Short communication

Detection of Mastitis in Goat Milk using qRTPCR

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ARTICLE INFO	ABSTRACT
<p><i>Keywords:</i></p> <p>Alpine Goat</p> <p>Mastitis</p> <p>qRTPCR</p> <p><i>Listeria monocytogenes</i></p> <p><i>Staphylococcus aureus</i></p> <p><i>Samonella enterica</i></p> <p><i>Streptococcus agalactiae</i></p> <p><i>Streptococcus dysgalactiae</i></p> <p><i>Streptococcus uberis</i></p>	<p>Abstract</p> <p>Replicate milk samples were obtained from a herd of Alpine Goats on the research farm at Langston University in Langston, Oklahoma. Subsequent DNA extraction and quantitative real time PCR (qRTPCR) were conducted using Norgen Biotek Milk DNA Preservation and Isolation kit followed by amplification with an iQTM SYBR Green Supermix. Quantitative real time PCR assays detecting <i>Listeria monocytogenes</i>, <i>Staphylococcus aureus</i>, <i>Samonella enterica</i>, <i>Streptococcus agalactiae</i>, <i>Streptococcus dysgalactiae</i>, and <i>Streptococcus uberis</i> were conducted. These bacteria are all known to cause Mastitis. Mastitis is an inflammation of the udder that causes chemical changes in the composition of, and subsequent lowering of quality in the milk that is produced by affected goats, further causing difficulty affecting an entire dairy herd. This leads to huge economic losses for producers and risk to consumers. Early detection of pathogens that cause Mastitis should be included in routine diagnostic testing. This study shows a diagnostic procedure that can be utilized for the assessment of safe dairy products from Alpine goats. Presented here are the results of a healthy herd raised at the American Institute for Goat Research.</p>

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1. Introduction

Mastitis is an inflammation of the udder. This inflammation causes chemical changes in, and a lowering in quality of, milk produced by affected goats. The lowered quality subsequently affects production of additional commodities, like cheese. Mastitis is most commonly a development of infection by the following bacterium: *Listeria monocytogenes*, *Staphylococcus aureus*, *Samonella enterica*, *Streptococcus agalactiae*, *Streptococcus dysgalactiae*, and *Streptococcus uberis*. Mastitis can rapidly spread throughout a herd prior to the presentation of symptoms. In parlors using milk machines, bacterium on one udder quickly transfers from one goat to another. Once the goats present symptoms, most or all of the herd may be affected. This disease is costly in two ways: Veterinary costs of treating the goats; Loss in product and commodity as a result of infection/low quality milk.

Early detection of pathogens that cause mastitis will reduce the likelihood of mastitis outbreaks. Pathogens that cause mastitis could be detected early by routine diagnostic testing. Our study aims to identify a diagnostic procedure for utilization in assessment of safe dairy products from dairy goats. Presented here are the results of a healthy herd raised at the American Institute for Goat Research.

2. Materials and methods

Replicate milk samples were obtained from the herd of Alpine Goats on the research farm at Langston University in Langston, OK. DNA was extracted with a Norgen Biotek Milk DNA Preservation and Isolation Kit. DNA (Norgen Biotek (3430 Schmon Parkway Thorold, ON Canada, L2V4Y6) was amplified using an iQ™ SYBR Green Supermix. qRTPCR assays were conducted to detect: *Listeria monocytogenes*, *Staphylococcus aureus*, *Samonella enterica*, *Streptococcus agalactiae*, *Streptococcus dysgalactiae*, *Streptococcus uberis*. All primers for Mastitis causing bacteria were synthesized and obtained from Norgen Biotek.

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Results

Fig. 1. qRT-PCR analysis revealing Negative Controls were not detected, that the negative control samples did not begin amplification until following 30 cycles. Amplification signal in negative control samples prepared with all reaction components except the DNA template, referred to as a “no-template” or “primer-only” control.

Fig. 2. qRT-PCR analysis revealed samples with 18S Primers all amplified well. All began amplifying with this positive control in < 20 cycles.

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Fig. 3. qRTPCR analysis revealed Positive Controls (Bacterial DNA): Bacterial Primers combination showed success amplification.

Fig. 4. qRTPCR analysis revealed that unknown goat milk samples obtained from a herd from the American Institute for Goat Research did not have any presence of bacteria, thus The the herd under study was Mastitis free.

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Discussion

Our study detected zero markers for the presence of Mastitis causing bacteria in the selected herd. This method of detection is advantageous and will prevent the spread of Mastitis early if testing is conducted at regular times. The methods described can be utilized for regular disease diagnostics procedures on a number of infected, suspected samples. This method of detection can be used to prevent harmful, invasive diseases from crossing into areas where healthy livestock and/or people reside.

Conflict of interest statement

The authors have declared that no conflict of interest exists.

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