

repeated on NA plates until pure cultures were obtained. Air-dried smears from NA cultures were stained using the Difco Gram-staining kit, according to the manufacturer's instructions. Cell morphology was examined by scanning electron microscope. Biochemical tests were performed using API 50 CHB according to the manufacturer's instructions. The enzymatic profile was performed by using the API ZYM commercial kit. Antimicrobial activity was measured by disc diffusion method. Growth characteristics were examined using nutrient broth as a basal medium. The optimum temperature was determined at various temperatures of 30 to 42°C. The optimum pH was determined over a pH range of 5.0 to 9.0. For deodorization testing, fecal samples were collected, and then 500 g of the sample was treated with the mixture of strain KBNP-BS3 and 3 natural product (Green tea, Mugwort, and Curcuma longa L.) extracts, respectively.

Results: A Gram-positive, rod-shaped, spore-forming, and mesophilic bacterial strain, KBNP-BS3, was isolated from Cheonggukjang. Optimal growth of KBNP-BS3 requires the presence of a pH of 7.0 and a temperature of 37°C. The whole cell fatty acid profile of the isolate includes anteiso-C_{15:0}, iso-C_{15:0}, and iso-C_{17:0} as major fatty acids. This is consistent with corresponding data for *B. subtilis*. Phylogenetic analyses of 16S rDNA gene sequences place this bacterium in the 'Firmicutes', within the genus *Bacillus*. Sequence similarity analysis indicates that the closest relatives of strain KBNP-BS3 are *Bacillus subtilis* YNB151. Thus strain KBNP-BS3 represents a species *subtilis* of the genus *Bacillus*, for which the name *B. subtilis* strain KBNP-BS3 is proposed. In the test result of deodorization, the mixture of strain KBNP-BS3 and green tea extracts had good deodorization effect against odor-causing compounds of the fecal samples.

Conclusions: The present study represents the characterization of *B. subtilis* strain KBNP-BS3 isolated from Cheonggukjang, showing a good reducing capacity against odor-causing compounds associated with livestock operations. These features make it a very attractive probiotic for potential application as livestock-environment improving agent.

References

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Management of warning system and national surveillance of *Culicoides* biting midges transmitting arboviruses on cattle farm

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Introduction: A nationwide vector surveillance program with early warning system, the five bovine arthropod-borne viruses (arboviruses), was initiated in South Korea. Bovine arboviruses are mainly transmitted by blood-sucking arthropods, such as, *Culicoides* biting midges and ticks. Aino virus (AINOV) and Akabane virus (AKAV), in the family *Bunyaviridae*, are among the arboviruses that cause disease outbreaks in cattle. Bovine ephemeral fever virus (BEFV) is classified into the family *Rhabdoviridae* and is known to cause an acute febrile disease. Chuzan virus (CHUV) and Ibaraki virus (IBAV) belong to the family *Reoviridae* and cause reproductive disorders, fever, anorexia. This study described that the result of the arboviruses surveillance conducted by collecting *Culicoides* biting midges in 2015.

Materials and Methods: Arboviruses vector surveillance was conducted by collecting from 4 sites nationwide on cattle farm. *Culicoides* biting midges were caught on a weekly basis using a light trap (SNC, Korea). *Culicoides* species (~60) were pooled into one sample and the sample tubes were subjected to RT-PCR for detecting five arboviruses. The PCR was performed on by RT-PCR kit (Arbovirus RT-PCR, Median diagnostic. Korea). The infection rate and identification of vector species were investigated from May to September 2015.

Results: *C. puntatus* was the most commonly collected species (51.1%), followed by *C. arakawae* (40.0%) and *C. maculatus* (8.6%). *C. homotomus* and *C. sumatrae* were identified on Jeju. The different abundance of *C.* species may be attributed to the fact that the Jeju is more southern region than the others. A total of 174 pooled samples of *Culicoides* biting midges were tested to detect the presence of arboviruses: CHUV was detected on July, Jeonju city. But it did not provide the precautionary attention level at detection rate.

Conclusions: The detection rate of the *Culicoides* biting midges is one of the important factors to predict the possibility of outbreak of arbovirus diseases. By analyzing the surveillance data, the livestock producer can be provided with vital information on when and where arboviruses are active, which may be helpful to prevent potential outbreaks.

References

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The Effect of Fermented Red Ginseng Marc in Swine

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