

# Concentrations of chlorinated pollutants in adipose tissue of yellow-legged gulls (*Larus michahellis*) from Spain: Role of gender and age

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Concentrations of 7 different polychlorinated biphenyl (PCB) congeners, and eleven organochlorine pesticides (OCPs) and metabolites, including DDTs (dichlorodiphenyltrichloroethane), HCHs (hexachlorocyclohexane isomers), Endosulfan, Endosulfan sulfate, Endrin, Dieldrin and HCB (hexachlorobenzene), were determined in adipose tissue of 57 yellow-legged gulls collected from NW and N Spain. Furthermore, the possible differences due to two endogenous factors, age and gender, were determined. All the analyzed PCBs were detected in over 66% of the samples, with levels of 291.9 (PCB 180), 34.5 (PCB 118), 0.7 (PCB 28), 432.6 (PCB 153), 225.5 (PCB 138), 1.3 (PCB 101) and 0.4 (PCB 52)  $\mu\text{g}/\text{kg}$  of adipose tissue. With respect to the OCPs and metabolites, only 4,4'-DDE and HCB were detected in more than 50% of the samples, with means of 360.6 and 2.5  $\mu\text{g}/\text{kg}$  of adipose tissue, respectively. From all the considered contaminants, only 4,4'-DDE levels presented significant differences depending on the gender, with females showing higher values than males ( $p < 0.01$ ). Significant differences ( $p < 0.001$ ) were also found related to age for the levels of PCBs 180, 138, 101, 28 and 153, as well as 4,4'-DDE, with adult levels being higher than those in young birds. The results of the present study constitute a baseline to better assess the environmental impacts of PCB and OCP contamination at other coastal sites for future biomonitoring

studies, with particular emphasis on gender- and age-related differences. © 2018 Elsevier Inc.

Fat

Larus michahellis

Male/female

OCP

PCB

Seabird

1,1 dichloro 2,2 bis(4 chlorophenyl)ethane

1,1 dichloro 2,2 bis(4 chlorophenyl)ethylene

chlorphenotane

dieldrin

endosulfan

endosulfan sulfate

endrin

hexachlorobenzene

hexachlorocyclohexane

organochlorine pesticide

polychlorinated biphenyl

unclassified drug

chlorinated hydrocarbon

chlorphenotane

hexachlorobenzene

lindane

pesticide

polychlorinated biphenyl

age

chlorine

concentration (composition)

environmental impact

gender role

metabolite

organochlorine pesticide

PCB

seabird

adipose tissue

adult

age distribution

animal tissue

Article

bioaccumulation

biological monitoring

bird

chemical analysis

concentration (parameters)

environmental exposure

environmental factor

environmental monitoring

female

geographic distribution

juvenile animal

Larus michahellis

male

nonhuman

sex difference

Spain

tissue level

toxicokinetics

adipose tissue

age

analysis

animal

Charadriiformes

chemistry

metabolism

pollutant

sex factor

Spain

Spain

Aves

Larus michahellis

Adipose Tissue

Age Factors

Animals

Charadriiformes

DDT

Environmental Monitoring

Environmental Pollutants

Female

Hexachlorobenzene

Hydrocarbons, Chlorinated

Lindane

Male

Pesticides

Polychlorinated Biphenyls

Sex Factors

Spain