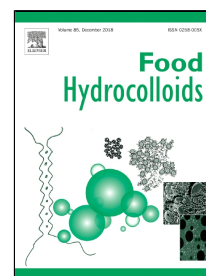


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Effect of Persian gum and Xanthan gum on Foaming Properties and Stability of Pasteurized Fresh Egg White Foam

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1 Effect of Persian gum and Xanthan gum on Foaming Properties and Stability of 2 Pasteurized Fresh Egg White Foam

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9 Abstract

10 Pasteurization process results in undesirable effects on foaming properties and stability of
11 liquid egg white. Persian gum (PG) as native hydrocolloids and Xanthan gum (XG) (in three
12 levels) were added to liquid egg white in order to improve the foaming properties of the final
13 solution prior to pasteurization. The viscosity increment of egg white was the natural
14 consequence of addition of XG and PG. By addition of hydrocolloids to egg white solution,
15 the solution's flow behavior changed from Newtonian to Pseudoplastic and flow curves were
16 fitted to power law model consequently. Both hydrocolloids showed positive effects on foam
17 stability in all levels, yet their negative effect on overrun and foam density was undeniable.
18 High concentrations of XG and PG (0.1 % \leq) resulted in the improvement of foam texture,
19 while XG exhibited the greatest effect on foam elasticity through physical interaction with
20 unfolded proteins. Analyzing microscopic images of foam bubbles, owing to different bulk
21 viscosity of samples, showed negative effect of over beating for some samples while in some
22 others the whipping time was inadequate to reach the maximum gas phase.

23

24 Keywords: Egg white, Foam, Persian gum, Xanthan gum, Pasteurization

25

26 1. Introduction

27 Fresh egg white (albumen) is a 10% protein solution containing over than 20 different proteins.
28 Albumen's pH varies from 7.6 to 9.7 depending on the storage time. The pH changes occur due to CO₂
29 diffusion from egg shell during storage time (Belitz, Grosch, & Schieberle, 2009). Owing to the
30 sensitivity of some proteins to surface denaturation (ovalbumin) and also viscosity making protein
31 (ovomucin) along with binding ability of some other proteins (lysozyme), albumen can make a solid,
32 irreversible and semi stable foam which is applied widely in variety of food and bakery products
33 (Abeyrathne, Lee, & Ahn, 2013; Garibaldi, Donovan, Davis, & Cimino, 1968; Hagolle, Relkin,
34 Popineau, & Bertrand, 2000; Stevens, 1991). It is noteworthy to mention that none of these proteins can

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