July 2019

Lab Protocol I

DNA Extraction

HIGH QUALITY DNA TODAY = RESOURCE MATERIAL TOMORROW

Extracting DNA using techniques that respect good molecular laboratory practice ensures the acquisition of quality data. The conditioning of organic (tissue) and/or genetic (DNA) material under good conditions facilitates subsequent use.

Manipulation The organic material from which DNA extraction is carried out must be handled according to protocols adapted to the type of material. If the whole specimen is used for DNA extraction, then a non-destructive method should be preferred.

During DNA extraction, it is important to avoid cross-contamination, especially with plate extraction methods. Once extracted, the DNA degrades over time and successive defrosts. It is therefore prudent to work with an aliquot and store the DNA sample under stable conditions.

Conditioning Individualized conditioning of DNA extracts is strongly recommended. Containers must be hermetic and resistant to the preservation conditions used.

A unique identifier should be attributed to each individual tissue and/or DNA sample. It is strongly recommended to place a label on each sample that is adapted to the container and that sticks to it assuredly.

Method

The technique must be adapted to the organism studied and the starting organic sample.

Material

The biological material concerns the tissue sample of the specimen (leaf, blood, muscle, buccal swab) and the genetic sample (DNA extract).

Data

Information on extraction is essential, as well as information on the genetic material available - tissue and DNA.

1	2	3
DNA ALIQUOT	SAMPLES	INFORMATION
Laboratory	Institution	SwissBOL

sofia.wyler@unine.ch

BEST PRACTICES

Methodologies Appropriate and sterile instruments must be used when preparing tissue samples for DNA extraction. The use of gloves is mandatory during all handling and precautions must be taken to avoid cross-contamination. During the DNA extraction process, it is essential to use sterilized auxiliaries (containers, tubes, eppendorfs, falcons, tips) and the use of filter tips is clearly an advantage. In addition, it is strongly recommended to use pipettes only used to work with low DNA concentrations, as well as handling in pre-PCR rooms. There are many commercial methods on the market that guarantee very good success rates, but less standardized and less expensive procedures are also available. What is important is that the selected method is adapted to the taxonomic group and type of organic material. Finally, a proven method for obtaining DNA in quantity and quality should obviously be preferred.

Storage In order to ensure that the quality of the DNA is not degraded, the biological material must be stored under good preservation conditions, in terms of temperature and humidity. Organic samples must be stored in such a way as to ensure quality handling afterwards. Genetic samples must be conditioned at -80°C or in liquid nitrogen. However, for short or medium term storage, stowing at -20°C can also be considered. Working aliquots can be stored at -20°C, or possibly at 4°C if intensive use is expected for a short period. The containers of the various samples must be adapted to the type of material and must meet the criteria of tightness and resistance to the storage conditions used.

Labelling The same temporary identifier may be used on all derivatives of the same specimen and must be securely stuck to the different containers. The temporary identifier corresponds to a unique code for the analytical laboratory or for the batch of specimens being processed. Appropriate and effective labels should be used for all stocked material in the medium to long term.

Information To facilitate the maintenance of links between the various objects, it is recommended to keep the unique identifier assigned to the specimen - BARCODE TAG (unique specimen identifier on label provided by GBIF.ch); INFOSPECIES ID (identifier of the occurrence assigned by a data centre); MUSEUM ID (catalogue number provided by the museum institution); FIELD ID (arbitrary identifier temporarily assigned during the sampling). Information on the DNA extraction and material is essential for data quality.

IDENTIFICATION	VOUCHERID	1	Internal identifier used to ensure links between genetic information - BARCODE TAG (GBIFCHID) or INFOSPECIES ID (occurrence ID) or MUSEUM ID (catalog Number)
	PROJECTCODE	1	Code attributed to the project to which sequence aquisition is associated
EXTRACTION METHOD (EXT)	DNA_EXTID	1	Identifier attributed by the lab that assures temporarily the link between genetic information
	DNA_EXTINS	1	Institution /Company where DNA was extracted
	DNA_EXTCONTACT	3	E-Mail of the contact person concerning the extraction
	DNA_EXTMETHOD	1	Method or protocol used
	DNA_EXTMETHODSUP	3	Supplier or the kit or bibliographic reference of the protocol
	DNA_EXTSTAFF	4	Person who performed the DNA extraction - first and last names written in full
	DNA_EXTYEAR	1	Date of the extraction Year
GENETIC MATERIAL (DNA)	DNA_DNATYPE	1	Type of DNA extracted
	DNA_DNAINS	2	Institution where the DNA is stored
	DNA_DNAID	2	Internal identifier attributed by the institution to the DNA sample
TISSUE MATERIEL (TISSUE)	DNA_TISSUETYPE	1	Type of organic material used for the DNA extraction
	DNA_TISSUEINS	2	Institution where the tissue is stored
	DNA_TISSUEID	2	Internal identifier attributed by the institution to the DNA sample

Prioritisation of information : 1 – mandatory ; 2 – basic ; 3 – recommended ; 4 – optional.

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