

## Potent and rapid antibacterial activity of the Protegrin-1 and its derivatives against different bacterial pathogens of animal production

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### Abstract

**Statement of the Problem:** Antibiotics have been used routinely in pig and poultry production, however, improper use of antibiotics has caused serious environmental and health risks, in particular antimicrobial resistance. Due to their unique mode of action, antimicrobial peptides are novel alternatives to traditional antibiotics for tackling the issue of bacterial drug resistance.

**Methodology & Theoretical Orientation:** Protegrin-1 (PG-1) is an 18-amino-acid beta-hairpin antimicrobial peptide found in porcine leukocytes and belongs to the cathelicidin family. It exhibited antimicrobial activity against many bacteria, fungi, and some enveloped viruses. In search for novel effective agents to combat swine and poultry gastrointestinal infections, a series of the PG-1 peptide and its truncated derivatives were synthesized chemically and their antibacterial activities were assessed.

**Findings:** Among the peptides tested, PG-11, PG-12, and PG-13 peptides, which were the modified peptide of the parental PG-1 peptide, clearly demonstrated potential inhibitory activity against colistin resistant *Listeria monocytogenes* and tetracycline resistant *Salmonella typhimurium* with 100 µg/ml. Decreasing the cationicity and increasing random coil percentage of PG-1 increased the potency against intestinal bacteria.

**Conclusion & Significance:** The shortest PG-13 peptide is a promising antibacterial agent against intestinal pathogens of swine and poultry.

### Image

	Tetracycline resistant <i>Salmonella typhimurium</i>	Colistin resistant <i>Listeria monocytogenes</i>
PG-1	–	+
PG-11	+	+
PG-12	+	+
PG-13	+	+

**Figure 1:** Antimicrobial activity of PG-1 derivative peptides against clinically isolated antibiotic resistant bacteria.



### Biography:

Cher-un Limyada has completed her PhD in Cellular and Molecular Biology. She has experience in animal product research with Vet Products Research and Innovation Center for three years. She has built this research for a year with National Center for Genetic Engineering and Biotechnology, Thailand. Since peptides were found to an alternative antibiotic and warrant further development as a novel therapeutic for treatment of bacteria in animal production.

### Speaker Publications:

1. Kang H K and Kim C; “The therapeutic applications of antimicrobial peptides (AMPs): a patent review”; The journal of microbiology / (2017) 55(1):1-12.
2. Teerapo K, Roytrakul S, Sistayanarain A and Kunthalert D; “A scorpion venom peptide derivative BmKn-22 with potent antibiofilm activity against *Pseudomonas aeruginosa*”; PLoS ONE/ (2019) 14(6):e0218479.

[7<sup>th</sup> World Congress and Exhibition on Antibiotics and Antibiotic Resistance](#); London, UK- March 16-17, 2020.

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