

## Modified Corn Starch as a Fat Replacer in Low-Calorie Mayonnaise

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The growing demand for healthier food options has spurred interest in reducing fat content in popular products like mayonnaise. This study investigates the potential of using modified corn starches as fat replacers to develop low-calorie mayonnaise emulsions with desirable physicochemical and sensory characteristics. Corn starch was subjected to four distinct modification techniques: annealing (ANN), citric acid hydrolysis (CA), acetylation (ACT), and heat-moisture treatment (HMT). The resulting modified starches were incorporated into mayonnaise formulations at 30% and 50% fat replacement levels, with a full-fat (FF) mayonnaise serving as a control. Comprehensive physicochemical analyses, including color, pH, viscosity, and emulsion stability (including freeze-thaw stability), were conducted. Furthermore, sensory evaluation was performed to assess the acceptability of the reduced-fat mayonnaise samples. Physicochemical analyses revealed significant variations in the properties of the modified starches due to the different treatments. Notably, mayonnaise samples formulated with ACT, CA, and HMT starches at a 30% fat replacement level exhibited high viscosities, comparable to the FF control. In contrast, ANN starch failed to provide adequate viscosity at both replacement levels. Interestingly, all fat-reduced mayonnaise samples demonstrated improved freeze-thaw stability compared to the FF control and exhibited high overall emulsion stability. Sensory evaluation (9 point hedonic test) indicated that mayonnaise prepared with ACT 30%, CA 30%, HMT 30%, and the FF control achieved comparable scores across all sensory attributes (appearance, color, aroma, texture, and taste), leading to high overall acceptability. Conversely, the ANN 50% sample received lower scores in all sensory aspects, consistent with its observed lower viscosity. This study highlights the promising potential of acetylated (ACT), citric acid hydrolyzed (CA), and heat-moisture treated (HMT) modified corn starches as effective fat replacers in mayonnaise, particularly at a 30% replacement level. These modifications enable the development of low-calorie mayonnaise alternatives that maintain crucial textural and sensory attributes comparable to their full-fat counterpart. Annealing, however, proved less effective in achieving desirable viscosity and sensory properties in reduced-fat mayonnaise. These findings offer valuable insights for the food industry in formulating healthier mayonnaise options.

**Keywords:** Corn starch, fat replacer, mayonnaise, modified starch