

Hydrolytic activity determination of Tail Tubular Protein A of *Klebsiella pneumoniae* bacteriophages towards saccharide substrates.

Autorzy

Ewa Brzozowska

Anna Pyra

Krzysztof Pawlik

Monika Janik

Sabina Górską

Natalia Urbańska

Zuzanna Drulis-Kawa

Andrzej Gamian

Rok wydania

2017

Czasopismo

Scientific Reports

Numer woluminu

7

Strony

18048/1-18048/9

DOI

10.1038/s41598-017-18096-1

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

In this paper, the enzymatic activity, substrate specificity and antibiofilm feature of bacteriophage dual-function tail proteins are presented. So far, tail tubular proteins A–TTPAgp31 and TTPAgp44–have been considered as structural proteins of *Klebsiella pneumoniae* bacteriophages KP32 and KP34, respectively. Our results show that TTPAgp31 is able to hydrolyze maltose as well as Red-starch. The activity of 1 μ M of the protein was calculated as 47.6 milli-Units/assay relating to the α -amylase activity. It degrades capsular polysaccharides (cPS), slime polysaccharides (sPS) and lipopolysaccharide (LPS) of *K. pneumoniae* PCM 2713 and shows antibiofilm reactivity towards *S. aureus* PCM 519 and *E. faecalis* PCM 2673. TTPAgp44 hydrolyses trehalose and cPS of *E. faecium* PCM 1859. TTPAgp44's activity was also observed in the antibiofilm test against *P. aeruginosa* PCM 2710 and *B. subtilis* PCM 2021. TTPAgp31 has been identified as α -1,4-glucosidase whereas, TTPAgp44 exhibits trehalase-like activity. Both proteins contain aspartate and glutamate residues in the β -stranded region which are essential for catalytic activity of glycoside hydrolases. The significant novelty of our results is that for the first time the bacteriophage tubular proteins are described as the unique enzymes displaying no similarity to any known phage hydrolases. They can be used as antibacterial agents directed against bacterial strains producing exopolysaccharides and forming a biofilm.

Licencja otwartego dostępu

CC-BY

Licencja na prawach której można swobodnie kopiować, rozprowadzać, zmieniać i remiksować objęty prawem autorskim utwór (Utwór-przedmiot prawa autorskiego) pod warunkiem podania imienia i nazwiska autora utworu pierwotnego oraz źródła pochodzenia utworu.

Pełny tekst licencji:

<https://creativecommons.org/licenses/by/3.0/pl/legalcode>

Adres publiczny

<http://dx.doi.org/10.1038/s41598-017-18096-1>