

RINGKASAN

Ekstrak anato adalah pewarna alami berwarna oranye hingga merah yang diperoleh dari ekstraksi biji dari buah kesumba (*Bixa orellana*) dengan pigmen utama berupa bixin dan norbixin. Pigmen khas ini terkandung pada lapisan luar biji kesumba sehingga diperlukan proses ekstraksi salah satunya maserasi. Faktor yang berpengaruh pada ekstraksi diantaranya jenis pelarut, pH pelarut, dan lama maserasi. Jenis pelarut menentukan seberapa banyak pigmen yang terekstraksi sesuai dengan kepolarannya. Aquades sebagai pelarut yang sangat polar diharapkan mampu mengekstraksi bixin yang nonpolar melalui pengaturan pH yang diduga mampu menurunkan konstanta dielektrik dan kepolarannya. Pelarut aquades yang diatur kebasaaan menjadi pH 9 dengan Na_2CO_3 , K_2CO_3 , dan MgCO_3 belum dilakukan pada ekstrak anato. Lama maserasi menentukan seberapa lama pelarut kontak dengan zat terlarut, tetapi pada ekstraksi ini memiliki keterbatasan lama maserasi karena diduga dapat mendegradasi bixin sehingga maserasi dilakukan selama 5 menit; 7,5 menit; dan 10 menit. Interaksi antara jenis pengatur keasaman tersebut dengan lama maserasi belum dilakukan.

Penelitian dilakukan dengan memasukkan biji dari buah kesumba pada aquades yang telah diatur pH menjadi 9 menggunakan bahan tambahan pangan Na_2CO_3 , K_2CO_3 , dan MgCO_3 dalam bentuk larutan pH 10. Dilakukan maserasi pada suhu 80°C dan 2000 rpm serta disaring dengan kertas saring sehingga diperoleh ekstrak anato tanpa biji. Dilakukan pengujian sifat fisik meliputi warna, kekeruhan, dan total padatan, serta sifat kimia dari ekstrak anato yang terdiri dari pH, total bixin, total norbixin, total asam, kadar gula reduksi, dan kadar protein terlarut. Data dianalisis statistik ragam dengan tingkat ketelitian 95% dan dilakukan uji lanjut beda nyata terkecil (LSD).

Angka kemerahan tertinggi diperoleh dari perlakuan Na_2CO_3 (38,22) dan lama maserasi 10 menit (37,15). Kadar bixin tertinggi diperoleh dari perlakuan Na_2CO_3 (0,49%) dan interaksi Na_2CO_3 pada maserasi selama 5 menit (0,60%). Kadar norbixin tertinggi diperoleh dari perlakuan Na_2CO_3 (0,68%) dan lama maserasi 10 menit (0,71%). Kadar gula reduksi tertinggi diperoleh pada perlakuan Na_2CO_3 (1,13%), lama maserasi 10 menit (1,23%), dan interaksi Na_2CO_3 pada maserasi selama 10 menit (1,66%). Kadar protein terlarut tertinggi diperoleh dari perlakuan interaksi MgCO_3 pada maserasi selama 7,5 menit (4,07%).

SUMMARY

Annatto extract is a natural colorant, ranging from orange to red, obtained by extracting seeds from the Bixa orellana fruit. Its primary pigments are bixin and norbixin and concentrated in the outer layer of annatto seeds, so an extraction process is needed to isolate these pigments, such as maceration. Several key factors in extractions are type of solvent, solvent pH, and extraction time. The solvent type determines the quantity of pigment extracted, corresponding to its polarity. As a highly polar solvent, distilled water (aquades) is expected to extract nonpolar bixin as a main pigment through pH adjustment, which is hypothesized to reduce the dielectric constant and overall polarity of the solvent system. The use of Na_2CO_3 , K_2CO_3 , and MgCO_3 as aquades adjusted to an alkaline pH of 9 has not yet been thoroughly investigated for annatto extraction. Maceration time dictates the duration of contact between the solvent and the solute; however, this extraction method has limitations regarding maceration duration due to the suspected degradation of bixin. Therefore, maceration was performed for 5 minutes, 7.5 minutes, and 10 minutes. The interaction between these types of alkalinity regulators and extraction time has not been previously studied.

This study involved immersing annatto seeds in distilled water whose pH was adjusted to 9 using food-grade alkaline agents—specifically, Na_2CO_3 , K_2CO_3 , and MgCO_3 —each prepared as a pH 10 solution. Maceration was conducted at 80°C with continuous stirring at 2000 rpm at extraction time, followed by filtration through filter paper to obtain the extract without seed. Extracts were analyzed for physical properties, including color, turbidity, and total solids, as well as chemical properties such as pH value, total bixin, total norbixin, total acidity, reducing sugar content, and soluble protein content. Data were statistically analyzed using analysis of variance (ANOVA) at a 95% confidence level, followed by post hoc testing using the Least Significant Difference (LSD) method at the same significance level.

The highest redness value was obtained from the Na_2CO_3 treatment (38.22) and a maceration time of 10 minutes (37.15). The highest bixin content was found in the Na_2CO_3 treatment (0.49%) and in the interaction of Na_2CO_3 with a maceration time of 5 minutes (0.60%). The highest norbixin content was obtained from the Na_2CO_3 treatment (0.68%) and a maceration time of 10 minutes (0.71%). The highest reducing sugar content was obtained in the Na_2CO_3 treatment (1.13%), at a maceration time of 10 minutes (1.23%), and in the interaction of Na_2CO_3 with a maceration time of 10 minutes (1.66%). The highest soluble protein content was observed in the interaction of MgCO_3 with a maceration time of 7.5 minutes (4.07%).