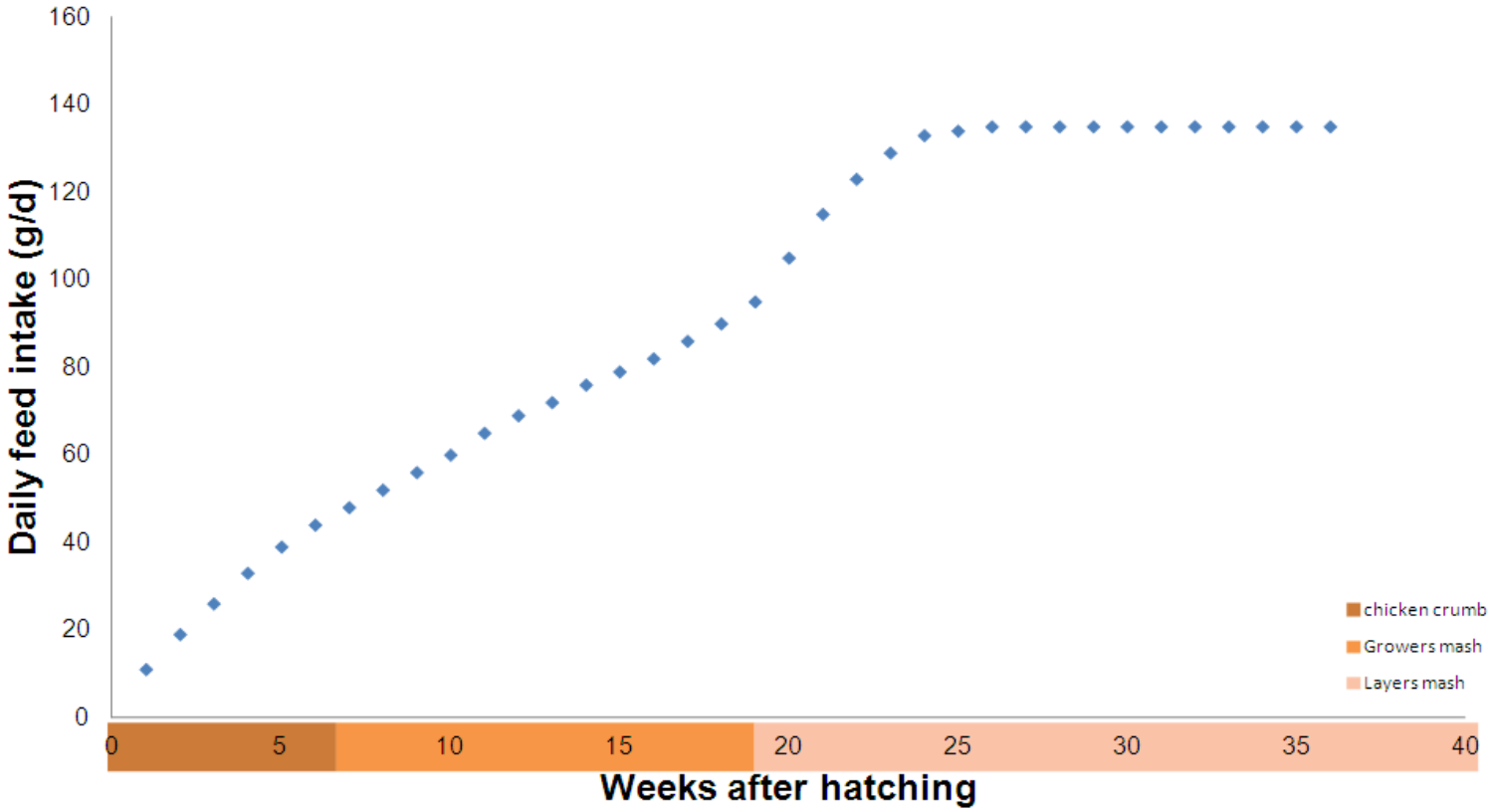
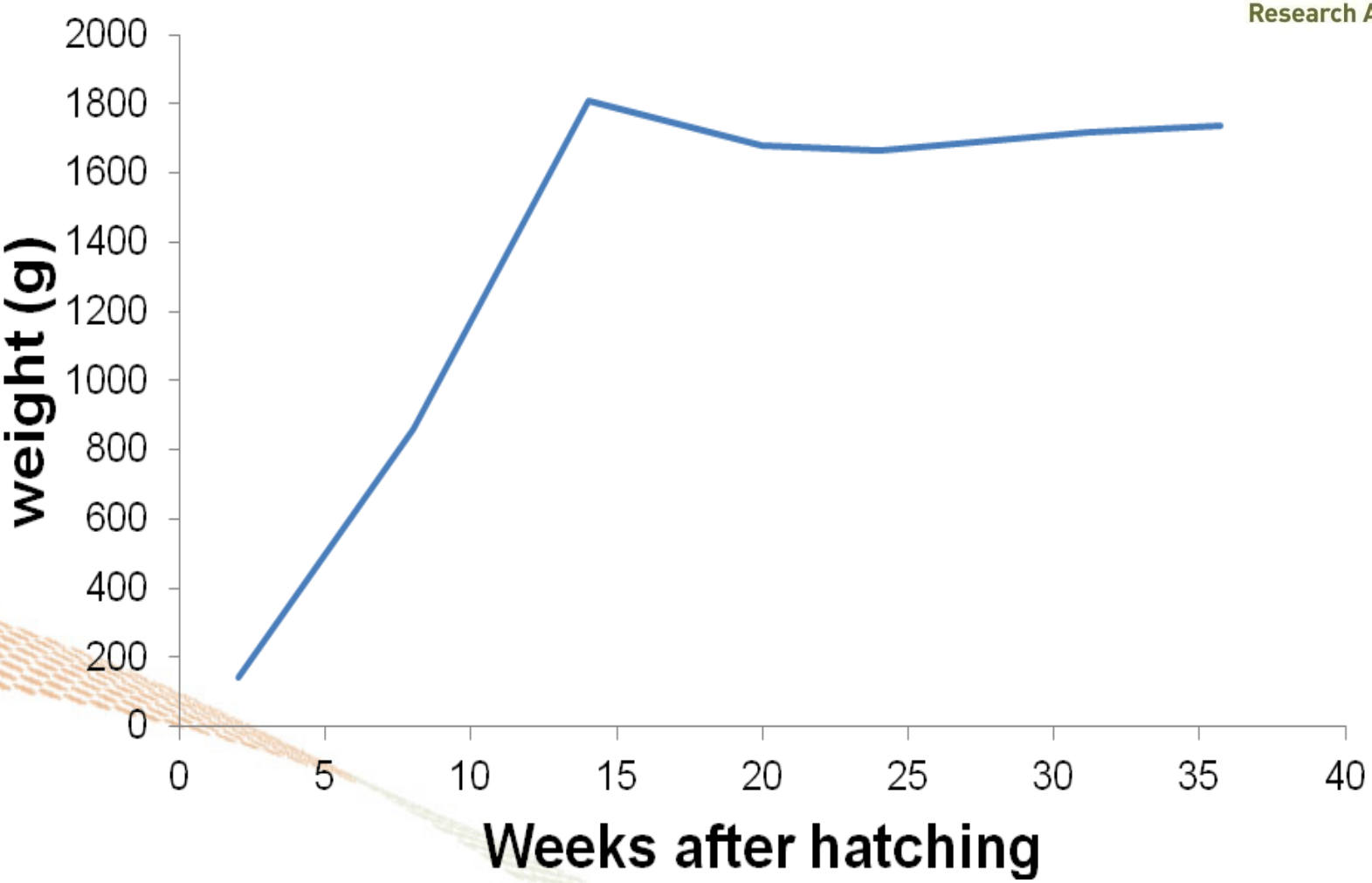
Free range/ indoor layers, Feed intake at end of week



