

Diagnosis of *Burkholderia pseudomallei* in Soil Samples from Goat Farms in the Lower Northeastern Region

Niramol Sriwongsa^{1,*}, Kan Saratho¹ and Aroonpan Prerdprao¹

Abstract

Background: Melioidosis is a severe infectious disease caused by the environmental bacterium *Burkholderia pseudomallei*. Livestock, particularly goats, have been identified as the most susceptible species to *B. pseudomallei* infection, showing the highest morbidity rate and causing significant economic losses due to high mortality and abortion rates. This disease is prevalent in the lower northeastern region of Thailand. Soil serves as a critical reservoir for the pathogen, posing a health risk to both animals and humans.

Objective: This study aimed to investigate the contamination of *B. pseudomallei* in soil at three different depths (surface soil, 15 cm, and 30 cm) and to evaluate the antimicrobial susceptibility of the isolated strains from goat farms in the lower northeastern region.

Methods: A total of 69 soil samples were collected from 23 sampling points at three depths: surface soil, 15 cm, and 30 cm. The samples were analyzed using culture techniques with Threonine Basalt Salt Solution (TBSS) and Modified Ashdown's agar (ASH). Microbial identification was confirmed by polymerase chain reaction (PCR) using specific primers targeting the genomic region TTS1-orf2 (BpTT4176F: 5'-CGTCTCTATACTGTCGAGCAATCG-3', BpTT4290R: 5'-GTGCACACCGGTCAGTATC-3'), yielding a 115 bp PCR product. Antimicrobial susceptibility testing was performed using the disk diffusion method against 10 antibiotics: amoxicillin, colistin, gentamicin, cefotaxime, ceftazidime, ciprofloxacin, doxycycline, norfloxacin, ofloxacin, and tetracycline.

Results: *B. pseudomallei* was isolated from 27.54% (19/69) of the soil samples. The detection rates were 8.70% (6/69) at the surface level, 10.14% (7/69) at a depth of 15 cm, and 8.70% (6/69) at a depth of 30 cm. Antimicrobial susceptibility testing revealed that 100% (19/19) of the isolates were susceptible to cefotaxime, ceftazidime, ciprofloxacin, doxycycline, norfloxacin, ofloxacin, and tetracycline. Conversely, all isolates exhibited resistance to amoxicillin, gentamicin, and colistin.

Conclusion: The findings demonstrate that *B. pseudomallei* persists at various soil depths within goat farm environments. Soil contamination, especially during high-moisture periods such as the rainy season, indicates an increased risk of melioidosis transmission to both livestock and humans in this region. Antimicrobial susceptibility testing of the soil isolates demonstrated 100% susceptibility to ceftazidime and doxycycline. Conversely, complete resistance was observed against amoxicillin, gentamicin, and colistin.

Keywords: *Burkholderia pseudomallei*, Melioidosis, Goat

¹ Veterinary Research and Development Center (Lower Northeastern Region), 291, Moo.9, Nabua, Muang Surin, Surin, Thailand 32000

* Corresponding author; E-mail: Niramolsriwongsa@gmail.com