Sintesis dan Analisis Tembaga Proteinat dan Mangan Proteinat dari Hasil Reaksi Tembaga Sulfat dan Mangan Sulfat dengan Protein Hasil Reaksi Limbah Ikan dengan Protease = Synthesis and Analysis of Copper Proteinate and Manganese Proteinate from Reaction of Copper Sulfate and Manganese Sulfate with Protein from Reaction of Fish Waste with Protease

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Abstrak

ABSTRAK

Tembaga dan mangan merupakan mineral esensial yang dibutuhkan oleh tubuh dalam jumlah sedikit. Akan tetapi, mineral esensial tidak dapat terabsorbsi dengan baik di dalam tubuh apabila dalam bentuk senyawa logam ataupun bentuk ion bebas, sehingga memiliki bioavailabilitas yang rendah. Salah satu cara yang dapat meningkatkan bioavailabilitas mineral esensial dalam tubuh yaitu mereaksikannya dengan protein menjadi kompleks logam proteinat. Kompleks ini akan lebih bersifat nonpolar sehingga lebih mudah diabsorbsi di tubuh. Oleh karena itu, pada penelitian ini dilakukan sintesis logam proteinat dengan mereaksikan senyawa logam dengan protein hasil hidrolisis enzimatis limbah ikan dengan enzim Pancreatin yang memiliki aktivitas enzim protease. Penelitian ini bertujuan untuk mendapatkan metode sintesis kompleks logam proteinat yang optimum dengan variasi bobot logam-proteinat (0,8:1), (1:1), dan (1,2:1), serta mendapatkan kadar mineral terikat yang optimum dengan analisis menggunakan spektrofotometri serapan atom. Pada penelitian didapat hasil sintesis tembaga proteinat berupa serbuk hijau tua Pantone 5743 U dengan rendemen berturut-turut dan hasil sintesis mangan proteinat berupa serbuk coklat Pantone 464 U. Kemudian dilakukan analisis kadar logam terikat protein dan logam bebas pada kompleks hasil sintesis menggunakan Spektrofotometri Serapan Atom dan kromatografi penukar ion. Berdasarkan hasil penelitian, dapat disimpulkan bahwa metode sintesis paling optimum didapat pada kondisi perbandingan tembaga-proteinat (0,8:1) dan mangan-proteinat (1,2:1) dengan rendemen masing-masing sebesar 98,55% dan 98,36%, yang memiliki rendemen terbesar dibanding dengan kompleks logam proteinat lainnya. Sementara untuk kadar logam yang optimum didapat pada kompleks tembaga-proteinat (1:1) dan kompleks mangan-proteinat (1,2:1) dengan kadar logam pada masing-masing kompleks sebesar 10,3599 mg/g dan 20,2865 mg/g, yang memiliki kadar terbesar dibandingkan kompleks logam proteinat lainnya.

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<i>ABSTRACT

Copper and manganese are an essential minerals that are required in small amount in our body. However, essential minerals cannot be absorbed well in body in the form of salts or free form, which is why their bioavailabilty is low. One method that can increase the bioavailability of essential minerals in the body is reacting it with protein to make a metal proteinat complex. This complex will be more nonpolar, so it will be easily absorbed in the body. Therefore, in this study metal proteinate synthesis was carried out by reacting metal compounds with proteins from enzymatic hydrolysis of fish waste powder with Pancreatin enzyme which has protease enzyme activity. This study aims to obtain the optimum method of synthesis of metal proteinate complexes with variations in the weight of metal-proteinate (0.8:1), (1:1), (1,2:1), and the

optimum of bound metal content by analysis using atomic absorption spectrophotometry. In this study, the results of copper proteinate synthesis were in the form of dark green Pantone 5743 U powder and the result of manganese proteinat synthesis were in the form of brown Pantone 464 U powder. After that, the content of metal from complexes were analyzed by using Atomic Absorption Spectrophotometry and using ion exchange chromatography for separating the complexes from free unbound metals. Based on the results of the study, it can be concluded that the most optimum synthesis method was obtained in the condition ratio of copper-proteinate (0.8:1) and manganese-proteinate (1,2:1) with yield of each complexes were 98.55% and 98.36%, which had the highest yield among any other metal proteinate complexes. While for the optimum metal content was obtained from copper-proteinate complex (1:1) and manganese-proteinate complex (1,2:1) with content of metal from each complexes were 10.3599 mg/g and 20.2865 mg/g, which had the highest metal content among any other metal proteinate complexes.</i>