

PathoProof™ Mastitis PCR Assay



NALMA Workshop, 2009

Martina Kahila
Finnzymes Diagnostics

Finnzymes Oy

- ❑ Founded in 1986 with focus on PCR (Polymerase Chain Reaction)
- ❑ Headquarters in Espoo, Finland
- ❑ Product range includes hundreds of products for molecular biology (reagents, instruments, reaction vessels)
- ❑ About 100 employees in Finland, distributors in over 70 countries
- ❑ Finnzymes Diagnostics: kits and services in veterinary, food and industrial fields



Mastitis

- ❑ Responsible for huge economic losses in the dairy industry due to reduced milk yield and cost for discarding milk
- ❑ The average loss due to mastitis is ~ 200 USD/cow/year. The total losses are over 1.7 billion USD/year in the US
- ❑ Bacterial culturing is currently the 'golden standard' in mastitis testing.
- ❑ However, culturing is:
 - *Slow*
 - *Inaccurate*
 - *Prone to errors*
 - *Requires aseptically taken quarter milk samples*
 - *Cannot be used with preserved milk samples*

PathoProof™ Mastitis PCR Assay



Rapid testing

- ❑ Takes 3-4 hours to perform in the laboratory.
- ❑ Does not require bacterial culturing
- ❑ Results can be reported during the same day
- ❑ Bacterial culturing takes at least 2-3 days, for Mycoplasma up to 10 days



Accurate testing

- ❑ 100 % specificity – the test detects the bacteria present in the milk sample
- ❑ No 'mixed growth' results. All bacteria are detected simultaneously. The most prevalent pathogen is reported if it accounts for >90% of the total bacterial quantity



Sensitive testing

- ❑ 40-50% of samples yielding no growth in conventional culturing provide positive results with the PathoProof Mastitis PCR Assay
- ❑ Equally sensitive for viable and growth inhibited bacteria



Ease-of-use

- ❑ Laboratories having no previous experience with bacterial culturing or PCR use the assay successfully
- ❑ Kits include everything for DNA extraction and PCR
- ❑ Software automatically creates a report of the results



Training provided for the laboratory by Finnzymes' application specialist (training is included in instrument purchase)

Mastitis and DHI laboratories

- ❑ The most convenient sample for mastitis testing would be the preserved milk recording sample
 - Bacterial culturing can not be used for mastitis testing from milk recording samples (the samples are preserved)
- ❑ The most convenient laboratory for mastitis testing would be the DHI laboratory.
 - DHI laboratories are usually not testing for mastitis, because testing methods suited for preserved samples have not been available



PathoProof Mastitis PCR Assay

- ❑ Rapidly adopted for use by milk recording organizations because:
 - Creates new business
 - Develops the laboratory's services
 - Makes mastitis management more efficient
 - Results in net money savings for the milk producers
 - Leads to higher milk yield, less discarded milk and reduced unnecessary use of antibiotics

Bacteria identified by the assay

Staphylococcus aureus

Coagulase negative staphylococci (all major mastitis species)

Streptococcus agalactiae

Streptococcus dysgalactiae

Streptococcus uberis

Escherichia coli

Corynebacterium bovis

Enterococcus faecalis and *faecium*

Klebsiella pneumoniae and *oxytoca*

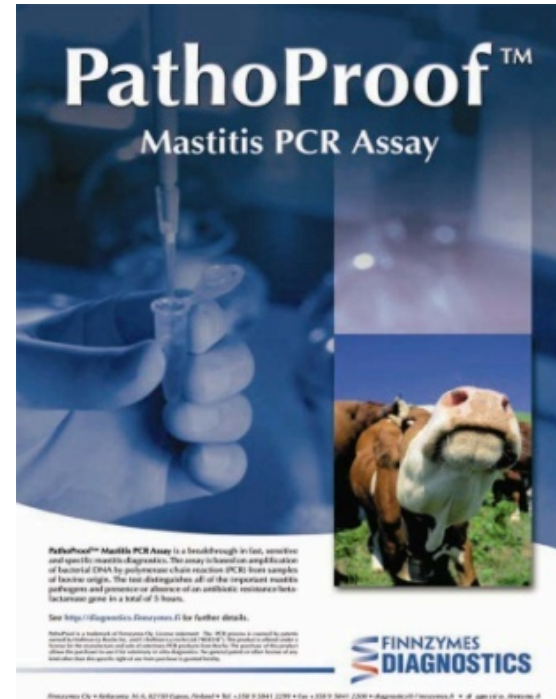
Serratia marcescens

Arcanobacterium pyogenes and *Peptostreptococcus indolicus*

Mycoplasma sp. ([available during 2009](#))

