



Extraction and characterization of gelatin from chicken feet and its application in cantaloupe jelly

A. Rezaee Zadeh¹, Z. Raftani Amiri^{2*}

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Introduction: Today, the demand for low calorie food based on fruits and easy production and keeping primary features including texture and taste is increasing. Jelly is one of low calorie products which is produced from fruits and other components, and its usage is increasing for human health. Chemical ingredients and natural features of fruits decrease the cancer. In addition to nutrition and medical values, rheological and texture features affect the general quality of fruit jelly. Gelatin is a protein which is obtained by thermal hydrolysis of collagen and is the main protein of bone, cartilage and skin. The source, animal age and the type of collagen are influential factors on gelatin characteristics. Different gelatins have different thermal and rheological characteristics such as transformation temperature to jelly and melting temperature. The melting temperature of gelatin is lower than human body temperature. In food industry, gelatin is used as an alternative for fat, to improve elasticity and transparency of fruit juices and also is used in production of jelly, chocolate, edible films, and so on. Gelatin quality and its application in industry are mainly because of its rheological features. Global demand for gelatin during recent years increases due to its low cost and solubility in biologic environments.

Materials and methods: In this study, the gelatin from chicken feet was extracted by acidic method using hydrochloric acid 0.5% normal with the rate of 1: 3.22 weight / volume. pH was adjusted to 7 by the use of sodium hydroxyl 1 normal and was dried in an incubator at 45° c for 28 hours. Different tests such as pH, protein, ash, moisture, fat, viscosity, jelly strength, color and rheology were done in gelatin molecule to measure of storage modules (G') and loss modules (G''). Then, the effect of extracted jelly in concentrations of 0 to 1.5 % on the physico-chemical (Brix, humidity, acidity, color, texture) and organoleptic properties of cantaloupe jelly (odor, sweetness, color, appearance, jelly status, transparency, adhesion) were investigated using five point Hedonic scale ranked. Experiments related to cantaloupe jelly were conducted in terms of a completely random design. A one-way analysis of variance and Duncan test ($P \leq 0.05$), in three replications were used to establish the significance of differences in experimental data's. The result was performed using the SPSS version 16.0 windows program, and charts were plotted with Excel 2010.

Results and Discussion: The results showed that the average yield of gelatin based on the wet weight was 4.80%, pH value before drying is 3.7, the total amount of protein is 83.95%, the total amount of ash is 0.89%, moisture is 9.66%, fat is 0%, viscosity is 216 centipoise. The strength of jelly is 487g that in compare with other alternatives such as gelatin from chicken skin is 355±48.1 gr, cow gelatin is 299±71.1 gr, fish gelatin including 181 to 263 gr for tilapia, 280 gr for horse mackerel fish, 125 and 177 gram for Sin croaker and Shortfin scad, respectively. The main reason for low level of gelatin in fish skin is the low amount of hydroxyl proline. Thus, it can be claimed that the high gel strength in chicken feet gelatin might be due to lower extraction temperature, strong hydrogen bond and more probably hydroxyl proline. Hydrocolloid solutions are usually viscoelastic; therefore, the level of storage modules (G') and loss modules (G'') is measurable for them. Gelatin from chicken feet exhibited G' greater than the G'' in a wide range of frequencies of the oscillatory test, which have indicated the gel network is high stable. By increasing the amount of gelatin in the cantaloupe juice, transparency and firmness of cantaloupe jelly increased. In the sensory analysis, jellies had not significant differences in the intensity of sweetness. In terms of overall acceptability, the sample containing 1.25 and 1.5 percent of gelatin gained maximum score.

Keywords: Cantaloupe Jelly, Chicken Feet, Extraction, Gelatin, Rheological Behavior

1 And 2. M. Sc. Student, Associate Professor, Department of Food Science and Technology, Sari Agricultural Sciences and Natural Resources University, Iran

(*Corresponding Author Email: zramiri@gmail.com).