Layer weight, mean of all types



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Residues in layer meat - indoor

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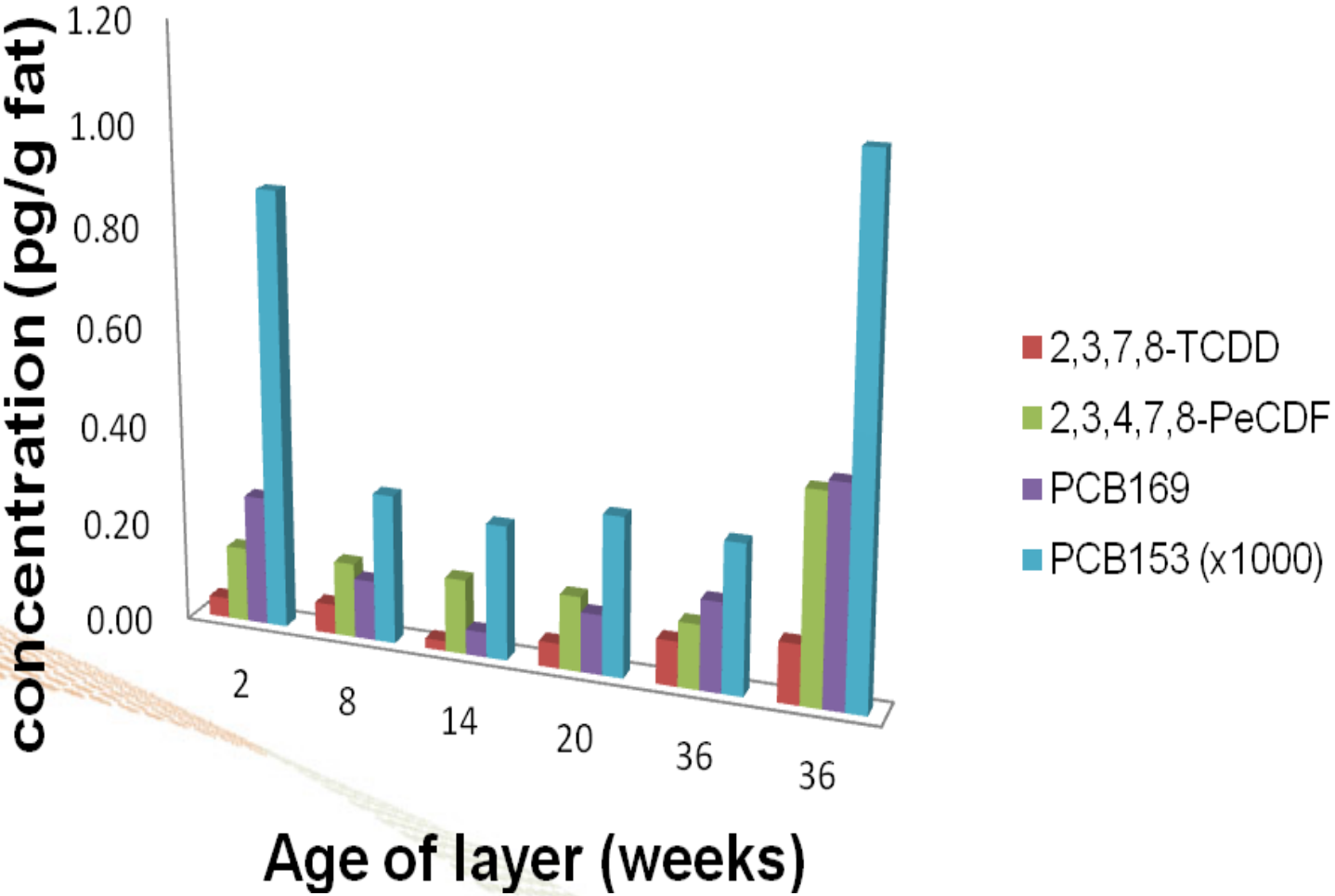
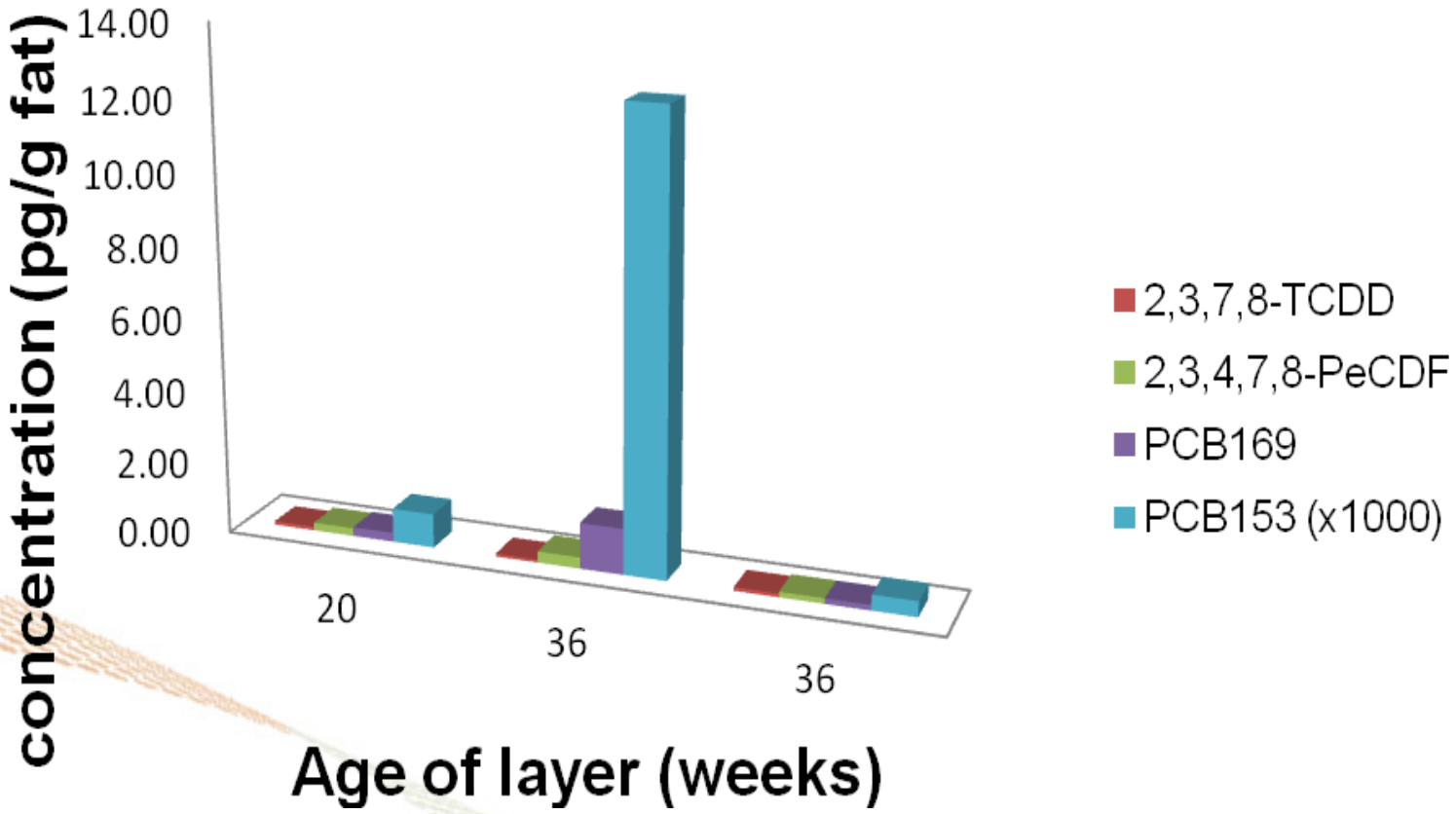
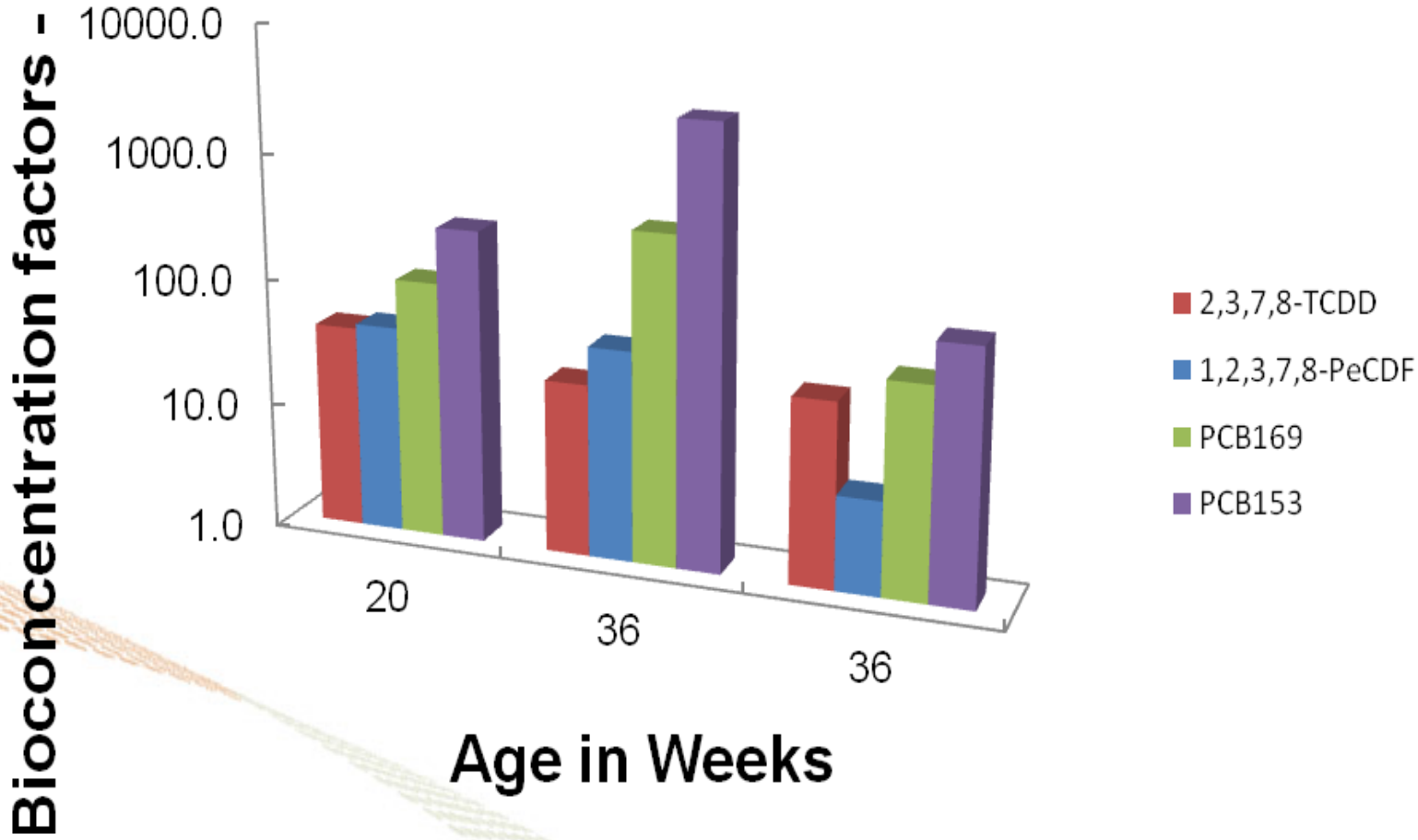


