OMICS International
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J Veterinar Sci Technol 2015, 6:6
http://dx.doi.org/10.4172/2157-7579.C1.013

2nd Indo-Global Summit & Expo on

Veterinary

October 26-28, 2015 Hyderabad, India

Development of PCR-based detection and quantification of animal fibers from textile materials

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There is worldwide demand of animal specialty fiber made shawls and apparels. Because of its scarce availability and lack of fast and reliable techniques to ascertain its origin in textile blends, false declaration of the apparels composition can be made in textile trade and commerce. The rapid development of molecular genetic analysis tools has made it possible to analyze most biological material having nucleic acids intact enough to amplify with PCR. We have developed a method which allows for the reliable detection of the purity of pashmina textiles up to 10% level. A patent for this work has already been filed to Indian Patent Office Patent No-3400/DEL/2012. Further we have optimized novel primers for amplification of rabbit specific DNA from rabbit hair in textile blends. This developed PCR analytical method can quickly extract total DNA i.e., nuclear DNA (nuDNA) and mitochondrial DNA (mtDNA) from raw or chemically finished animal fibers. Further, we are working to quantify animal origin fibers (sheep, goat, Yak, rabbit, camel and silk) in finished textile products. Such efforts will help to combat adulteration or false declaration and will ensure adherence to the international trading agreements and would provide protection to local manufacturer involved in specialty animal fiber-based cottage industry.

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Exhaled breath condensates-source of biomarkers of respiratory disease in animals

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Respiratory diseases are major problem for dairy producers. These diseases are commonly associated with calves and dairy cows. Exhaled breath condensate (EBC) is a source of biomarkers of lung disease. EBC is an exhalate from breath which is condensed by cooling using a collection device. Exhaled breath consist of volatile substances such as carbon dioxide, nitric oxide, ethane, pentane and non-volatile compounds such as hydrogen peroxide, eicosanoids, cytokines, electrolytes and water vapor and bio-aerosols (bacteria, viruses, fungi) that derive from the respiratory tract. Concentrations of these substances are influenced by lung diseases and modulated by therapeutics treatment. Aldehydes like hexanal, heptanal are lipid peroxides their concentration in the EBC indicates oxidant induced damage. The oxidative biomarkers like H_2O_2 & NO are present in the exhaled breath and their concentration indicates the lung condition. H_2O_2 is released from activated inflammatory cells during respiratory burst. Nitric oxide (NO) originates from endogenous sources such as alveoli, airway epithelium and inflammatory cells. PH of EBC also changes in respiratory diseases. EBC can be performed in conscious as well as anesthetized animals. EBC is a non-invasive method, simple to perform, can be repeated frequently. The invasive methods commonly used to analyze immune parameter and inflammatory mediators in the lung of animals are like bronchoalveolar lavage, lung biopsy. EBC method is one of the diagnostic tool usually practice in humans for lower respiratory tract diseases but only few studies available in veterinary medicine. EBC can be collected successfully in animals but interpretation of results is difficult due to the wide range of the concentration of inflammatory markers in healthy animals. Future work is necessary to determine normal ranges for values of inflammatory markers in large number of different animals and to investigate change associated with lung diseases.

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