

FROM DNA TO SPECIES IDENTIFICATION

FOOD FRAUD CAN HAPPEN AS A RESULT OF...

Substitution
of species of:



MORPHOLOGICAL
SIMILARITY



HIGHER VALUE
FOR LOWER
VALUE

Wrong
production
method:



"FARMED" SPECIES
BEING MARKETED
AS "WILD-CAUGHT"

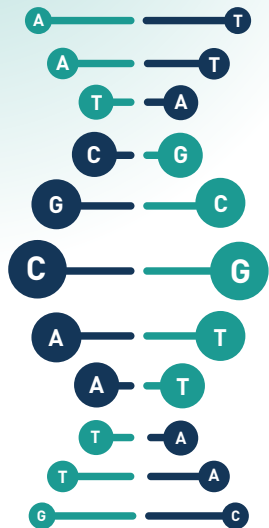
01 DNA
EXTRACTION

02 PCR

03 DNA
SEQUENCING

04 IDENTIFICATION
OF THE SPECIES

05 LABELING
VERIFICATION



WHAT IS DNA?

DNA or DeoxyriboNucleic Acid is a very long molecule made up of two strands in the shape of a double helix, which is found in the cells of almost every organism on the planet.

These strands are made up of units called **nucleotides**, which are commonly known as **A** (Adenine), **T** (Thymine),


G (Guanine), or **C** (Cytosine). Each A in one strand is always paired with a T in the other strand, and each G with a C, thus keeping the two strands together.

An **individual's genetic information** is given by the exact order of millions (sometimes billions) of nucleotides in the strands of their DNA.

WHAT IS A PCR?

The acronym PCR comes from "Polymerase Chain Reaction", and it is a technique that allows to produce millions of identical copies of a DNA fragment. It is done in a laboratory device called a thermocycler.



Commercial designation MACKEREL	Business name and address xxx	Use by 18/01/15
Scientific name <i>Scomber scombrus</i>	Production method Catch area Caught in Celtic Sea North	Storage conditions Keep at 0 to 2°C
Fishing gear category Trawls	Port and Date of landing Landed in Killybegs on 16/01/15	Certification label YYY Certified sustainable
Net quantity 250g	 56825426565855435	
<i>Ireland</i> XXX-YYY-ZZ EC		

DNA SEQUENCING: SPECIES IDENTIFICATION

After extracting DNA from fish cells, PCR is used to make many copies of a **short fragment**, whose **nucleotide sequence** is unique to a given species.

By comparing that sequence with a database, we can **know the species** to which that individual belongs.

This is of great importance to **verify the accuracy of the label** under which the fish is sold, that is, to verify that a fish belongs exactly to the species it is sold as.