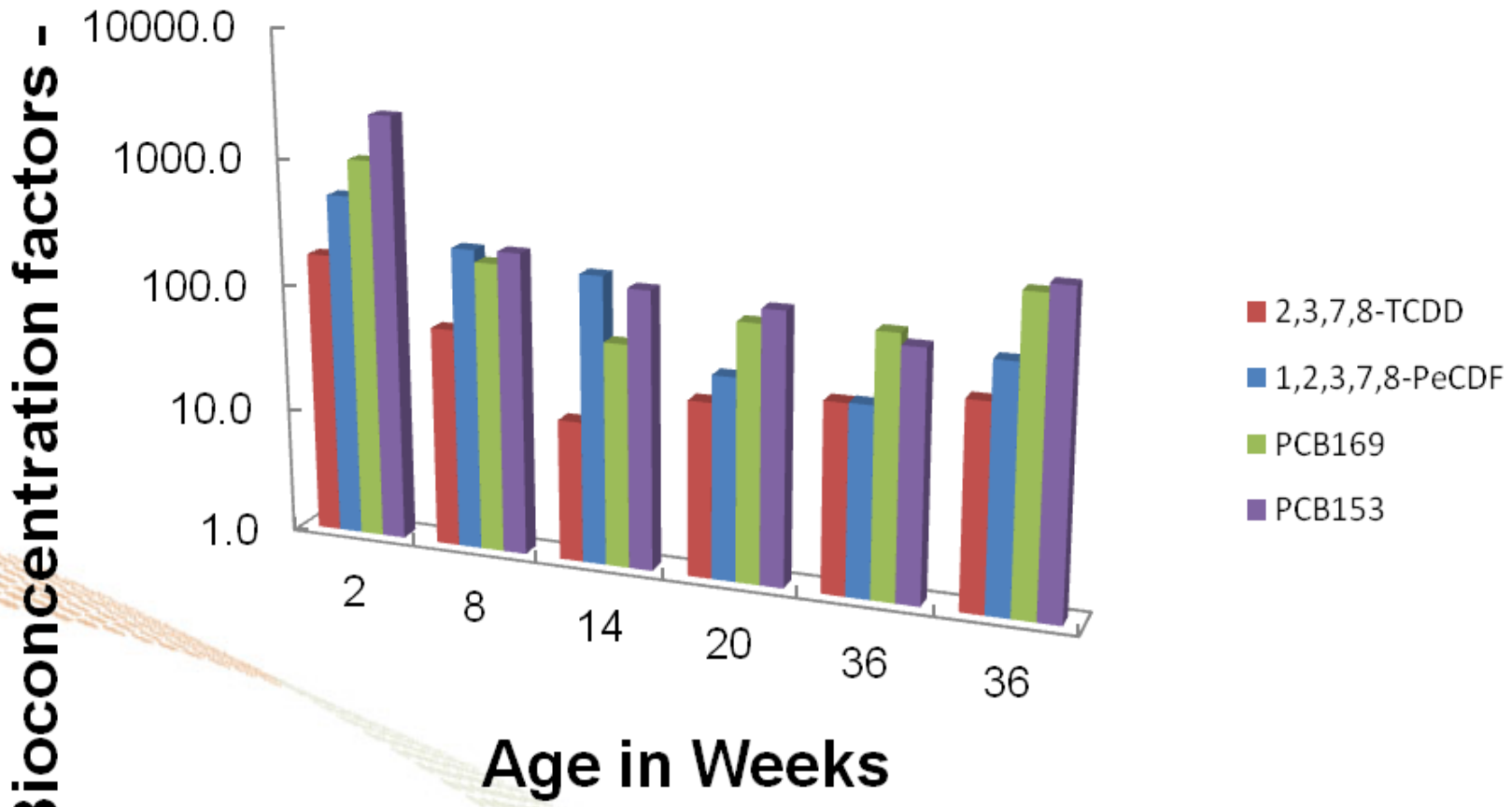
Residues in layer meat - free range



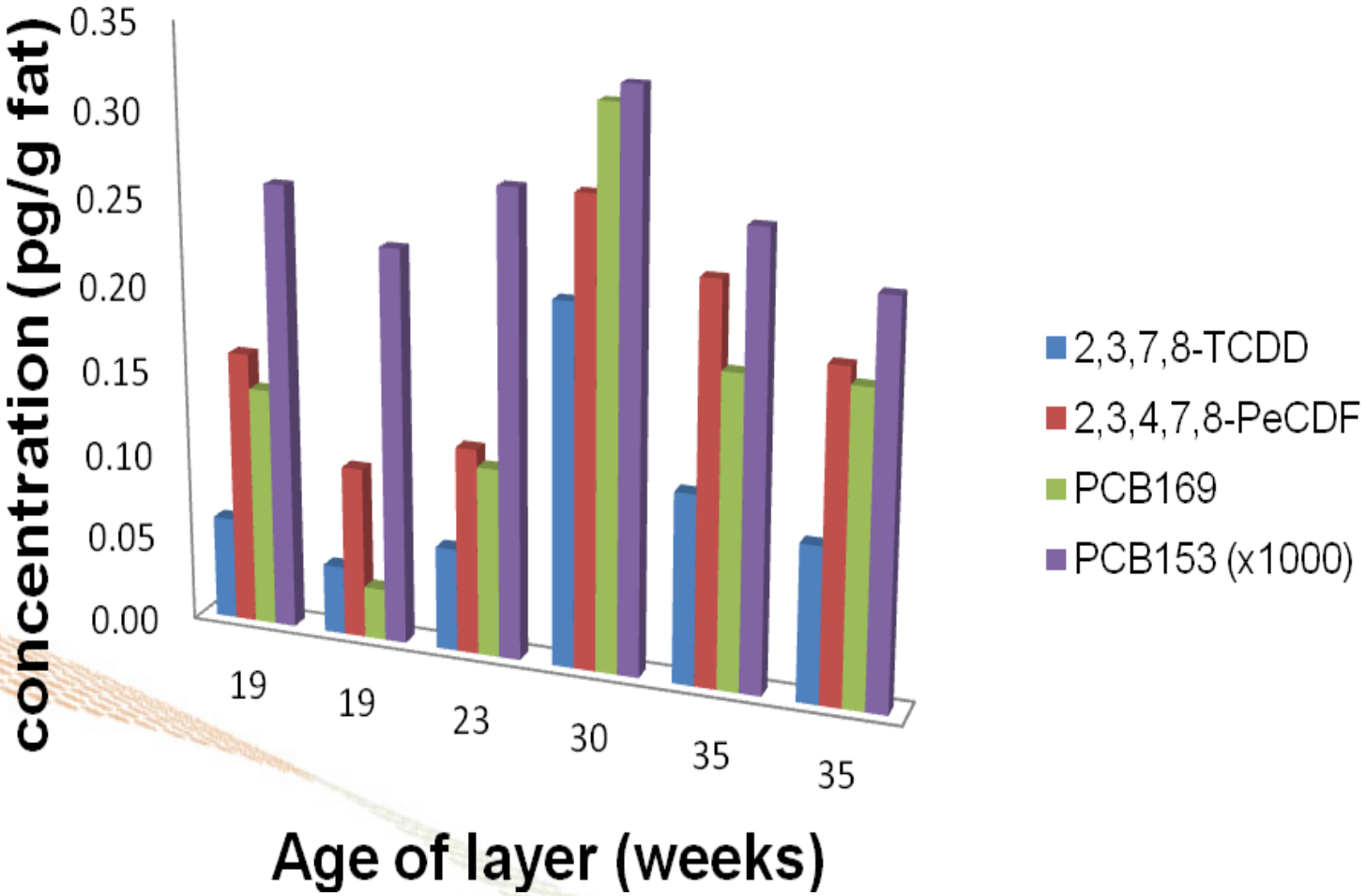
Bioconcentration factors - Free range Meat



