



Chapter 18

Screening of Endosymbionts for EPS Production for Enhancement of Symbiotic Proficiency with the Host

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Abstract

The microbial loop is a central system in the rhizosphere, where most microbes compete, and their various activities establish a distinct soil microflora. These microorganisms include bacteria, fungi, protozoa, viruses, and mold which may produce antibiotics, exopolysaccharide (EPS), and organic acid or act as bacterivorous organisms. Endosymbionts are organisms that live inside a host in a symbiotic relationship without causing harm. The biologically active compounds or metabolites produced by endosymbionts benefit the host. EPSs are high molecular weight polymeric molecules composed of sugar residues. The characteristic properties of EPS such as high water holding capacity, protection against biotic and abiotic stress, and nutrient acquisition benefit both the producing endosymbionts and their host. The ability of endosymbionts to produce EPS enhances their symbiotic association with the host. EPS producers thus play an important role in soil fertility and crop sustainability. The present protocol briefly describes methods for screening EPS-producing endosymbionts.

Key words Exopolysaccharides, Symbiosis, Negative staining, Methylene blue, Biofilm

1 Introduction

Endosymbiosis is the ability of an organism to live inside a host in a symbiotic association without any harm and often benefits the host. Endophytes are a significant source of unique metabolites and potential bioactive compounds [1]. The horizontal gene transfer among the host and its endosymbionts can enable the synthesis of metabolites similar or identical to those produced by the host itself [2].

Exopolysaccharides (EPSs) are polymeric metabolic products synthesized and secreted surrounding the bacterial cell surface [3]. EPSs consist of various organic and inorganic substances, among which carbohydrates are the prime constituent. Their composition and structure are widely variable; EPS may be