

**Comparative Analysis of Physiochemical Properties in Gelatin Extraction from Thai Pangas (*Pangasianodon hypophthalmus*) Skin and Bone by Alkaline, Acidic Methods and Commercial Gelatin**

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Roll No: 0122/11

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**A thesis submitted in the partial fulfillment of the requirements for the degree of Master of Science in Fishing and Post-Harvest Technology**

**Department of Fishing and Post-Harvest Technology,**

**Faculty of Fisheries**

**Chattogram Veterinary and Animal Sciences University**

**Chattogram-4225, Bangladesh**

**December, 2023**

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**December, 2023**

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**This is to certify that we have examined the above master’s thesis and have found that is complete and satisfactory in all respects and that all revisions required by the thesis examination committee have been made**

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| **List of Abbreviations** | |
| **Short Form** | **Abbreviation** |
| **%** | Percent |
| **°C** | Degree Celcius |
| **ANOVA** | One-way Analysis of Variance |
| **T1** | Treatment 1 for 0.2% NaOH |
| **T2** | Treatment 2 for 0.2% H2SO4 |
| **T3** | Treatment 3 for 0.2% NaOH,0.2% H2SO4 and 1% Citric Acid |
| **NaOH** | Sodium Hydroxide |
| **H2SO4** | Sulphuric acid |
| **mPa.s** | Millipascal-second |
| **ml/g** | Milliliter per gram |
| **M** | Molar |
| **cm** | Centimeter |
| **mm** | Millimeter |
| **OH-** | Hydroxyl ion |
| **H+** | Hydrogen ion |
| **AOAC** | Association of Official Analytical Chemists |
| **FC** | Foaming Capacity |
| **FS** | Foaming Stability |
| **rpm** | Revolutions per minute |
| **CVASU** | Chattogram Veterinary and Animal Sciences University |
| **et al.** | And his associates |
| **gm** | Gram |
| **SD** | Standard Deviation |
| **SE** | Standard Error |
| **w/v** | Weight in Volume |
| **GMIA** | Gelatin Manufactures Institute of America (New York) |

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**ABSTRACT**

Aquatic sources are gradually replacing mammalian sources like pigs and cows in the production of gelatin due to sociocultural and religious reasons. In Bangladesh, Thai Pangas (*Pangasianodon hypophthalmus*) is highly popular due to its affordability and easy availability. The research aimed to extract gelatin from skin and bone of this catfish and compare the efficiency of alkaline and acidic extraction techniques, focusing on gelatin yield and key physiochemical properties compared to commercial gelatin. Here three pretreatments were applied. Treatment 1 for 0.2% NaOH (T1) was an alkaline method of extraction. Treatment 2 for 0.2% H2SO4 (T2) was an acidic method of extraction. Treatment 3 was for 0.2% H2SO4, 0.2% NaOHand 1% Citric Acid (T3) was a combination of acid-base extraction method. It was observed that the skin gelatin sample (T1) of Thai pangas yielded a significantly higher amount of gelatin (16.61±0.52%) compared to bone gelatin. The research also found that three different brands of commercial gelatin had similar protein, ash, moisture, and lipid content. Furthermore, skin gelatin (T3) had proximate values that were comparable to the values of commercial gelatin. Skin gelatin T3 showed values that were equal to those of commercial gelatin, despite the fact that commercial gelatin had higher values than extracted gelatin for melting and setting temperatures, viscosity, pH, foaming capacity water holding capacity, fat binding capacity and foam stability. Between gelatin of skin and bone, skin gelatin (T3) had higher viscosity (2.36±0.01 mPa.s), water holding capability (1.29±0.02 ml/g), and fat binding capability (2.77±0.00 ml/g). On the other contrary, melting temperature, setting temperature, and pH higher in bone gelatin (T1). Gel strength of skin gelatin (T3) had value (268.51±1.46 g) that was quite near to commercial. It was observed that bone gelatin (T2) had the lowest value of foaming capacity (0.86±0.01%), and foam stability (0.59±0.00%). In this investigation, it was discovered that the Skin Gelatin (T3) exhibited better physical qualities than other pretreatments. It was shown in this study that Skin Gelatin (T3) had better physical properties compared to other treatments that were close to commercial gelatin.

**Key words:** Gelatin; *Pangasianodon hypophthalmus*; acidic and alkaline method; physiochemical properties