

**T**he increasing need for protein-rich food by humans and animals has created the need for alternative protein sources. Palm Protein (Figure 1) could be one of the potential proteins. It is a product of palm kernel meal (cake) derived from the process of extracting protein from palm kernel by-product (patent application No. PI2010004553). The process involves thermal extraction of soluble protein in palm kernel cake (PKC) and precipitation of protein by organic acid solvent. This product could be used for food industries such as meat analog, white egg substitute, baked products and as nutritional supplements for the pharmaceutical industry. Moreover, Palm Protein could be a protein feed additive in animal feed formulations.



Figure 1. Palm Protein.

**THE PRODUCT**

Palm Protein may contain 37% protein or more, having all the 17 required amino acids (Tables 1 and 2). Palm Protein is rich in glutamic acid, arginine, valine, glycine, aspartic acid, leucine,

fibre and hemicellulose. The product has low acid and neutral detergent fibres. The extraction process successfully extracted protein from PKC. Production of Palm Protein did not affect the nutritional composition of PKC.

**TABLE 1. PROXIMATE COMPOSITION OF PALM PROTEIN**

Proximate analysis	Palm Protein
Crude protein (%)	36.95±0.4
Crude fibre (%)	0.35±0.2
Acid detergent fibre (%)	0.46±0.1
Neutral detergent fibre (%)	1.20±0.1
Hemicellulose (%)	0.74
Energy ( Cal g <sup>-1</sup> )	<b>3583±5.2</b>

**TABLE 2. AMINO ACID PROFILE OF PALM PROTEIN**

Amino acid	Palm Protein (%)
Aspartic acid	1.1
Threonine	0.45
Serine	0.54
Glutamic acid	8.98
Glycine	0.95
Alanine	0.54
Cysteine	0.60
Valine	0.59
Methionine	0.11
Isoleucine	0.21
Leucine	0.82
Tyrosine	0.48
Phenylalanine	0.54
Lysine	1.16
Histidine	0.36
Arginine	5.13
Proline	8.73
<b>True Protein</b>	<b>31.29</b>

## ADVANTAGES OF PALM PROTEIN PROCESS

- Ease of operation.
- No inorganic chemical is used.
- Precipitation of protein by polar affinity, not by isoelectric point process.

### BENEFITS

Palm Protein is suitable for a range of essential functions in the body, including the followings:

- building and repair of tissues (including muscles);
- essential body processes such as water balancing, nutrient transport and muscle contractions;
- overall good health; and
- non-toxic, safe to use.

## ECONOMIC EVALUATION

The estimated investment cost for the development of a 50 000 t yr<sup>-1</sup> capacity Palm Protein plant is RM 3.02 million. The payback period is three years with an internal rate of return (IRR) of 60%. The net present value (NPV) at 12% discount rate is RM 4 828 589, with a B:C ratio of 2.07. The investment is financially feasible.

### CONCLUSION

Palm Protein has the potential for various applications in food, pharmaceutical, cosmetics and animal feed.

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