

DERIVATION OF INDICATORS FOR ASSESSING THE QUALITY OF BIOTA SAMPLES AND THEIR SUITABILITY FOR ENVIRONMENTAL MONITORING STUDIES



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Introduction

- The EU-funded **LIFE Apex project** aims to foster and improve the systematic use of chemical monitoring data from **apex predators and prey (AP&P) samples** for regulatory purposes
- In the context of chemicals management, monitoring data from appropriate biota samples can **prove the presence of chemicals** in the environment and **support the prioritisation of substances** for further hazard assessment
- AP&P samples for such investigations are already **available in Environmental Specimen Banks (ESBs), Natural History Museums (NHMs) and Research Collections (RCs)**
- These organisations apply **different sampling approaches (systematic and/or opportunistic) and sample storage conditions**
- For AP&P samples certain important **specimen-related data have to be available** and **basic quality assurance aspects must be considered**

Survey

- A **survey was conducted among ESBs, NHMs and RCs** on the application of guidance documents and quality assurance measures for sampling, processing and archiving of AP&P samples in 2019
- The survey evaluation revealed **great differences regarding quality assurance measures** between participating organisations
- However, **basic information on archived specimens is mostly available** (e.g., sampling location and date, biometric data)
- The **temperature for archiving mostly is -20°C or -80°C**; only **one RC and two ESBs in the survey are using -150°C storage** in the inert gas phase of evaporating liquid nitrogen
- Some institutions collect **samples specifically for contaminant monitoring purposes and sample treatment is conducted by experts trained in chemical monitoring**, often following specific guidance documents
- Organisations archiving samples for other purposes than chemical monitoring have **sometimes only limited possibilities to consider contamination aspects**

Derivation of indicators for the suitability of biota samples

- Based on the survey answers and discussions in the LIFE Apex project team, **indicators were derived to allow an assessment of the suitability of biota samples for environmental monitoring investigations**
- The **indicators are covering aspects from sampling, processing and archiving**
- These indicators will be used **to assess the quality and appropriateness of the samples for environmental monitoring** in the LIFE Apex project

Additional important information on AP&P samples to be provided

- Is the sample classified as a **biological hazard**?
- Which materials were in direct **contact with the tissue sample / specimen** during sampling or processing (field packaging material, working benches/plates, gloves etc.)?
- Are **field-blank samples** available (or samples from less anthropogenic influenced/near-natural sites, which can be analysed in comparison to samples that are expected to have higher burdens)?
- Are the **fat and water contents** of tissues available?
- Is the **trophic position** of specimens known (e.g., from stable isotopes)?
- Are already **data from previous chemical analyses** available?

Indicators for the quality and suitability of samples for environmental monitoring of chemicals

Sampling

- **Unique sample code / designation**
- **Species name** (resident or migrant species?)
- **Date of sampling / finding**
- Sampling approach: e.g., opportunistic or systematic sampling
- **Location where sampled / found** (geo-coordinates, if available)
- Description of the state of the sample (for opportunistic samples, e.g., state of autolysis; if possible, estimated time of death under consideration of actual environmental conditions)
- **Biometric data**: e.g., weight, size/length, sex, age (juvenile/adult); cause of death
- Information whether an individual was **euthanised or received medical treatment** (may be relevant if a sample was received, e.g., from a wildlife rehabilitation centre)

Processing

- **Description of handling**: e.g., examination, organs dissected
- Date of each processing step
- **Preparation of composite samples**, if applicable, from several individuals: information on, e.g., number of individuals, selected tissue, amount of each individual used, age and sampling region of individuals
- **Homogenisation of tissues**, if applicable: description of procedure

Archiving

- **Date of freezing**
- **Storage temperature**, e.g., -20°C (maximum -15°C), -80°C (maximum -70°C), -150°C (maximum -135°C)
- Description whether the **whole organism is stored or only individual organs**
- **Amount of sample** available
- **Material of sample packaging** (e.g., glass bottles, aluminium foil)

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LIFE Apex project: <https://lifeapex.eu>

Visit the homepage of the LIFE Apex project and download our newsletter or retrieve monitoring data from the [LIFE Apex database](#). A specific data collection template is available ([link](#))



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