Molecular solutions in the Agro-alimentary lab

MRAMA

November 20th 2018

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Application Specialist
Technical Service Department

Agenda

- Promega Presentation
  - Mission and Vision
  - Promega Corp.
  - Our Standard of Quality
- Food analysis
- Molecular biology workflow with food samples
  - DNA Extraction and purification: Critical step
  - Maxwell® extraction instrument
  - Pathogen detection by real time PCR
- Application: Analysis of pathogens
  - Analysis of *Listeria* + *Salmonella* in food samples
  - Analysis of *Legionella* in water samples
- Application: Analysis of GMOs, food fraud and allergens
- Conclusions

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Promega: Mission and Vision

Mission: To provide reliable and personalized solutions that allows the progress in biomedical research, agro-alimentary industry, forensics and molecular diagnostic by offering quality products and best possible customer service.

Vision: To facilitate molecular biology techniques and tools for agroalimentary labs. **No agroalimentary lab without PCR**

Promega Corporation

Biotech Multinational, global manufacturer

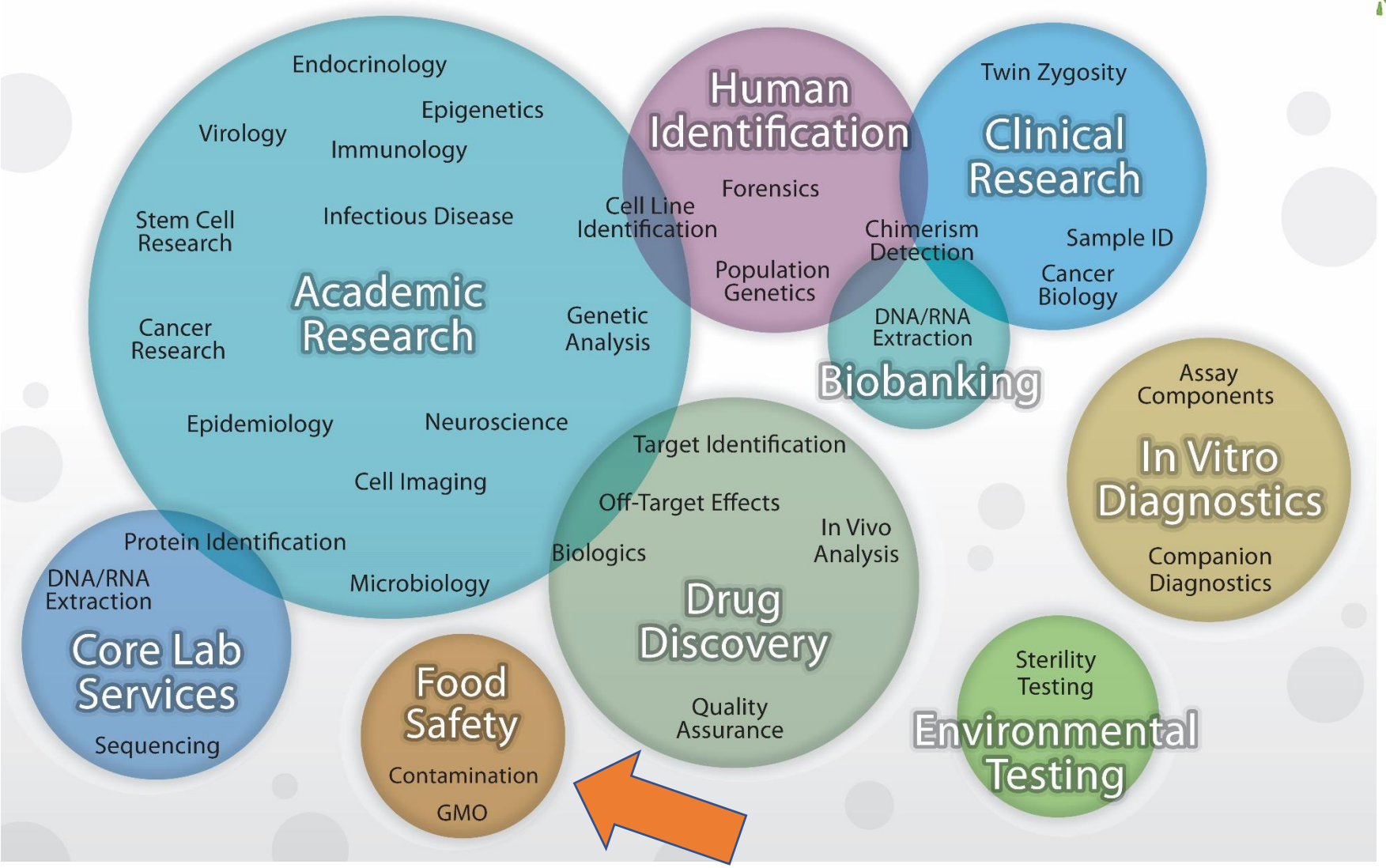
Sales~ $400M, >4000 products portfolio,

~1400 employees

Presence in R&D markets

CELEBRATING OUR FIRST 40 YEARS Promega 1978 – 2018

We support…



Standards of Quality

ISO 13485:2003

Sistema de Gestión ISO 9001:2015
TÜVRheinland CERTIFICADO
www.tuv.com ID 9105047804