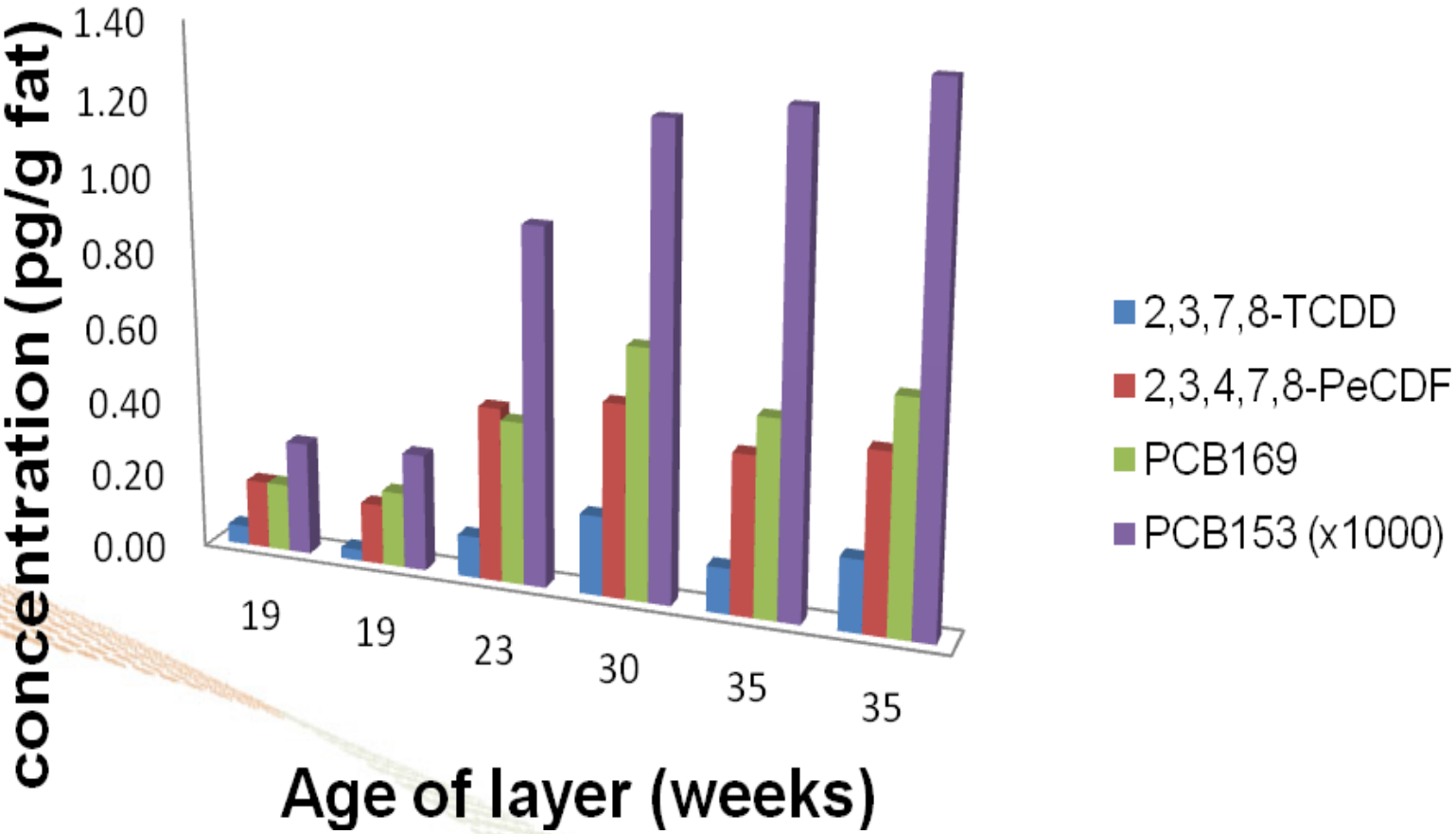
Bioconcentration factors - Indoor Meat



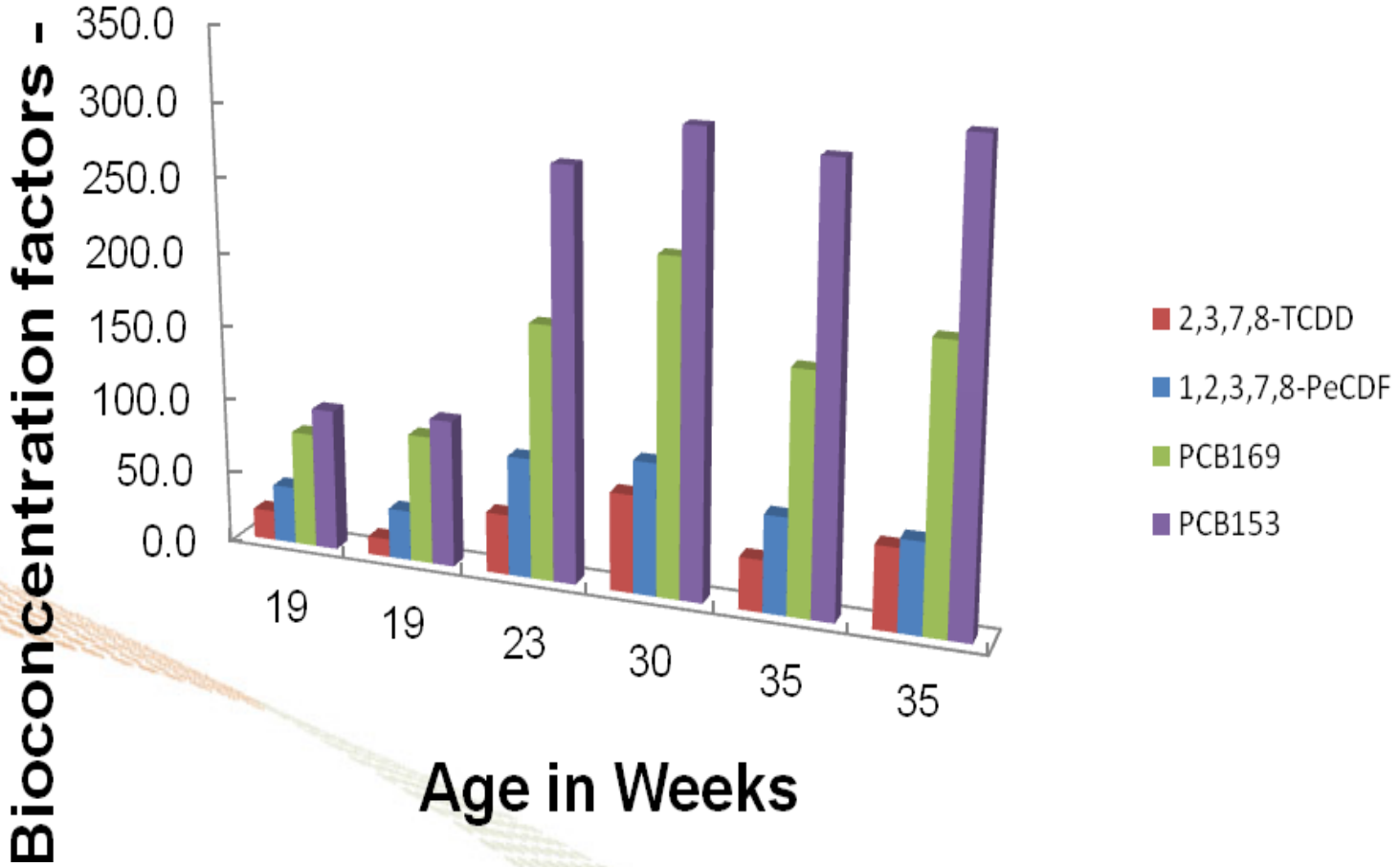
Residues in laid eggs - indoor



