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# Rearing kids on chlordecone contaminated soils: Activated carbon, a promising media to limit the transfer from soil to animal tissues

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## 1. Introduction

Chlordecone (Kepone) (CLD) is an organochlorine pesticide, persistent organic pollutant<sup>1</sup>, which was intensively used in French West Indies to fight the banana black weevil. Because of its toxicity and considerable levels in soil, it became a major threat for human health to address<sup>2</sup>. Recent studies have shown that chlordecone contained in soil is extracted during the digestive process and assimilated by animals<sup>3</sup>. **Soil ingestion is the main exposure route for free range animals.** In order to ensure the production of safe animal foodstuffs, it is necessary to reduce the transfer from soil to animal tissues.

## 2. Objective

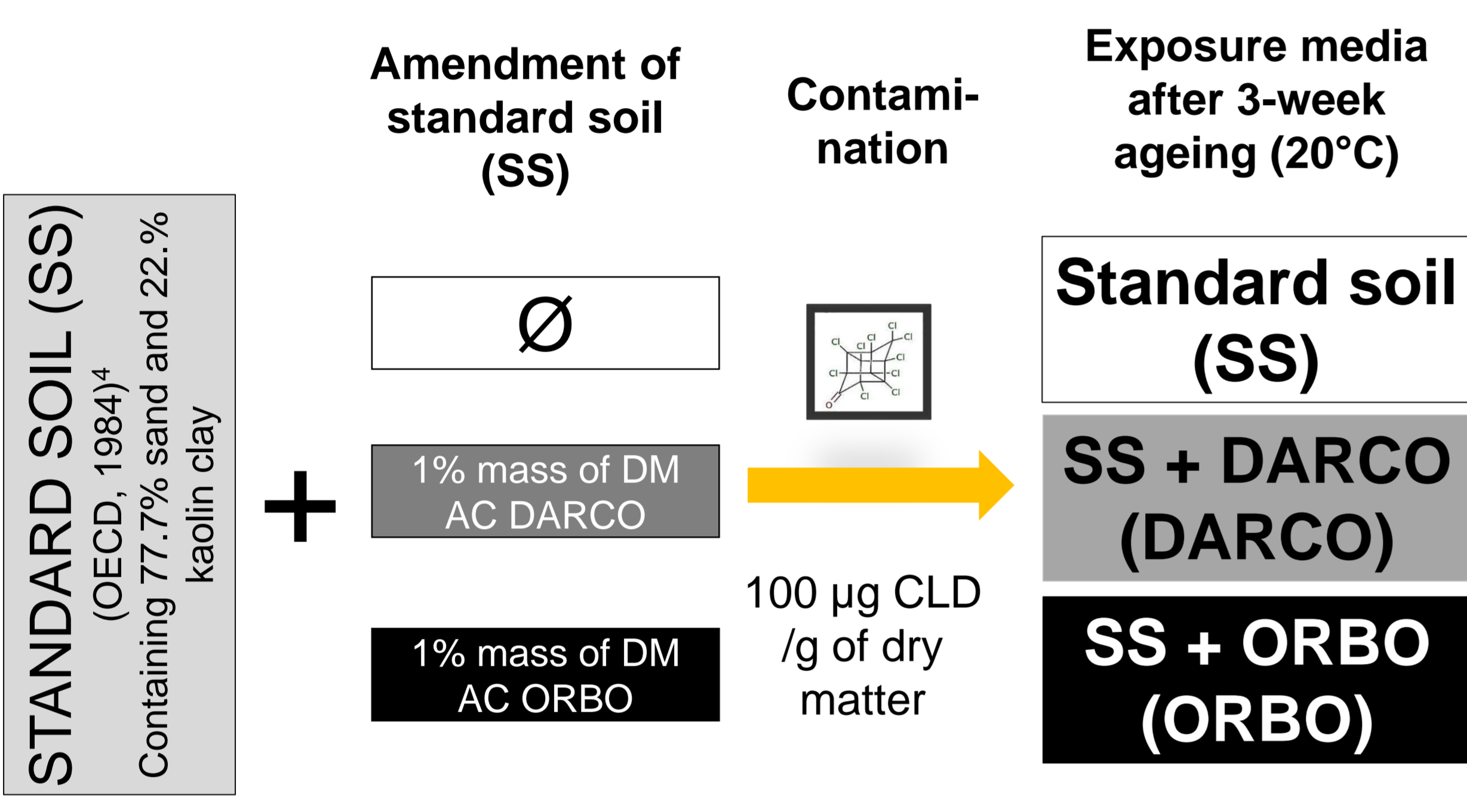
The present study intends to test whether two different activated carbons (AC) : ORBO (activated coconut charcoal, specific surface area (SSA) of 1070 m<sup>2</sup>/g) DARCO (lignite activated carbon, SSA of 793 m<sup>2</sup>/g), could limit the CLD transfer from soil to animal.

