



Acid Solubilization Process of Mechanically Separated Turkey Meat (MSTM) with the Aid of Citric Acid and Calcium Ions: Effect on the Polar and Neutral Lipid Classes

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Summary

An approach for increasing the utilization of MSTM is to remove fat and pigments to make the resulting product more acceptable for the production of further-processed meat products. A new technology, based on acid solubilization with the aid of citric acid and calcium chloride (CaCl_2) has been developed to recover proteins and remove fat and pigments from MSTM.

Problem

Consumer preference has shifted over the years from purchasing whole birds to poultry parts such as breasts, thighs and wings. The remaining edible material tissues are extracted through mechanical separation to produce MSTM.

MSTM is a finely ground, paste-like product with heavy fragmented muscle fibers. The major problems with the utilization of MSTM for product development are appearance (color) which affects consumers' selection, higher fat content compare to white meat and poor shelf life stability due to the rancidity of fat.

Lipid oxidation is one of the key factors limiting the use of MSTM proteins for the production of further processed poultry meat products. Polar lipids (PL) membranes being rich in polyunsaturated fatty acids (PUFAs) are considered to be the primary substrates for lipid oxidation as compared to neutral lipids (triacylglycerol; TAG). Thus, if polar lipid membranes are removed from MSTM, the stability of the isolated proteins could be increased dramatically.

The aim of the study was to determine the effect of citric acid and CaCl_2 on the lipids removal from MSTM under low pH conditions.

Our Approach

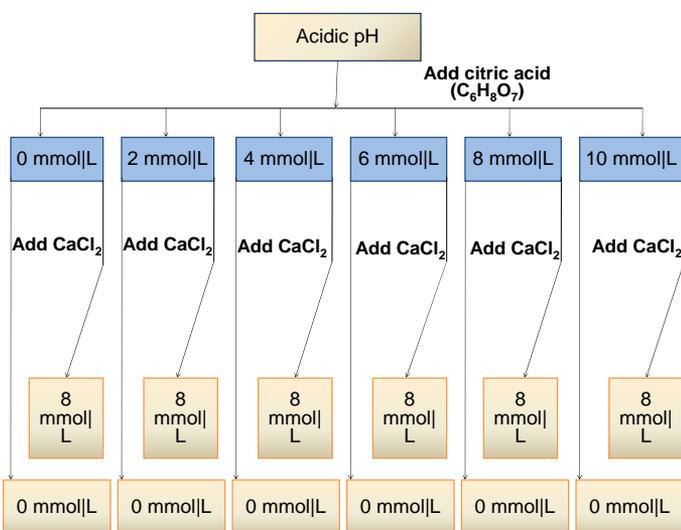


Figure 1. Experimental design for protein extraction process

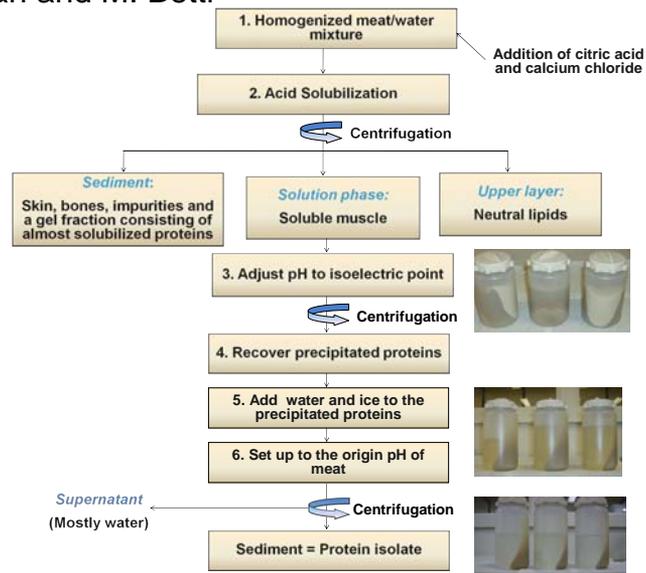


Figure 2. Schematic diagram of the protein extraction process

Observations

- In general all the combinations removed an average of 90.3% of the total fat from MSTM
- The lowest total fat was found by using 4 mmol/L of citric acid (1.14 %)
- The lowest level of PL was at the concentration of citric acid equal to (0.22 %) 2 mmol/L
- Citric acid at the concentration of 6 mmol/L was the most efficient for TAG removal (97.8%)
- The addition of CaCl_2 did not show any significant effect on total fat, TAG and PL removal
- The highest protein yield was obtained from the sample processed with 6 mmol/L of citric acid (84.48 %)

Conclusion

New protein extraction technology with the addition of citric acid gives the possibility to remove majority of the phospholipids, improve the oxidative stability and increase the yield of proteins isolated from MSTM.

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