

Optimizing Culture Condition for MK1 Strain Producing Exopolysaccharide

Jeong Eun Ryu* and Young Nam Lee

Division of Life Sciences, Chungbuk National University

MK1 strain isolated from soft-rotten tissue of Neung-ee mushroom (*Sarcodon aspratus*) is presumably a novel bacterium producing a copious amount of exopolysaccharides (EPSs). First, optimizing culture conditions for growth of MK1 were elucidated (*i.e.* carbon, nitrogen, and carbon/nitrogen ratio, and various environmental factors). Glucose, galactose, fructose, and sucrose were able to support MK1 growth, but were lactose, starch, and dextrin not. Optimal growth of MK1 was obtained with 2% glucose, ammonium sulfate with 10:1~40:1 C/N (w/w) at pH 7.0, 30 °C, and 150 rpm. Second, investigation of MK1 EPS which seems to stimulate macrophage was made. Element composition of EPS produced by MK1 grown in glucose (2%) containing mineral salts medium (pH 7.0) were carbon (37.1%), nitrogen (2.2%), oxygen (49.3%), and hydrogen (6.4%), but no sulfate. fruEPS (EPS obtained from fructose medium) showed similar composition. Paper chromatography revealed that both glu- and fru EPSs were hetero-acidic-polysaccharide containing uronic acid, rhamnose, fructose, and glucosamine or galactosamine. EPSs obtained at various medium pH were different in viscosity, texture, and their sugar composition. The relative viscosities (η_{rel}) of gluEPS (10% w/v) obtained from medium pH 6.0 and 7.5 were 1.18, and 1.36, respectively. And those of fruEPS (10% w/v) were 1.19, and 1.47, respectively. Freeze-dried gluEPSs obtained at low pH (6.0 and 6.5) were fine crystals and less water-soluble, whereas those obtained at high pH medium (7.0 and 7.5) were rather gluey and water-soluble. Scanning electron microscope of EPSs revealed change in morphology from crystalloid (about 5- 40 μ m) to glutinous (about above 100 μ m) by increase of medium pH. Sugar compositions of EPSs obtained from different medium pH were dissimilar, *that is*, no fructose and uronic acids found in EPS obtained at pH 7.5.