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ANALISIS ADHESI IN VITRO PADA EPITEL USUS LELE, KETAHANAN ASAM, DAN GARAM EMPEDU BAKTERI PROBIOTIK
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ABSTRAK

Kemampuan adhesi bakteri ke sel epitel usus, ketahanan terhadap asam, dan ketahanan terhadap garam empedu merupakan syarat utama yang harus dimiliki bakteri probiotik. Koleksi bakteri probiotik di Departemen Perikanan UGM berasal dari saluran pencernaan ikan kakap merah (*Lutjanus* sp.), kerapu (*Epinephelus* sp.), cumi-cumi (*Loligo* sp.), sotong (*Sepia* sp.), gurita (*Octopus* sp.) dan bandeng (*Chanos chanos*) dan menurut beberapa penelitian sebelumnya akan lebih baik apabila probiotik diisolasi dari saluran pencernaan ikan itu sendiri, sehingga kemampuan daya hidupnya dalam saluran pencernaan ikan sudah teruji. Tujuan dari penelitian ini yaitu untuk mengetahui suhu inkubasi sel epitel usus ikan lele terbaik untuk pengujian adhesi secara *in vitro*, mengetahui waktu inkubasi, suhu inkubasi, dan kepadatan bakteri probiotik terbaik untuk pengujian adhesi secara *in vitro*, mengetahui kemampuan adhesi strain bakteri probiotik pada jaringan epitel usus ikan secara *in vitro*, dan mengetahui kemampuan pertumbuhan strain bakteri probiotik terhadap berbagai variasi derajat keasaman dan garam empedu. Probiotik yang digunakan antara lain JT3, T3P1, PCP1, JC5, JC20, JC28, JC25, JC10, JC18, T3A, T2A, JC32, JC33, JC31, dan JM4. Penelitian ini menggunakan metode eksploratif dan deskriptif yang terdiri dari pengujian kemampuan adhesi *in vitro* serta ketahanan asam dan garam empedu probiotik. Pengujian adhesi in vitro meliputi teknik optimasi metode terlebih dahulu dengan beberapa bakteri, setelah optimasi, semua bakteri diuji adhesi secara *in vitro* dengan kristal violet. Pengujian ketahanan asam dan garam empedu dilakukan dengan 5 tingkat keasaman yaitu pH 2+0,5% garam empedu, pH 3+0,5% garam empedu, pH 4+0,5% garam empedu, pH 5+0,5% garam empedu, dan pH 7+0,5% garam empedu. Hasil pengujian adhesi *in vitro* menunjukkan 10 bakteri yang memiliki kemampuan lebih baik dan sama dengan *L.casei* Shirota. Hasil pengujian ketahanan asam dan garam empedu menunjukkan 10 bakteri (JT3, PCP1, JC5, JC20, JC28, JC25, JC10, JC18, JC33, dan JC32) yang diuji memiliki ketahanan terhadap asam (pH 2, 3, 4, dan 5) dan garam empedu.

Kata kunci : Probiotik, adhesi bakteri, toleransi asam, toleransi garam empedu, sel epitel usus.

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ABSTRACT

The bacterial adhesion into intestinal epithelial cells, resistance to acids, and resistance to bile salt are the essential requirements for development of probiotic candidate bacteria. The probiotic bacterial strains in the Department Fisheries UGM comes from the digestive tract of red snapper (*Lutjanus* sp.), Grouper (*Epinephelus* sp.), Squid (*Loligo* sp.), Cuttlefish (*Sepia* sp.), Octopus (*Octopus* sp.), milkfish (*Chanos chanos*) and according to some previous studies it is better if probiotics are isolated from the fish digestive tract, so that the ability of its life force in the fish digestive tract is tested. The purposes of this study were to study the best intestinal epithelial cell incubation temperature of catfish *in vitro*; determined the best incubation time, incubation temperature, and density of probiotic bacteria *in vitro*; studied the adhesion ability of probiotic candidate bacterial strains to the intestinal epithelial tissue of fish *in vitro*; and determined the growth ability of probiotic candidate bacterial strains in various acidity and bile salts. Probiotics used were JT3, T3P1, PCP1, JC5, JC20, JC28, JC10, JC18, JC18, T3A, T2A, JC32, JC33, JC31, and JM4. This research used explorative and descriptive methods which consisted of *in vitro* adhesion test and acid and bile salt resistance of probiotic candidates. The *in vitro* adhesion test used the optimization technique first with some bacteria, after optimizing all the bacteria were tested for adhesion *in vitro*. Acids and bile salts resistance tests were done with 5 levels of acidity namely pH 2 + 0.5% bile salt, pH 3 + 0.5% bile salt, pH 4 + 0.5% bile salt, pH 5 + 0.5% salt bile, and pH 7 + 0.5% bile salt. The results of *in vitro* adhesion test showed that 10 bacteria were able to grow in acid condition with the same even higher growth rate than that of *L.casei* Shirota as positive control. Acid and bile salt resistance test results showed that 10 bacteria (JT3, PCP1, JC5, JC20, JC28, JC10, JC18, JC18, JC33, and JC32) were able to grow in acid condition (pH 2, 3, 4, and 5) and bile salts.

Keywords : Probiotic, bacterial adhesion, acid tolerance, bile salt tolerance, intestinal epithelial cells.