

# **Analisis Zat Gizi dan Viskositas Formula Enteral Berbasis Tepung Susu Kambing dan Isolat Protein Kedelai untuk Pasien Paru Kronik**

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## **ABSTRAK**

**Latar Belakang :** Pasien dengan penyakit paru kronik memiliki kebutuhan gizi yang lebih tinggi akibat peningkatan kerja pernapasan dan inflamasi sistemik yang berlangsung lama, sehingga berisiko mengalami malnutrisi. Formula enteral diperlukan untuk memenuhi kebutuhan gizi secara efisien serta mengurangi beban metabolik pernapasan. Bahan utama formula yang digunakan adalah tepung susu kambing dan isolat protein kedelai karena keduanya kaya protein dan asam amino esensial.

**Tujuan :** Penelitian ini bertujuan untuk menganalisis kandungan gizi dan viskositas formula enteral modifikasi dan pengaruh variasi formulasi terhadap kandungan zat gizi serta nilai viskositas dari masing-masing formulasi yang dikembangkan untuk mendukung kebutuhan nutrisi pasien paru kronik.

**Metode :** Penelitian ini merupakan penelitian eksperimental dengan 3 taraf perlakuan yaitu perbandingan tepung susu kambing dan isolat protein kedelai pada P1 (32%:22%), P2 (27%:27%), P3 (22%:32%). Analisis kandungan zat gizi dan viskositas dilakukan dengan uji *One-Way* ANOVA, dilanjutkan uji Duncan. Selanjutnya, dilakukan uji MADCAW untuk menentukan formulasi terbaik.

**Hasil :** Hasil analisis menunjukkan terdapat perbedaan yang signifikan ( $p < 0,05$ ) antar formulasi terhadap kandungan energi ( $p = 0,026$ ), karbohidrat ( $p = 0,009$ ), lemak ( $p = 0,012$ ), dan viskositas ( $p = 0,037$ ). Namun, tidak terdapat perbedaan yang signifikan pada kandungan protein ( $p = 0,262$ ). Formula P3 memiliki kandungan energi dan lemak tertinggi, serta karbohidrat yang sesuai dengan preskripsi penyakit paru. Hasil uji Duncan menunjukkan formulasi P1 berbeda nyata dari P2 dan P3 pada kandungan energi, karbohidrat, dan lemak.

**Kesimpulan :** Formula terbaik adalah P3 karena nilai viskositas yang paling tinggi, kandungan energi, protein, dan lemak paling tinggi, serta karbohidrat yang memenuhi preskripsi diet penyakit paru kronik.

**Kata Kunci :** Penyakit Paru Kronik, Formula Enteral, Tepung Susu Kambing, Isolat Protein Kedelai

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## **Nutrient Composition and Viscosity Analysis of Enteral Formula Based on Goat Milk Powder and Soy Protein Isolate for Chronic Pulmonary Disease Patients**

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### **ABSTRACT**

**Background :** Patients with chronic pulmonary disease have higher nutritional needs due to increased respiratory effort and prolonged systemic inflammation, which increases the risk of malnutrition. An enteral formula is required to meet nutritional needs efficiently while reducing the metabolic burden of respiration. The main ingredients used in the formula are goat milk powder and soy protein isolate, both of which are rich in protein and essential amino acids.

**Objective :** This study aimed to analyze the nutritional content and viscosity of a modified enteral formula, as well as the effect of formulation variations on the macronutrient content and viscosity value of each formula developed to support the nutritional needs of chronic pulmonary disease patients.

**Methods :** This experimental study used three levels of treatment based on the proportion of goat milk powder to soy protein isolate: P1 (32%:22%), P2 (27%:27%), and P3 (22%:32%). Nutritional composition and viscosity were analyzed using One-Way ANOVA, followed by Duncan's multiple range test. The MADCAW method was then applied to determine the best formulation.

**Results :** The analysis showed significant differences ( $p < 0.05$ ) between formulations in terms of energy ( $p = 0.026$ ), carbohydrate ( $p = 0.009$ ), and fat content ( $p = 0.012$ ), but no significant difference in protein content ( $p = 0.262$ ). Formula P3 had the highest energy and fat content, as well as carbohydrate content that aligns with pulmonary disease dietary prescriptions. Duncan's test indicated that P1 differed significantly from P2 and P3 in energy, carbohydrate, and fat.

**Conclusion :** The best formulation is P3, as it had the highest viscosity, energy, protein, and fat content, and its carbohydrate content met the dietary requirements for chronic pulmonary disease patients.

**Keywords :** Chronic Lung Disease, Enteral Formula, Goat Milk Powder, Soy Protein Isolate

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