

Development of an economical and sustainable protein powder, using natural ingredients for Sri Lankan athletes

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Protein is athletes' most important nutritional component to repair and protect their muscles. This study aims to produce protein supplements at a low cost using local ingredients for Sri Lankan athletes because all the supplements available on the market are expensive. After protein content analysis by Kjeldahl method, soybeans (0.55 kg), mushrooms (1.500 kg), and millet (0.200 kg) were used as main ingredients for the preparation of 1 kg of powder. All the ingredients were properly powdered and mixed in special lab processes. Energy (calories and kilojoules), protein content, fat content, carbohydrate content, and moisture content were evaluated for the final product. Sensory analysis, shelf-life testing, and determination of water-soluble ash content tests were carried out for this product. The final product was dissolved in water and used in three ways for sensory analysis (A-Supplement 1 tablespoon dissolved in 300 ml water, B-Supplement 2 tablespoon dissolved in 300 ml water, C-Supplement 3 tablespoon dissolved in 300 ml water). A sample of 30 students was used to test the texture, color, aroma, taste, melting, and after taste of the product, and the results were analyzed using descriptive statistics and an ANOVA test. According to the Kjeldahl method results of protein content analysis, protein content in soybeans, mushrooms and millet was 27%, 14%, and 25% respectively. Further, the final product had a nutritional profile with energy content of 329 kcal (1375 kJ) per 100 g, a protein content of 31.9%, 12.6% of fat, 25.6% of carbohydrates, 10.1% of sugar content and finally with a moisture content of 15.83%. Statistical analysis revealed that there was a significant difference between the above six components ($p < 0.05$). Sample B is the best one because the above statistical test shows the highest mean (Mean \pm Standard Deviation = 25.07 ± 3.18). Cost analysis proved that this supplement can be produced at a low cost of Rs. 1825 per kg. This study shows that a protein-based balanced protein supplement powder can be developed using local low-cost ingredients. As a result, the developed nutritional powder provides a balanced blend based on protein. In the future variations of flavors of this powder can be developed.

Keywords: *Local ingredients, Low cost, Protein supplement*