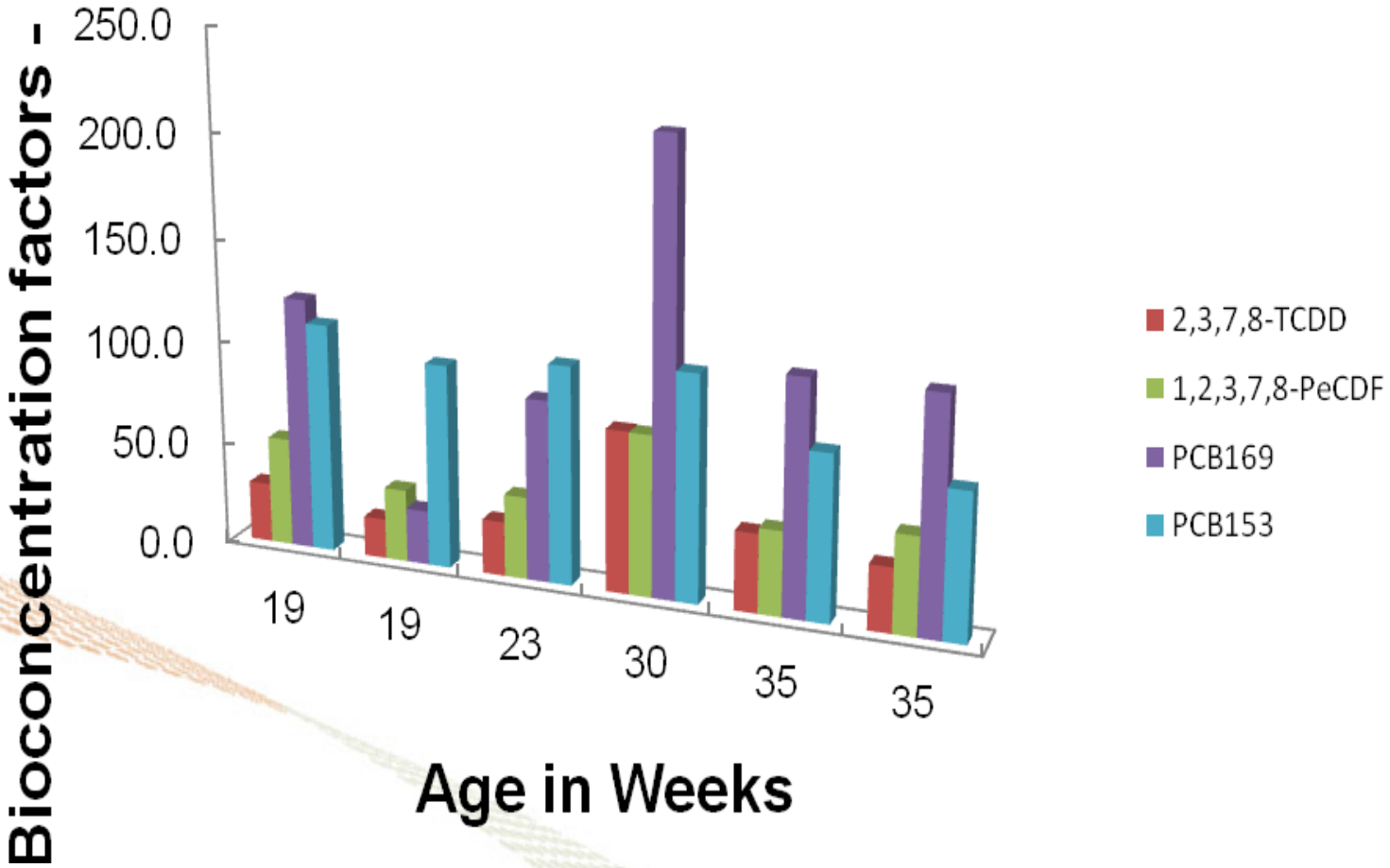
Residues in laid eggs - free range



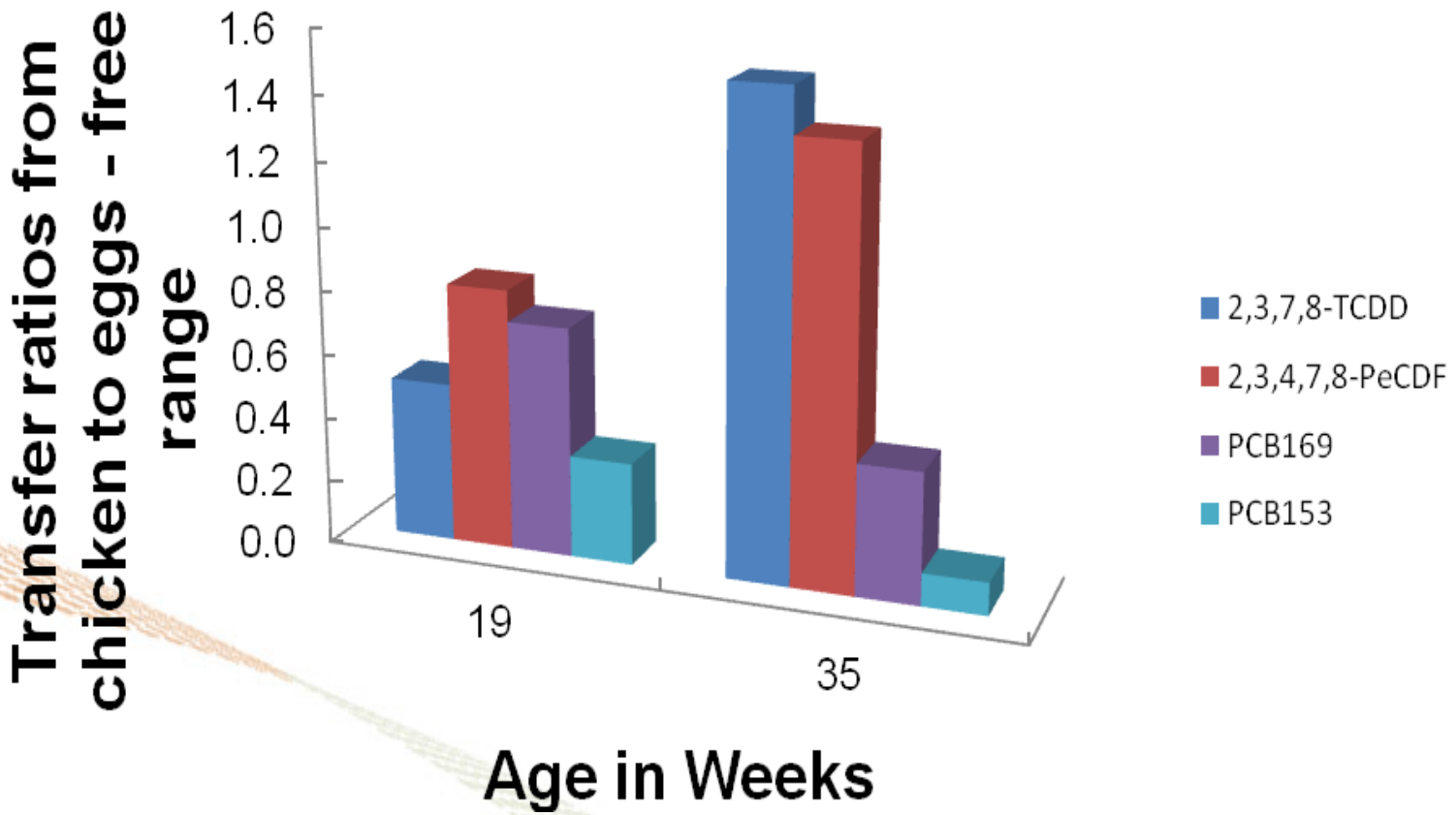
