INQUIRY BASED BIOTECHNOLOGY

AMGEN® Biotech Experience

Scientific Discovery for the Classroom

Inquiry-based learning
Problem-solving
Peer tutoring
Collaboration
Deep learning
Future-proofing

THE AMGEN BIOTECH EXPERIENCE FOR STUDENTS

- Real-world, high tech, cutting edge
- Topical, relevant, high-profile
- Inclusive
- Raising awareness of 3rd level and career opportunities
- Informed healthcare decision-making
- Social, economic and ethical awareness

Developing Laboratory Skills

Microbiology through Inquiry

'Probiotics' and the Lactic Acid Bacteria

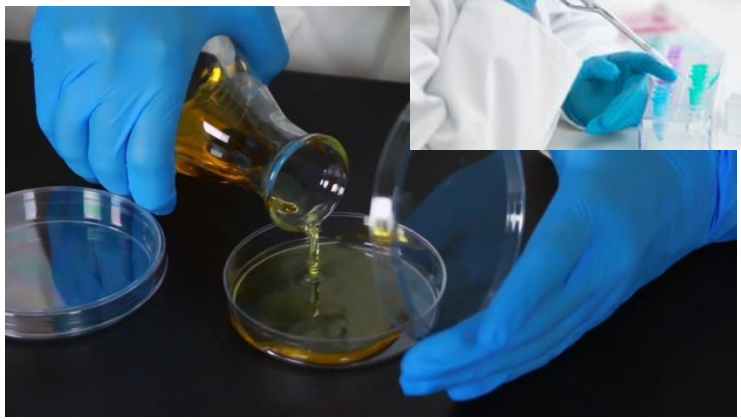
WHAT IS ACTIMEL?

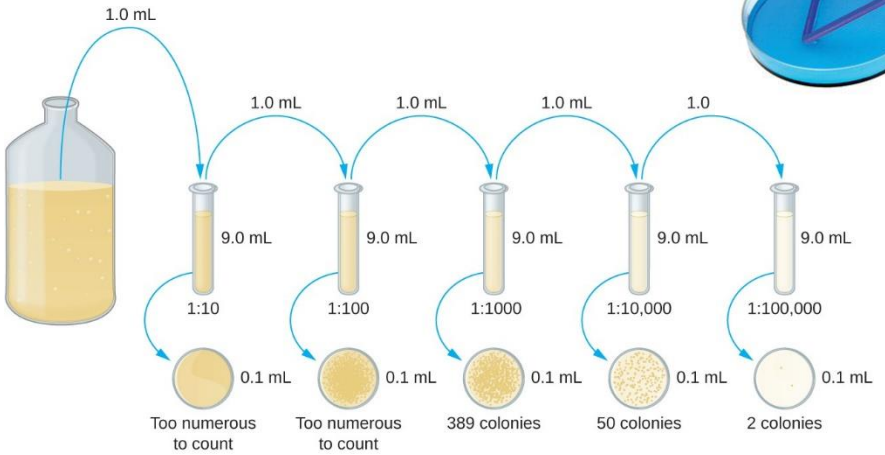
Actimel is a delicious fermented milk drink. It contains 10 billion exclusive L. casei cultures, Vitamins B6 and D in every bottle, making it a great way to start the day!

Actimel is available in a wide range of fabulous flavours, including four delicious fat free varieties and a specific range for kids.

THE LACTIC ACID BACTERIA

- Introduction to Biotechnology (and micro lab skills)
- Isolating bacteria from a “probiotic” yoghurt
- Estimating the number of bacterial cells in a yoghur





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Scientific Discovery for the Classroom


1.100
P.K
T.T
1:1,000
P.K
T.T
1:10,000
P.K
T.T
1:100,000
P.K
T.T

PCR IN THE SCHOOL LABORATORY

DNA ANALYSIS TO DETECT SHIGA TOXIN *E.COLI*

DR DECLAN CATHCART

INQUIRY-BASED BIOTECHNOLOGY

E. COLI AND SHIGA TOXIN

- Shiga toxin-producing *E.coli* (STEC) strains live in the guts of animals, primarily cattle
- The major source of human illness in cattle, but it is also passed from person to person
- Two main virulence factors
  - Shiga toxin (*stx*)
  - Intimin adhesin protein (*eaeA)*