### Hypotheses :

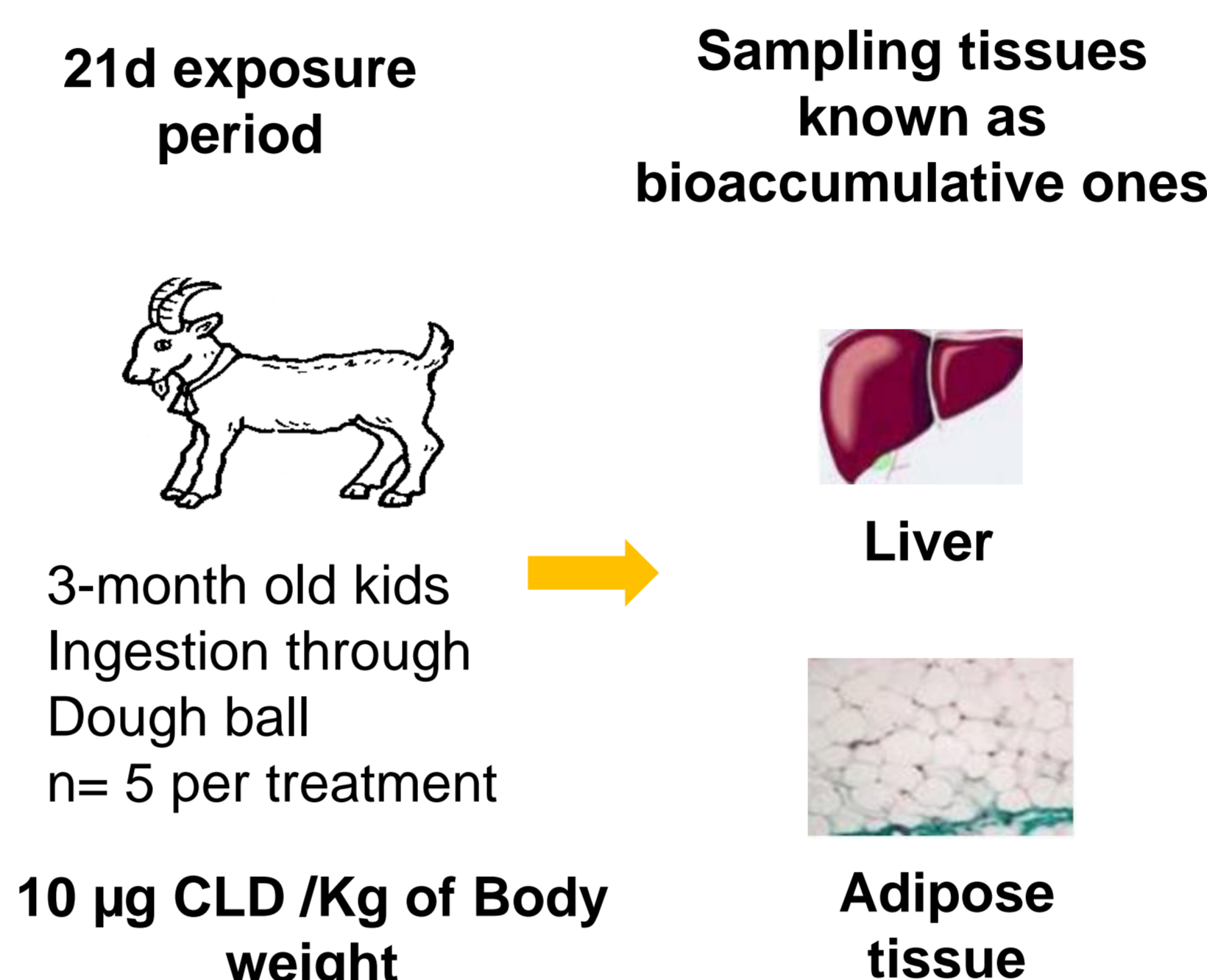
- AC limits the absorption of CLD through soil ingestion.
- This effect depends on the properties of AC.

## 3. Material & Methods

### I – Preparation and contamination of artificial soils



### II – In vivo assay



### III – Analysis

#### Analysis of biological samples

Extraction  
Analysis of CLD by LC-MS/MS.  
Detection by mass spectrometry using a triple quadrupole.

