

INTISARI

Daun teh hijau (*Camelia sinensis*) mengandung senyawa *epigallocatechin gallate* (EGCG) yang berfungsi sebagai antibakteri. Pengembangan formulasinya dengan penambahan dapar dan emulgator, stabilitas EGCG dan aktivitas antibakteri diperlukan untuk peningkatan stabilitas dan efektivitas. Tujuan penelitian ini adalah ingin mendapatkan metode stabilitas EGCG, aktivitas antibakteri pada *Propionibacterium acnes* ATCC 6919 (*P. acnes*) dan *Staphylococcus epidermidis* ATCC 35984 (*S. epidermidis*), komposisi optimum campuran dapar antara asam sitrat, asam askorbat dan triethanolamin yang menghasilkan pH 5 dan komposisi optimum campuran emulgator antara propilen glikol, tween 80 dan span 80 didapat dengan metode *simplex lattice design* (SLD).

Stabilitas EGCG dilakukan dengan penambahan larutan dapar, asam fosfat dan kontrol pada suhu 2°C, 25°C dan 40°C selama 15 hari yang dievaluasi dengan spektrofotometri Ultraviolet lamda maks 280 nm, setelah itu masing-masing perlakuan dilihat kadar EGCG dengan HPLC. Dosis fraksi etil asetat ekstrak daun teh hijau (bahan uji) dilakukan dengan uji aktivitas antibakteri pada bakteri penyebab jerawat *S. epidermidis* dan *P. acnes*. Optimasi dapar dilakukan dengan 13 komposisi pada perbandingan asam sitrat, asam askorbat dan triethanolamin. Optimasi emulgator dilakukan dengan 13 komposisi pada perbandingan propilen glikol, tween 80 dan span 80 berdasarkan evaluasi daya sebar, daya lekat dan stabilitas kimia dengan metode SLD. Selanjutnya krim optimum dievaluasi aktivitasnya pada bakteri *S. epidermidis* secara *in vitro* selama 3 bulan.

Hasil penelitian yaitu EGCG stabil pada suhu 2°C, didapat serbuk EGCG berwarna kuning dengan perlakuan ekstrim dingin dan penambahan larutan dapar pH 4 serta proses ini menghasilkan konsentrasi EGCG dua kali lebih besar dibanding kontrol (60,98% dibanding 26,18%). Bahan uji konsentrasi 6% memberikan daya hambat paling besar pada *P. acnes* dan *S. epidermidis*. Komposisi campuran 23,5 asam sitrat: 54 asam askorbat: 22,5 triethanolamin sebagai komposisi dapar dan campuran 21 propilen glikol: 57 tween 80 dan 22 span 80 sebagai komposisi emulgator. Krim optimum dapat berdampak pada difusi EGCG dan mempertahankan efektivitasnya selama 3 bulan.

Kata kunci: Krim optimum, Stabilitas EGCG, Aktivitas antibakteri

ABSTRACT

Green tea contains *Epigallocatechin gallate* (EGCG) used as antibacterial agent. The formulation development was conducted by buffer and emulsifier addition, while EGCG stability and antibacterial activity are needed to increase the stability and effectivity. This study was aimed to determine EGCG stability methods, antibacterial activity in *Propionibacterium acnes* ATCC 6919 (*P. acnes*) and *Staphylococcus epidermidis* ATCC 35984 (*S. epidermidis*), the optimum formula from buffer combination between citric acid, ascorbic acid, and triethanolamine that produce pH 5 and optimum emulsifier combination from propylene glycol, tween 80 and span 80 used *simplex lattice design* method.

The EGCG stability was obtained by adding buffer solution, phosphoric acid and control tested at 2°C, 25°C, and 40°C temperature during 15 days evaluated for absorbance using ultraviolet spectrophotometry (maximum wave length 280 nm), after that EGCG concentration from the three groups were compared using HPLC. The ethyl acetate fraction of green tea leaves extract (sample test) dose was obtained using antibacterial activity testing against bacteria *P. acnes* and *S. epidermidis*. Buffer optimization was obtained using 13 compositions with the combination of citric acid, ascorbic acid, and triethanolamine. Emulsifier optimization was obtained using 13 compositions with the combination of propylene glycol, tween 80 and span 80 with SLD method. Moreover, the antibacterial activity of optimum cream was evaluated in vitro against *S. epidermidis* during 3 months.

The results showed that EGCG was stable at the storage temperature of 2°C. Yellow EGCG dry powder was gathered from extreme cold and buffer solution pH 4 adding treatment. This process increased EGCG concentration twice than the control (60.98% than 26.18%). The highest antibacterial activity against *P. acnes* and *S. epidermidis* was obtained by 6% concentration sample test. The combination of 23.5 citric acid : 54 ascorbic acid : 22.5 triethanolamine as the optimum buffer composition and the combination of 21 propylene glycol : 57 tween 80 : 22 span 80 as the emulsifier composition. The optimum cream could diffuse EGCG well and keep its effectivity during 3 months.

Keywords : Optimum cream, EGCG stability, Antibacterial activity