

Effects of extraction conditions on characterization of gelatin from water buffalo (*Bubalus bubalis*) skin

ABSTRACT

The study aimed to determine the characteristics of gelatin from water buffalo (*Bubalus bubalis*) skin pre-treated with NaOH and Ca(OH)₂ at different concentrations (0.3 M, 0.5 M and 0.7 M) and extracted at 65°C for 6 hrs and 24 hrs respectively. The gelatin obtained was evaluated for its moisture, protein and ash content, UV-vis absorption value, colour, emulsifying and foaming properties. The highest yield (20.25%) was observed for gelatin extracted by 0.5 M NaOH at 24 hrs extraction time. For alkaline pre-treatment, it was found that NaOH was more efficient than Ca(OH)₂ in terms of preparing the skin for subsequent extraction process. The protein content of the extracted gelatin samples was in the range of 71.76% - 87.83%, showing that the varying processing conditions are sufficiently to recover protein from the raw material. Ash content for all samples was in agreement with USDA standard, which was below than 3%. The extracted gelatin had varying pH values which were from 5.47 to 7.02. The gelatin was colourless with 'L' values of more than 80, except for 0.7 M Ca(OH)₂ at 24 hrs which showed slightly darker properties. The intensity of the UV-vis absorption spectrum showed that a high absorption peak was observed at 6 hrs of extraction time (230 – 250 nm) compared to 24 hrs extraction time. Emulsifying properties of buffalo gelatin increased with increasing concentrations of alkaline except for 0.7 M NaOH and 0.7 M Ca(OH)₂ for both extraction time. Meanwhile, foam expansion of the gelatin extracted from the different extraction conditions was observed to have a significant difference ($p < 0.05$) for all samples. To our knowledge, buffalo skin has the potential to be an alternative source of gelatin in the diversified industrial application by modifying the extraction conditions in order to produce gelatin with desired quality.