ISO 9001:2015

FORENSIC GRADE ISO 18385

ISO 18385:2016

REACH Compliant

WEEE compliant

WEEE Compliant

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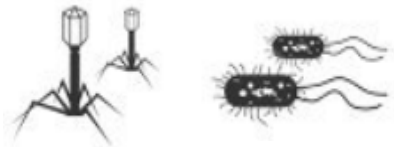
Food Analyses

I. We offer a molecular biology based solution to control different parameters in food samples (DNA extraction kits + qPCR detection kits).



Microorganisms

Species identification, GMOs, allergens

II. Optimized and validated methods. Easily to accredit with ENAC.

III. Consulting and continuous technical support ★ (open to organize trainings, developing new possible applications)

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Molecular biology workflow with food samples

Automated DNA Extraction +

(DNA Quantification)

- ✓ Fast method
- ✓ Minimal steps and less hands-on time
- ✓ Efficient with food inhibitors
- ✓ DNA ready to be used directly in a variety of downstream applications (real-time PCR, microarrays, or sequencing: NGS and Sanger)
- ✓ Adaptable Capabilities (16, 48, 96 sample format)

Real-time PCR Detection

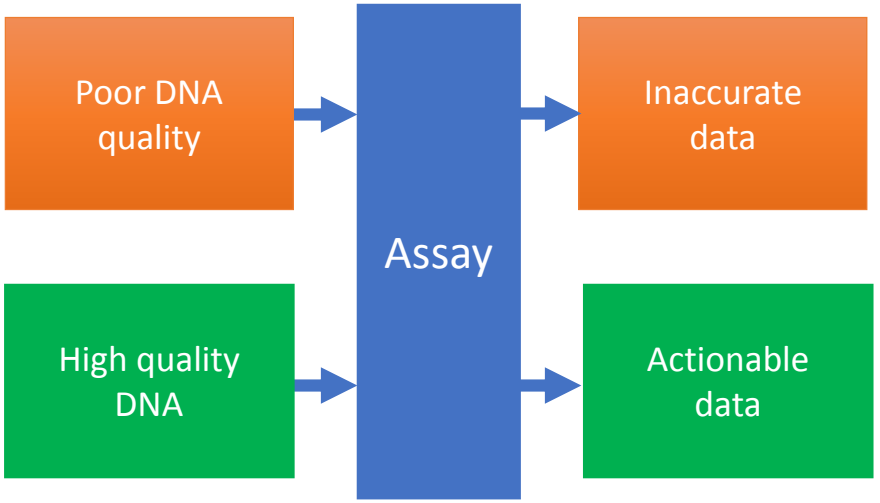
- ✓ Fast
- ✓ High specificity
- ✓ High sensibility
- ✓ Decrease of false negatives

Report of the results

DNA Extraction and purification: A critical step

Poor DNA quality:

- Unable to analyze sample
- Incorrect target assessment (pathogens, GMOs, allergens..)
- False +/ -
- Misinterpretation of results
- Irreproducible results
  - Variation in event data
  - Inconsistency
  - Delays
  - Additional costs



"Quality Data Begins with Quality Analytes"

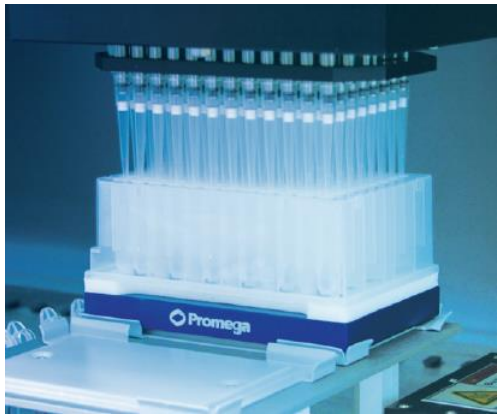
Automated extraction system

Maxwell

- Extraction system based in **Paramagnetic Particles** which bind to the DNA/RNA
- Pre-filled cartridges with the reagents
- Extraction time: 20-60 minutes

