Screening for natural inhibitors of penicillinase by copolymerization of hydrolyzed starch or glycogen in sodium dodecylsulfate polyacrylamide gels for detecting penicillinase activity

梁文俐
Liang WL;Huang HM;Lin RD;Hou WC

Abstract

The 0.08% hydrolyzed starch or glycogen were copolymerized in 7.5% or 10% sodium dodecylsulfate polyacrylamide gels. After electrophoresis and SDS removal, the commercial penicillinase in gels was reacted with penicillin G (100 mg in 50 mL, 0.1 M phosphate buffer, pH 7.0) for 30 min and then stained with 0.6% I2 in 6% KI solutions. The clear zone of penicillinase activity bands stood out against purple or orange-red backgrounds, respectively, for hydrolyzed starch or glycogen used. This activity staining method was used successfully to detect commercial penicillinase activities from Bacillus cereus and the cultured methicillin-resistant Staphylococcus aureus ATCC 33591 strain. This activity staining method was also applied to penicillinase natural inhibitor screenings. It was found that anthraquinone-related compounds, such as aloe-emodin, emodin and rhein, could inhibit penicillinase activity. This fast and sensitive method can be used in the process of penicillinase purification, characterization and inhibitor screening.

Keywords: Activity staining; Anthraquinone; Copolymerization; Penicillinase; SDS-PAGE.