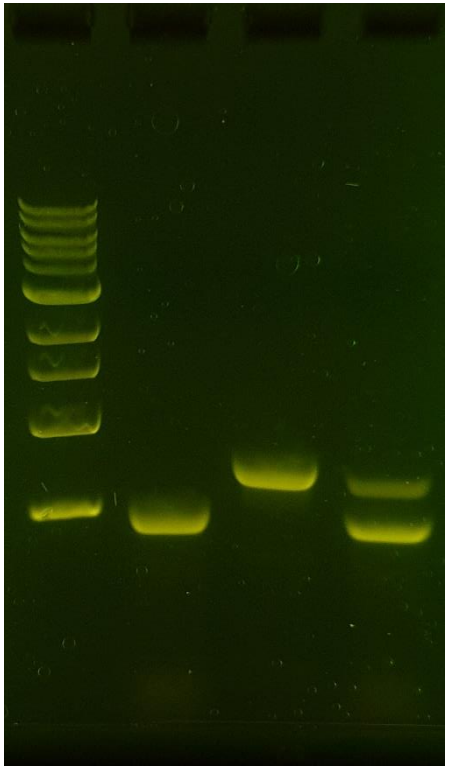
PCR PRIMER DESIGN

- **Degenerate primers are designed to amplify different versions of the *stx* genes (*i.e. stx1* and *stx2)*, and *eaeA* genes as well as known mutations**
- **Both pairs of primers may be used in the same PCR reaction**
- **This duplex PCR allows for the detection of either or both of the *stx* and *eaeA* genes**

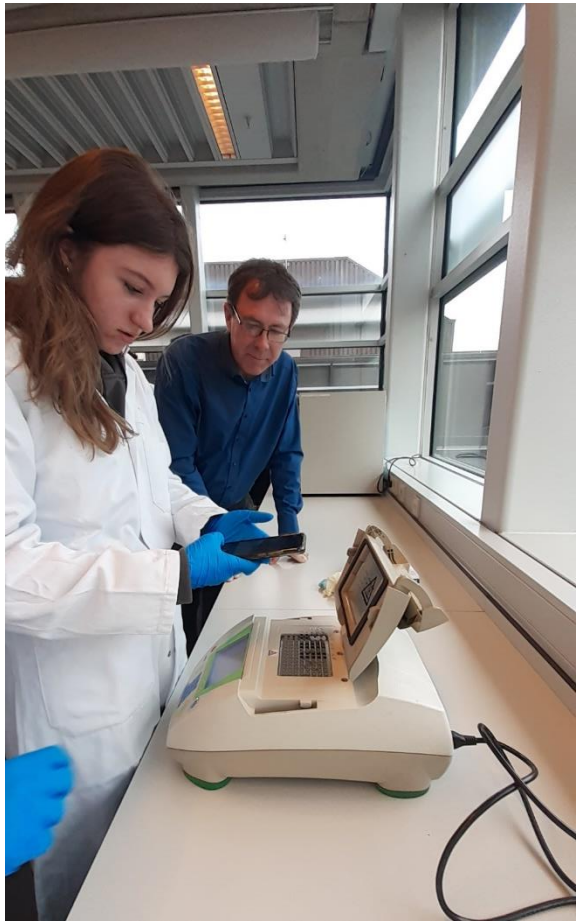
Name	DNA sequence	Function	PCR Product size (bp)
stxForwa	GAACAAAATAATTTATATGT	Forward *stx1* and *stx2*	
stxForwb	GAACGAAATAATTTATATGT	Forward *stx1* and *stx2*	
stxForwc	GAGCAAAATAATTTATATGT	Forward *stx1* and *stx2*	
stxForwd	GAGCGAAATAATTTATATGT	Forward *stx1* and *stx2*	
			526 (stx1) **523** (stx2)
stxReva	ATGATGATGACAATTCAGTAT	Reverse *stx1* and *stx2*	
stxRevb	ATGATGATGGCAATTCAGTAT	Reverse *stx1* and *stx2*	
stxRevc	CTGATGATGACAATTCAGTAT	Reverse *stx1* and *stx2*	
stxRevd	CTGATGATGGCAATTCAGTAT	Reverse *stx1* and *stx2*	
eaeForw	ACCCGGCACAAGCATAAG	Forward *eaeA*	
eaeAReva	CGTAAAGCGAGAGTCAATATA	Reverse *eaeA*	**741**
eaeARevb	CGTAAAGCGAGAGTCAATGTA	Reverse *eaeA*	
eaeARevc	CGTAAAGCGGGAGTCAATATA	Reverse *eaeA*	
eaeARevd	CGTAAAGCGGGAGTCAATGTA	Reverse *eaeA*	

AGAROSE GEL ELECTROPHORESIS

Ladder ***stx*** ***eaeA*** **duplex**



741 bp
522 bp



ABE NL SCIENCE ON STAGE

- **Utrecht, Nov 2021**