Maxwell® RSC Instrument

Maxwell® HT option: Promega offers same chemistry adapted to high throughput formats for use with liquid handling platforms (Eg. Tecan, Hamilton, etc…)



Maxwell® HT in Liquid Handlers

Pathogen detection by real time PCR

- **Food Pathogens**
  - *Salmonella spp.*
  - *Listeria monocytogenes*
  - STEC
  - *Campylobacter*
  - *Vibrio*
  - *Yersinia*
  - Virus: HAV, HEV, Norovirus, ASFV, etc..
- Enviromental pathogens
  - *Legionella*
- Animal health pathogens
- Plant health pathogens
- Food industry
  - Spoliage bacteria: beer, wine, juice, meats, etc..

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Application:
Analysis of Listeria + Salmonella in food samples

Efficiency and productivity

2 parameters

BPW
(*Salmonella*)

HF
(*Listeria*)

1 DNA extraction

1 PCR reaction

2 results

Enrichment: 18h to 26h

Extraction: 30 min

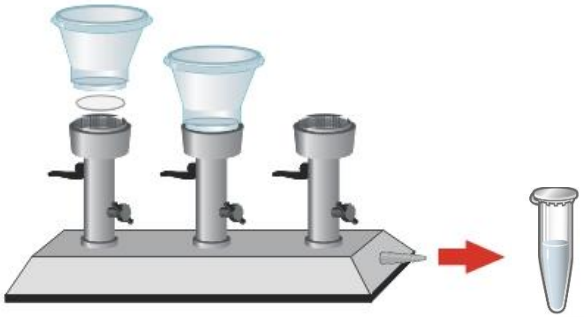
PCR: 1 h 25 min

Application:
Analysis of Legionella in water samples

UNE 100030:2017: **Recognition of the PCR as alternative method to the culture**

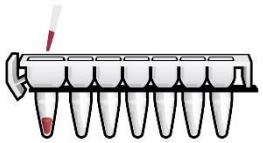
Step 1. Sample prep

Sample Concentration:



Incubation-Lysis

Add the concentrate sample to the Maxwell® cartridge

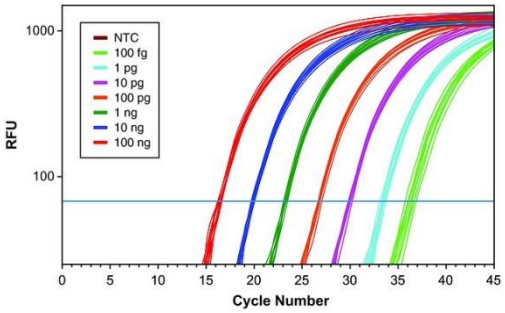


Step 2. Maxwell® Extraction System

Select the protocol and put the rack into the Maxwell®

Step 3. Real-Time PCR Detection

Legiofast SPECIES



~ 1h

~1h 30min

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Analysis of GMOs, food fraud and allergens

GMOs Analysis

- Food and seed imported to the EU from countries where there are genetically modified crops, they are suspect to have GMO traces.
- The EU requires this products must assessed and correctly labeled.
- When the content of GMO is >0.9%, normative requires label it as GMO product. If product has a content of 0.9% or lower is defined as non GMO

Food Fraud

- Ambiguity in the practices of labelling
- Label fraud on products (adulterations, substitutions of ingredients)
- Concerns by consumers (price implications, diet restrictions, halal products)

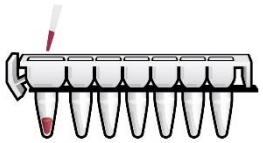
Allergens

- Increasing numbers of allergies and intolerances
- Labeling normative more stringent

Application:
Analysis of GMOs, food fraud and allergens

Step 1. Sample prep

- Add CTAB, Rnase y Proteinase K.
- Incubate 30 min
- Centrifuge 10 min.
- Add 300µl of lysate and 300µl of Lysis Buffer into well #1 of the Maxwell® RSC cartridge



Sample prep: 40 min

Step 2. Maxwell® Extraction System

Select method and put the rack into the Maxwell®

Extraction: 40 min

Paso 3. Detection kit (GMO, allergens, ID species).

PCR: ~1h 30min

Conclusions

- Molecular Biology increase capabilities of an agroalimentary lab
- Broad use of real time PCR for analyses detection.

  In next 5 years all agroalimentary labs will have a thermocycler in their facilities.
- Quality of DNA is crucial to get reliable and consistent results.

Promega offers the technology necessary for the analysis of pathogens, GMO and allergens in food samples along with consulting and continuous technical support.

Promega

Thank you
Questions, any comments?

esp_techserv@promega.com