ISOLATION AND TOXIN TYPING OF *CLOSTRIDIUM PERFRINGENS* FROM SUNGAI SELANGOR AND SUNGAI BERNAM

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ABSTRACT

Clostridium perfringens (CP) is an anaerobic, spore forming bacterium that is emerging as a preferred faecal pollution indicator. In the local scene, little is known about the density and toxinotype of CP in river water, and how does river discharge affects the density. Therefore, water samples were taken from three Malaysian rivers, Sungai Bernam, Sungai Selangor and Tengi Canal between April 2007 and January 2008 to examine the CP densities and toxinotypes. The rivers were selected because of their differences in adjacent land usage. Sungai Selangor reported lower CP isolation rate ranging between 0 to 25% but higher CP densities of <1 to 2695 cfu/100ml. In contrast, CP isolation rates in Sungai Bernam were higher at 0 to 35% but the densities were lower at <1 to 763 cfu/100ml. Tengi Canal showed the lowest CP isolation rate of 0 to 10% and CP densities of <1 to 212 cfu/100ml. Sulphite reducing Clostridia (SRC) were consistently present, and the densities were significantly different temporally in each of the study sites. The highest CP and SRC densities were in the downstream of Sungai Selangor. No significant correlation was found between CP densities and river discharge in all the study sites. Toxinotyping was performed with Polymerase Chain Reaction (PCR) using published primer sequences, and multiplex primers designed specifically to include also the detection of enterotoxin (CPE) gene. All 142 CP isolates found in this study belonged to *Clostridium perfringens* Type A. Five of the isolates also harboured CPE gene.

ABSTRAK

Clostridium perfringens (CP) ialah sejenis bakteria anaerobik dan penghasil spora yang kini semakin kerap dijadikan sebagai petunjuk pencemaran najis. Namun, kepekatan CP dan jenis toksin CP dalam air sungai negara kita, serta kesan luahan sungai terhadap kepekatan CP adalah kurang diketahui. Maka, sampel air telah diambil daripada Sungai Bernam, Sungai Selangor dan Terusan Tengi dalam tempoh April 2007 hinggga Januari 2008 untuk mengkaji kepekatan dan jenis toksin CP. Tiga sungai tersebut dipilih kerana kegunaan tanah sekeliling yang berbeza. Sungai Selangor melaporkan kadar isolasi CP yang lebih rendah dalam lingkungan 0 hingga 25% tetapi kepekatan CP sungai tersebut adalah lebih tinggi iaitu <1 hingga 2695 cfu/100ml. Sebagai perbandingan, kadar isolasi CP di Sungai Bernam adalah lebih tinggi dengan 0 hingga 35% tetapi kepekatan CP adalah lebih rendah iaitu <1 hingga 763 cfu/100ml. Terusan Tengi mencatatkan kadar isolasi dan kepekatan CP yang paling rendah, iaitu 0 hingga 10% dan <1 to 212 cfu/100ml. Clostridia penurun sulphite (SRC) didapati sentiasa wujud. Dalam setiap tapak kajian, kepekatan SRC sepanjang tempoh kajian menunjukkan perbezaan yang nyata. Kepekatan CP dan SRC yang tertinggi dicatitkan di hilir Sungai Selangor. Tiada hubungan yang nyata wujud di antara kepekatan CP dan luahan sungai di kesemua tapak kajian. Jenis toksin ditentukan melalui PCR dengan menggunakan turutan primer yang telah diterbitkan, dan juga primer multipleks yang direka khas untuk turut mengesan kehadiran gen enterotoksin (CPE). Kesemua 142 koloni CP yang diperolehi dalam kajian ini tergolong kepada CP jenis toksin A. Lima daripada jumlah koloni itu juga mempunyai gen toksin CPE.

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TABLE OF CONTENTS **Page**

TABLE OF CONTENTS **Page**

TABLE OF CONTENTS **Page**

TABLE OF CONTENTS **Page**

TABLE OF CONTENTS **Page**

LIST OF FIGURES

LIST OF FIGURES

LIST OF TABLES