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Comparison of DNA extraction methods for polymerase chain reaction amplification of guanaco (*Lama guanicoe*) fecal DNA samples

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ABSTRACT. Feces-based population genetic studies have become increasingly popular. However, polymerase chain reaction (PCR) amplification rates from fecal material vary depending on the species, populations, loci, and extraction protocols. Here, we assessed the PCR amplification success of three microsatellite markers and a segment of the mitochondrial control region of DNA extracted from field-collected feces of guanaco (*Lama guanicoe*) using two protocols - Qiagen DNA Stool Kit and 2 cetyltrimethylammonium bromide/phenol:chloroform:isoamyl alcohol (2CTAB/PCI) method. Chelex resin treatment to remove inhibitors was also tested. Our results show that the mitochondrial locus was the most difficult to amplify. PCR success rates improved for all markers after Chelex treatment of extracted DNA, and 2CTAB/PCI method (95.83%) appeared to perform slightly better than

stool kit (91.67%) for the nuclear markers. Amplification success was significantly influenced by the extraction method, Chelex treatment, and locus ($P < 0.001$) but not by the freshness of the feces (fresh *vs* old, $P = 0.17$). The repeatability levels were high without Chelex treatment (> 0.89), but they decreased slightly after treatment for amplification of nuclear markers and markedly after treatment for amplification of the mitochondrial control region. Thus, we showed that Chelex treatment gives high PCR success, especially for nuclear markers, and adequate DNA extraction rates can be achieved from *L. guanicoe* feces even from non-fresh fecal material. Although not significant, 2CTAB/PCI method tended to provide higher successful amplification rates on a whole set of samples, suggesting that the method could be particularly useful when using small sample sizes.

Key words: Non-invasive genetics; Mitochondrial control region; Microsatellites; Polymerase chain reaction inhibitors; Chelex treatment; *Lama guanicoe*