Bioconcentration factors - Free range Egg



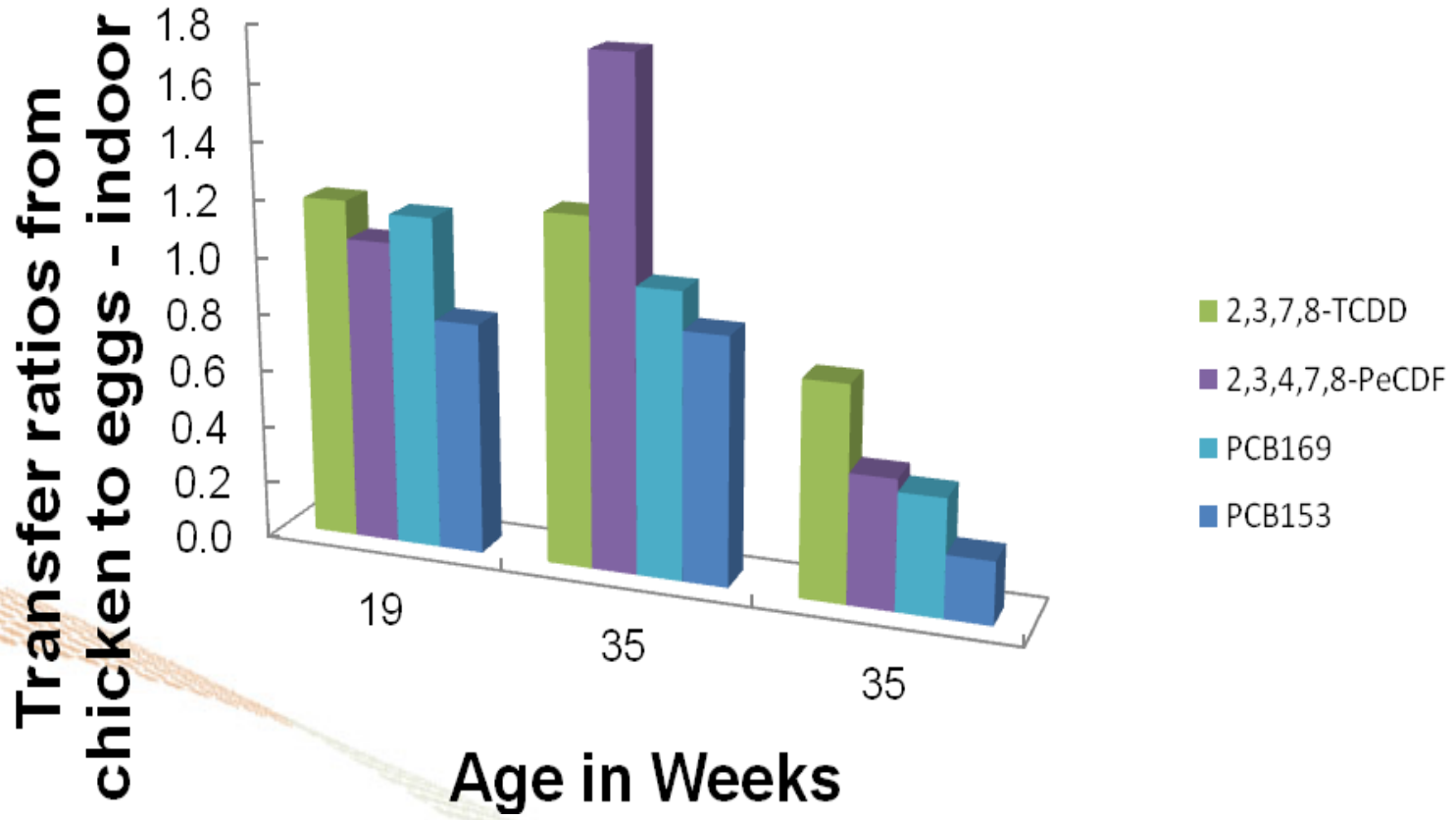
Bioconcentration factors - Egg Indoor



Transfer ratios from chicken to eggs



Transfer ratios from chicken to eggs



Acknowledgements

- Chris Foxall and Ian Lake – UEA
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