

Intisari

Penelitian bertujuan untuk 1) mengetahui pengaruh suhu tinggi terhadap ekspresi *Heat shock response* dan *Heat shock proteins* dengan indikator utama berupa kandungan alkaloid dan masa simpan buah pisang raja, 2) menentukan tingkatan suhu yang paling efektif untuk menginduksi ekspresi Hsr dan Hsps pada buah pisang raja, menggunakan indikator kandungan alkaloid buah, dan 3) mencari pola hubungan antara kandungan alkaloid dengan masa simpan buah pisang raja. Penelitian disusun menggunakan Rancangan Bujur Sangkar Latin (RBSL) dengan tiga blok sebagai ulangan. Perlakuan yang diuji adalah pemberian suhu tinggi pada buah pisang raja selama 20 menit, terdiri dari tiga tingkatan suhu yaitu 40°C, 50°C, dan kontrol tanpa diberi perlakuan suhu tinggi. Variabel yang diamati meliputi kandungan alkaloid total, total padatan terlarut, total asam tertitrasi, indeks warna, *visual quality rating*, susut bobot, kekerasan buah, dan beberapa karakter organoleptik buah pisang raja. Data yang telah dikoleksi selanjutnya dihitung nilai rerata dan simpangan baku. Rerata dan simpangan baku masing-masing variabel selanjutnya disajikan pada tabel histogram yang dilengkapi dengan *error bars*. Hubungan antara perlakuan suhu tinggi dengan variabel pengamatan, maupun antar variabel pengamatan, ditentukan menggunakan analisis regresi. Hasil penelitian memberikan informasi bahwa buah pisang yang diberi perlakuan suhu 40°C selama 20 menit mampu mengekspresikan Hsr dan Hsps dengan indikator berupa kenaikan kandungan alkaloid total yang diikuti pelambatan laju degradasi klorofil sehingga kulit buah tetap berwarna hijau dengan tingkat kekerasan buah yang lebih tinggi. Kondisi tersebut menyebabkan buah pisang yang diperlakukan suhu 40°C selama 20 menit memiliki masa simpan lebih panjang jika dibandingkan dengan kontrol. Suhu optimum untuk menginduksi Hsr dan Hsps pada buah pisang raja adalah 39,73°C dengan kandungan total alkaloid sebesar 0,15%. Kandungan alkaloid total dan total asam terlarut buah pisang memiliki hubungan regresi dengan kecenderungan kuadratik, kenaikan total alkaloid sampai dengan 0,28% selalu diikuti oleh kenaikan total asam terlarut. Namun demikian, jika kenaikan total alkaloid melebihi 0,28% justru berdampak pada penurunan total asam terlarut dalam buah pisang.

Kata kunci : buah pisang, Hsps, suhu tinggi, dan total alkaloid.

Abstrack

The research objectives were 1) to determine the effects of high temperature on the expression of Heat shock response (Hsr) and Heat shock proteins (Hsps) with alkaloid total and shelf life of “Raja” banana as main indicators, 2) to determine the optimum temperature that able to induce Hsr and Hsps expression on “Raja” banana, using alkaloid total as main indicator, and 3) to determine the pattern of relationship between alkaloids total with shelf life of “Raja” banana. The research was arranged in a Latin Square Design (LS), with three blocks as replications. The treatment was high temperature for 20 minutes, consisting of three levels of temperature, namely 40°C, 50°C, and control (without being treated with high temperature). The observations were done on several variables of alkaloid total, dissolved solids total, titrated acids total, color index, visual quality rating, weight loss, fruit firmness, and some organoleptic characters. Data that have been collected then analyzed to calculate the average and standard deviation for each variable and treatment. The mean and standard deviations of each variable were then presented in the histogram with error bars. The relationship patterns between high temperature treatments with observation variables, as well as between observation variables, were determined with regression analysis. The results showed that “Raja” banana that treated with 40°C for 20 minutes was able to express Hsr and Hsps with the increase of alkaloid total as main indicator, and then followed by slowing of chlorophyll degradation rate so that the finger remains green and firm. The “Raja” bananas that treated with 40°C for 20 minutes have longer shelf life if compared to control. The optimum temperature to induce Hsr and Hsps in “Raja” bananas was 39.73°C, with 0.15% of alkaloids total in the finger. The alkaloids and titrated acid total of “Raja” banana have quadratic regression relationships. The increased of alkaloids total up to 0.28% were always followed by increased of titrated acid total. However, the increased of alkaloids total >0.28% actually reduced titrated acid total inside “Raja” banana fingers.

Keywords: banana, high temperature, Hsps, and alkaloids total.