In vitro cytotoxicity assessment of cellulase and ceftazidime combinations with non-antibiotic drugs on human cell lines

Komal Khajuria, Neha Sharma*, Rajesh Singh Tomar & Vinay Dwivedi

Amity University Madhya Pradesh, Maharaj Pura Dang, Gwalior, Madhya Pradesh, India

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The rapid emergence of multidrug-resistant (MDR) bacteria has reduced the effectiveness of existing antibiotics, highlighting the demand for novel therapeutic strategies. Drug repurposing, particularly in combination with enzymes such as cellulase, represents a novel approach to enhance antimicrobial efficacy while minimizing host cytotoxicity. This study explores the *in vitro* cytotoxicity of cellulase in combination with the antibiotic ceftazidime (CAZ) and non-antibiotic drugs anti-inflammatory (AI) and anti-diarrheal (AD) on human cell lines (HEK-293 and THLE-2). The MTT assay was conducted to evaluate the cytotoxic effects of Sample-1 (CELLULASE +CAZ+AI), Sample-2(CELLULASE +CAZ+AD) and cellulase (control) on HEK-293 and THLE-2 cell lines. The cell viability percentage was measured at 570nm on different concentrations for both samples (62.5, 125, 250, 500, and 1000µg/mL). The results indicated a dose-dependent reduction in cell viability for Sample-1 and Sample-2, whereas cellulase exhibited a relatively stable and biocompatible profile. The untreated control cells maintained 100% viability. The present study reveals sample-1 demonstrated the highest cell viability, reaching approximately 88.5% and sample-2 closely followed by 87.5% at 62.5µg/mL and 125µg/mL respectively. MTT assay showed slight reduction in cell viability at 250µg/mL and beyond. Further investigations, including *in vivo* studies, are needed to determine the clinical implications of these interactions. In conclusion these findings confirm that sample-1 and sample-2 combination showed maximum cell viability with minimum cell cytotoxicity and making it a promising future option for treating resistant bacterial infections.

Keywords: Multidrug resistance, Drug repurposing, Ceftazidime, Cellulase, HEK-293, THLE-22