# Rumen Protected Fat Preparation using By-products Generated in Coconut Processing Industry

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Rumen protected fat (RPF) is an energy supplement used in dairy cattle feeding. Yet, none of the studies were conducted in manufacturing RPF in Sri Lanka. Hence, the present study was conducted to optimize the fusion method of preparing RPF using by-products generated in the coconut processing industry in Sri Lanka. Amongst 03 by-products generated (i.e. sludge oil, low-fat coconut residue oil, and paring oil), paring oil was selected as the suitable fat source for preparing RPF due to its favourable physiochemical properties and ease of extraction. The fatty acid profile of the paring oil was determined using Gas Chromatography (GC). For producing RPF using fusion method, paring oil was mixed with CaO (aq) and heated using direct heat. In the experiment, RPF samples were prepared using CaO percentage in the range of 11%-14% with the time, temperature combinations ranging 10 – 120 minutes, and 150 – 300 °C, respectively. The best time, temperature, and CaO% were finalized as 30 minutes, 250 °C, and 13.5%, respectively. The crude fat content, ash content, and pH of the final product was assessed. The stability of the final product in the rumen was assessed by comparing it with a commercial RPF using *in vitro* gas production technique. According to GC results, Lauric acid was identified as the highest available fatty acid in paring oil. The crude fat and crude ash content of the final product was 77.77 ± 0.32% and 22.16 ± 0.37%, respectively. As confirmed by the *in vitro* gas production technique, rumen-protected fat produced from paring oil and commercial rumen-protected fat had indicated similar stability under *in vitro* rumen conditions. The final product showed no significant difference ($p<0.05$) in pH up to 5 weeks. The current method yielded 1.11 kg of rumen-protected fat from 1 kg of paring oil. Considering the above results, the current process was identified as a successful method of preparing rumen-protected fat using paring oil generated.

*Key words*: CaO, Coconut processing industry, Fatty acids, Fusion method, Paring oil

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