#### Relative bioavailability calculation

Determination of the retention offers by AC against standard (reference)

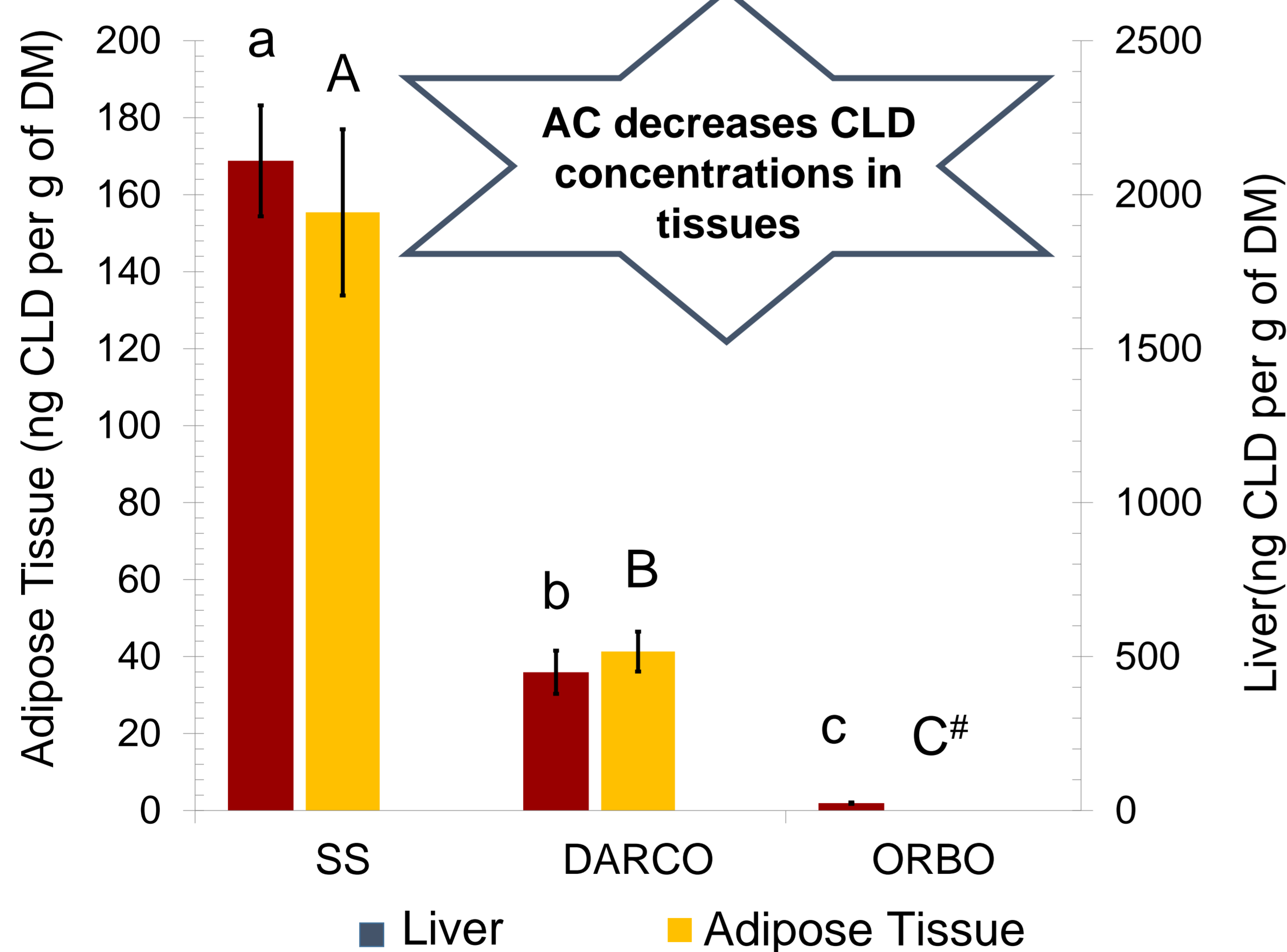
$$RBA_{CLD} (\%) = \frac{C_{AC}^{\circ}}{C_{SS}^{\circ}}$$

RBA<sub>CLD</sub>: relative bioavailability of CLD in tested soil amended with AC

C<sub>AC</sub><sup>°</sup> and C<sub>SS</sub><sup>°</sup> are respectively concentrations of CLD found in the same target tissue after ingestion of one AC soil or SS

## 4. Results

### Concentration of CLD in target tissues



### Relative bioavailability (%)

Treatment	Liver	Adipose Tissue
DARCO	25.3 % <sup>a</sup> [17,8% - 32,8%]	36.5 % <sup>A</sup> [26,3% - 46,63%]
ORBO	1.35 % <sup>b</sup> [1,1% - 1,6%]	1.8 % <sup>B</sup> [NE]

RBA values (%) and respective 95% confidence interval are presented

NE: non estimated confidence interval as concentrations in adipose tissue were lower than LOQ

Line without a common letter differ significantly (p>0.05)

#: < Limit of Quantification (LOQ=2 ng/g of DM)  
Column without a common letter differ significantly (p>0.05)

## 5. Conclusion & Perspectives

This study leads to conclude that :

- AC could dramatically reduce the relative bioavailability of CLD (up to 98% for ORBO).
- Extent of this limitation depends of the properties of AC.
- This result obtained with artificial soils is considered as a first step prior to on-field experiments.