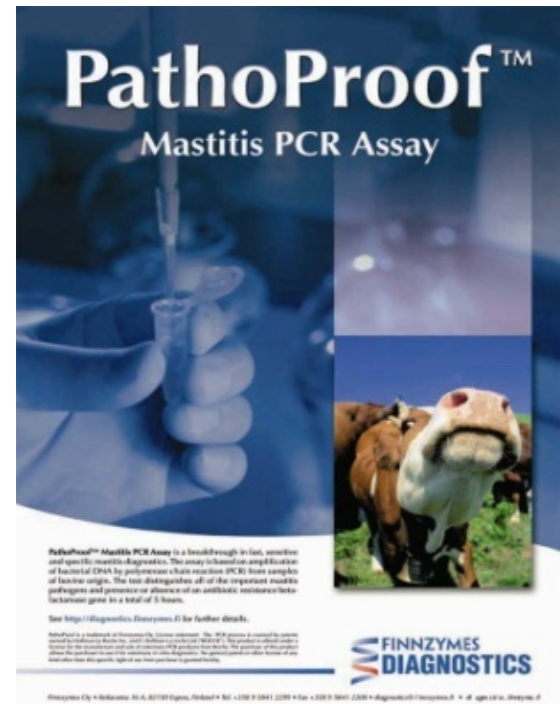
Beta-lactamase penicillin resistance gene

⇒ **These cover >95% of all clinical and subclinical mastitis cases**



Contagious pathogens assay

- ❑ Available during autumn 2009
- ❑ Detects all contagious pathogens associated with mastitis: *Staph. aureus*, *Strep. agalactiae* and *Mycoplasma sp.*
- ❑ Can be used for bulk tank testing, screening or DHI samples



PathoProof™
Mastitis PCR Assay

PathoProof™ Mastitis PCR Assay is a breakthrough in fast, sensitive and specific mastitis diagnosis. The assay is based on amplification of bacterial DNA by polymerase chain reaction (PCR) from samples of faecal origin. The test distinguishes all of the important mastitis pathogens and provides an absence of an antibiotic resistance beta-lactamase gene in a matter of 5 hours.

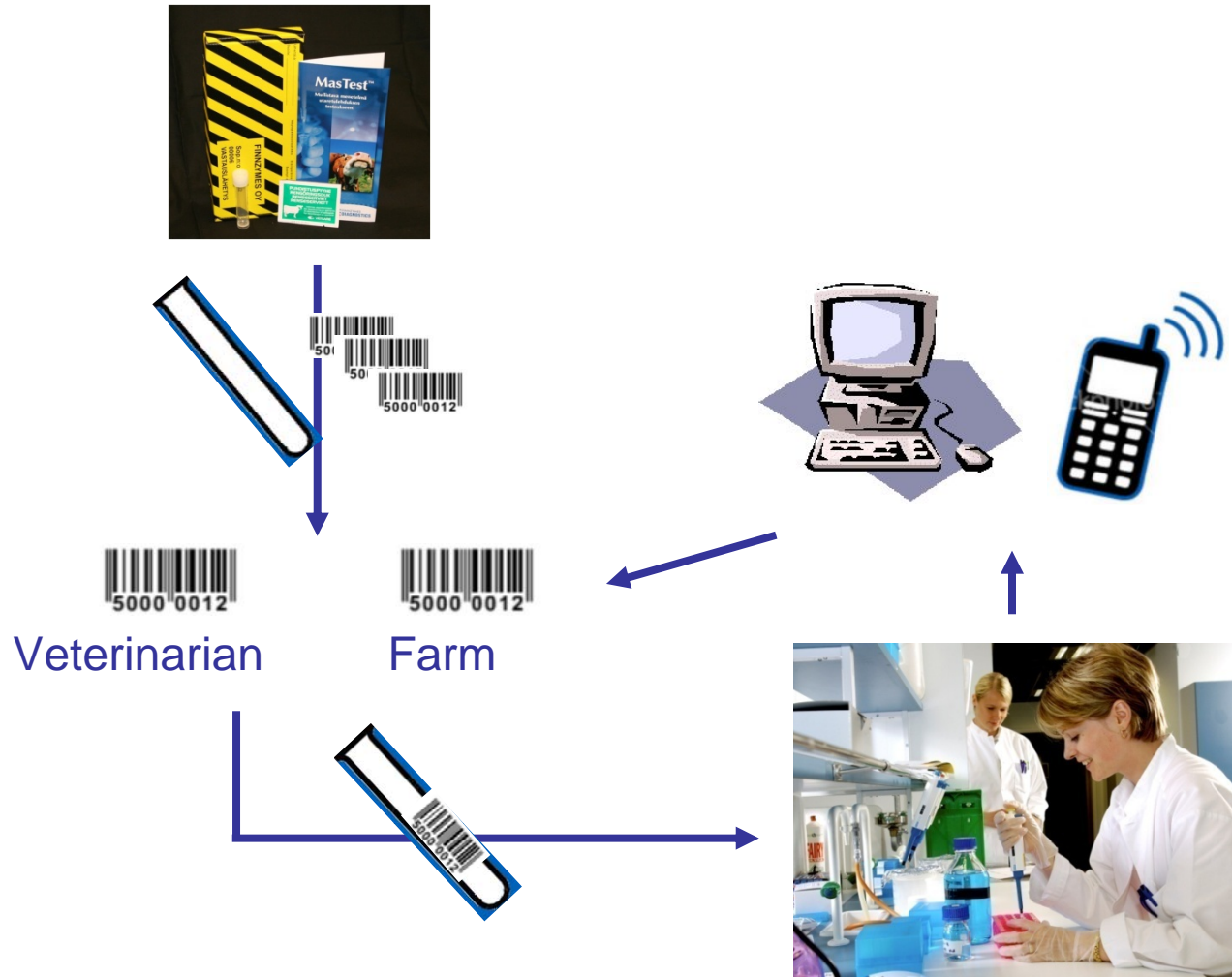
See <http://finnzymes.com/pathoproof> for further details.

