

Research Paper

Study of oil uptake and some quality attributes of potato chips affected by hydrocolloids

Amir Daraei Garmakhany, Habib Ollah Mirzaei, Mahdi Kashani Nejad and Yahya Maghsudlo

Department of Food Science & Technology, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran

The use of coating agents is one effective way to reduce oil absorption in fried products. Reducing the fat content of fried foods by application of coatings is an alternative solution to comply with both health concerns and consumer preferences. The aim of this study was to analyze the effect of hydrocolloids as coating agent on the quantity of oil uptake and on sensory attributes of potato chips. The effect of the coating composition showed that the minimum fat content was related to 1% carboxymethyl cellulose (CMC), 0.5% xanthan, 0.3% guar and 1% xanthan with 21.2, 21.7, 22.4 and 24.8%, respectively, and the highest of fat content was related to blank sample (non-coated), 2% tragacanth, 0.5% guar gum with 49.4, 41.7 and 33.2% of oil content, respectively ($p < 0.05$). The most effective coating agent reduced the oil uptake by 57.03, 55.94, 54.67 and 49.71%, respectively ($p < 0.05$). Sensory evaluation showed that the best color was related to 1% CMC, 0.3% guar and 2% tragacanth, and with respect to flavor evaluation the best flavor was observed in tragacanth 2%, CMC 0.5% and CMC 0.1%, and the best texture referred to tragacanth 2%, CMC 0.5% and CMC 1%. In sensory evaluation, all coated chips got high scores compared with blank (non-coated chips) samples ($p < 0.05$).

Keywords: Coating / Hydrocolloids / Oil absorption / Potato chips

Received: October 29, 2007; accepted: May 23, 2008

DOI 10.1002/ejlt.200700255

1 Introduction

Overweight and body fat greatly increase the risk of adverse health consequences. Despite the shift in eating patterns to low-fat foods, especially those low in saturated fats to reduce the risk of heart disease, people still consume high levels of fried foods because they are more tasty and easier to prepare. Ways of reducing fat absorption during frying are mentioned as below: use of pre-drying before frying, frying under high-temperature and short-time conditions, and use of an edible film as coating agent [1–5]. Thus, reducing the fat content of fried foods by application of coatings is an alternative to comply with both health concerns and consumer preferences.

Susanne and Gauri [6] investigated the effects of 11 hydrocolloid materials, including gelatine, gellan gum, k-carrageenan-konjac-blend, locust bean gum, methyl

cellulose (MC), microcrystalline cellulose, pectin (three types), sodium caseinate, soy protein isolate (SPI), vital wheat gluten, and whey protein isolate. Their results showed that all coating agents reduced oil absorption in comparison to blank samples.

Several groups have studied the properties of different coatings to reduce oil migration [7–10]. Hydrocolloids with thermal gelling or thickening properties, like proteins and carbohydrates, have been tested. Williams and Mittal [9] found that MC films reduced fat uptake more than hydroxypropyl cellulose and gellan gum films applied to a pastry mix. Mallikarjunan et al. [8] stressed that, in products coated with cellulose derivatives, a protective layer is formed on the surface of the samples during the initial stages of frying due to thermally induced gelation above 60 °C. This protective layer retards the transfer of moisture and fat between the sample and the frying medium.

García et al. [10] tested different cellulose derivatives for coating formulations to reduce the oil uptake of fried products. The coating application did not modify either the texture characteristics or sensory properties of the fried samples. MC

Correspondence: Dr. Habib Ollah Mirzaei, Department of Food Science & Technology, Gorgan University of Agricultural Sciences and Natural Resources, Beheshti Ave., Gorgan 49138-15739, Iran.

E-mail: habibmirzaei@yahoo.ca

Fax: +981714426432