



Formulation of Dates Gel and Condensed whey and Analysis of its Sensory and Chemical Properties

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Introduction: Due to the lack of proper harvest, packaging, transport and storage, about 30% of country dates production cannot be directly absorbed into the consumer market and must be exchanged to valuable products in transformation industries. Hydrocolloids are used in fruit snack formulations to create novel texture, increase stability due to their water-holding capacity, improve texture and have an impact on flavor release and other structural and sensory properties in the respective products. Gelatin is a gel forming hydrocolloid. Xanthan gum is a kind of long-chained polysaccharide with high molecular weight. Like Xanthan and guar gums can also interact with some polysaccharides such as gelatin, agar and carrageenan synergistically leading to increased viscosity or gel forming power. This type of synergistic behavior among polysaccharides is commercially valuable, because it creates a novel texture and a more desirable structure. This study on viscosity and textural changes caused by using a mixture of gums in food formulations is important and will affect the cost of various stages of the process.

Material and methods: The initial materials containing date (Shahani variety), condensed whey (brix=35) were provided from Asali Mod company, Xanthan gum from Sigma company. powdered glucose and date were bought from Mashhad bazar. In order to produce gel based on date puree, the date were first washed up, peeled and cut into pieces. Then the pieces were grinded. The prepared puree was mixed with hydrocolloids and sweeteners at 70°C with specific ratios. The mixture was then poured into stainless steel mesh molds with cavity dimensions of 1.2 cm × 2 cm × 2 cm and the molds were kept at 4°C for 2 hours to form the gel. Then the obtained gel was taken out of the mold cavities and the samples were dried at Environmental drier with 1.5 m/s airflow rate.

In this research, the produce of jelly viable products based on date puree by the different rates of gelatin hydrocolloids in two levels (6 and 8%) and Xanthan in two levels (0.25 and 0.75%) and condensed whey in three levels (5, 10 and 20%) was studied. Dependent variables were consisting of moisture content, water activity, PH, Brix, protein, ash, texture assessment and color parameters. In final has done the sensory evaluation.

To measure pH, pH meter (Hana, Portugal) was used. The measurement of mixture Brix was performed by an optical refract meter (Carlze, Germany).

Moisture, protein and ash were measured according to the Iran national standard.

In order to determine the water activity of the samples, equal weights of the samples were grinded and the water activity was measured by a a_w meter (Testo model 200, England) at 20°C.

Texture profile analyzer (QTS25 CNS Farnell England) equipped with a software was used to determine the textural properties of the samples. Samples were compressed and decompressed in two reciprocating cycles by a round plate cylindrical probe with 3.5 cm diameter, 1 mm/s probe speed and 5 g force to 30% initial height. Histological properties obtained from force-deformation curve are as follows: Hardness, Cohesiveness, Elasticity, Adhesiveness and Chewiness.

In order to measure color parameters of samples, three samples were choose randomized from each formulation, and pictures were taken with 90 angle and pictures were saved with IPG format. The other stages of picture processing were done by ImageJ 1.40g software.

Sensory test was performed with the judgment of 10 trained panelists. In order to evaluate the samples. A 9-point Hedonic method (1: very undesirable - 9: very desirable) was used. 5 sensory attributes (color, texture, flavor, odor and overall acceptance) were evaluated.

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This study was triplicated through a completely randomized design. Gelatin hydrocolloids in two levels (6 and 8%) and Xanthan in two levels (0.25 and 0.75%) and condensed whey in three levels (5, 10 and 20%) were considered as the independent variables and a design composed of 12 formulations was created. SPSS software was used for the statistical analysis of the parameters. Mean of the replicates were compared via the multi-range Duncan's test at 95% confidence level.

Results and discussion: The obtained results showed that with increasing of condensed whey decrease the PH formulation but ash, moisture, water activity and the rate of protein in samples significantly have increased. Also effect of Xanthan and gelatin had an increase trend in water activity of samples. Also with increasing every three variables in formulation, brix had an increase trend. According to results with increasing hardness gelatin has increased the chewing and continuity feature of texture but adhesion had a decreasing trend. The increasing of Xanthan formulation led to increase of elasticity, context chewing of gum and decreasing of samples. Colorimetric results in method of Image processing were not significant on none of colorimetric variables. But in generally with increasing hydrocolloids in formulation had decreasing the light intensity and L* had a decreasing process. Sensory evaluate shows samples containing of 20% whey have less general acceptance. Also the samples containing of highest percentage of hydrocolloids allocated to themselves the less of rating flavors and aromas.

Keywords: Date scrap, Whey, hydrocolloid, Texture profile Analysis, Image processing.