PathoProof is a trademark of Finnzymes Oy, Finland. The PCR process is covered by patents owned by Finnzymes. All other trademarks are the property of their respective owners. The product is not intended for use in the European Union. The product is not intended for use in the European Union. The product is not intended for use in the European Union.

FINNZYMES
DIAGNOSTICS

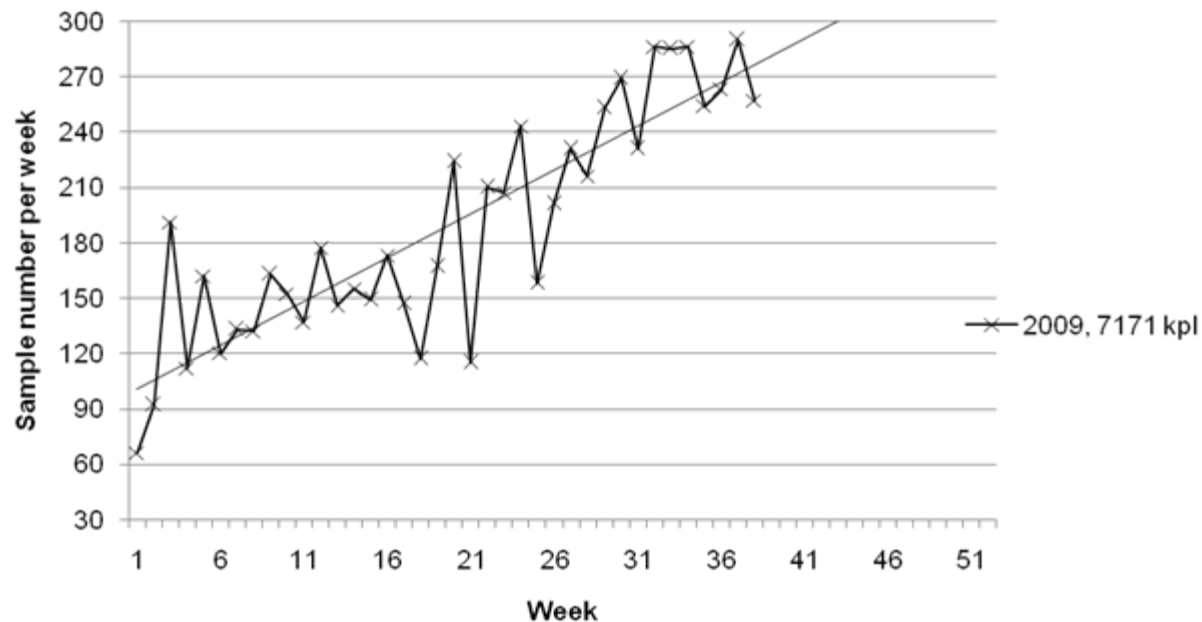
Finnzymes Oy • Helsinki, Finland • Tel: +358 9 2541 2200 • Fax: +358 9 2541 2200 • info@finnzymes.fi • www.finnzymes.fi

MasTest service in Finland



MasTest service in Finland

- ❑ 330 000 dairy cows
- ❑ Testing service started about 2 years ago
- ❑ Samples are sent per mail from all over Finland



Examples of PathoProof users in the world today

- ❑ DHI laboratories and bacterial culture laboratories from ~15 countries are already using the technology, only 12 months after launch
 - ❑ CanWest DHI, Canada
 - ❑ Lancaster DHI
 - ❑ SuisseLab, Switzerland
 - ❑ BioBest Laboratories, UK
 - ❑ Eurofins, Denmark / Danish Dairy Board
 - ❑ GD Deventer / QLIP, The Netherlands
 - ❑ LKV Weser-Ems, Germany
 - ❑ Valio, Finland
- ...and many more



PathoProof™ Mastitis PCR Assay

- ❑ Fast
- ❑ Accurate
- ❑ Sensitive
- ❑ Easy to use
- ❑ Can be used with:
 - preserved milk
 - quarter milk samples
 - DHI samples
 - bulk tank milk samples

