

Laboratory training in biotechnology applied to diagnostic activity

New methods for identification of
contaminants

Lesson 4

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Identification of contaminants in food

- It is necessary that newly graduates are able to identify contaminants using the modern techniques and also are able to recognise the origin of the product especially of the meat
- Contaminants may derive from the environment or may be due to uncorrect manipulations of the aliments

Environment contamination

- The food may be contaminated with inanimate substances or by animate subjects
- 1) Chemical substances present in the environment may be found in the food in spite also of low concentration in the air or soil
- 2) Vegetal may contain some toxic properties
- 3) Insects, bacteria parassites and virus may be present in the food or may contaminate them during the preparation

Chemical agents

- Metals frequently are present in the food of animals and sometime are concentrated in some of them thus reaching concentration toxic for the human as happens for mercurium which may be concentrated in the fishes.
- Pesticides are also cicling from the soil to the food and may reache toxic level

Vegetal agents

- They can act through two mechanisms:
- 1) Some of them are toxic like fungi and small quantity are capable to kill a man
- 2) The vegetal is not toxic ,but growth in contaminated area and absorb such products during the development

Animate agents

- 1) Bacteria like Escherichia Coli are diffuse everywhere and are present also in the food, it is necessary therefore to use safety procedure
- 2) Parasites are present especially in the animals and they may therefore contaminate the person
- 3) virus also may be present in the tissue and may be transmitted by the liquid containing contaminate cells e.g. viral hepatitis

Methods

- 1) Chemical analysis using various extraction procedures and analytical methods such as chromatography, HPLC
- 2) Microscopic examination and identification of parasites and bacteria
- 3) Identification of specific antibody
- 4) Molecular biology

Innovative methods

- Identification of nucleic acids using complementary DNA
- Amplification of DNA sequences by using PCR
- Sequences analysis
- Extraction and analysis of nucleic acids
- Protein separation and enzyme activity determination

Advantages of new methods

- Increase in precise determination
- Increase in sensitivity
- Easy application
- Determination using small samples
- Early evaluation
- Automatic system availability

Identification of products origin

- The meat origin may be established by analysing the DNA using fingerprinting technique
- The same may be made for other food products, thus preventing sophistication

“BIOTECHNOLOGY LABORATORY METHODS”

Booklet prepared for laboratory use

- This booklet contains all description of the more useful methods which permit to develop these analyses