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Mixed Cream Stabilized with Xanthan Gum, a New Substitute for Dairy Cream

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In recent years because of the increasing prevalence of diseases and health problems caused by consumption of high cholesterol foods, food manufacturers have tried to decrease the amount of cholesterol in foods. Notable amounts of cholesterol in animal fats such as cream, is a risk factor for cardiovascular diseases [1]. In food processing or storage, some compounds are produced due to oxidation of cholesterol that can endanger human health [2]. Since sensory characteristics of the foodstuffs such as taste, mouthfeel, and texture are produced by fats, complete removal of fat from foods' formula is not possible [3]. Mixed creams are alternatives for dairy creams in which dairy fats or proteins are replaced wholly or partially by non-milk components, especially vegetable fats, oils, and proteins. The main motivation for producing these products is demand of industrial units for cheap alternatives with similar and proper functional properties of dairy cream. Mixed cream consists of an aqueous continuous phase (optionally containing one or more compounds of milk), a fat phase (containing vegetable and dairy fat), and the emulsifier system. Food emulsions, such as cream are thermodynamically unstable. Generally, the factors affecting the stability of the emulsion can be divided into two categories: internal and external. Internal factors include interfacial properties conditions and storage time while bacterial action and mechanical stirring are external factors. Creaming, Flocculation, Coalescence, and Ostwald ripening are physical instability factors of emulsion and there are two ways to delay the instability process in emulsion. The first way is to use mechanical operations to control the size of dispersed particles and the second method is to add additives, such as emulsifiers which have low molecular weight and stabilizers. The main aim of using the second method in this research is to prevent from reconnection and mixture of emulsion particles which is often made through repulsive reactions among particles [4]. In this study, Xanthan was used as stabilizer because Xanthan solutions are very stable against environmental conditions. For

example they have stable viscosity in pH = 1-13 and temperature range of 0-100 ° C. Xanthan solutions have unique ability to protect viscosity emulsion before their melting temperature. In this temperature, viscosity decreases suddenly due to irreversible molecular changes [5]. Viscosity of the emulsion system depends on rheological properties of the continuous phase which is strongly influenced by the number and strength of intermolecular forces [6]. Stabilizers are used to increase the viscosity of the continuous phase of emulsion. Stabilizers increase stability of the emulsion by slowing down and postponing movement of droplets [7]. Stabilizers change rheological properties directly and increase viscosity of the continuous phase. In addition, stabilizers alter the rheological properties indirectly by changing the intensity of gravitational forces between the droplets [8]. Xanthan forms highly viscous solution at relatively low concentrations and creates desirable rheological properties in food emulsions [9]. Although xanthan gum is an ionic gum and has lower molecular weight than other gums such as guar gum, it increases viscosity at similar concentrations [10]. The results of this study showed that Xanthan gum increases the viscosity and reduces the amount of drainage stability in the mixed cream. Furthermore, although soy milk affects the taste of product, it creates a proper texture along with other ingredients. Using flavors in the soy products reduces undesirable flavors and also brings variety in products. With regard to different capacities of water bindings as well as vegetal and animal proteins, using stabilizers such as Xanthan can be effective in improvement of appearance characteristics, especially texture of soy products [11].

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