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Guar Gum Fiber as Fat Replacer in Low Fat Cheddar Cheese

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Low fat Cheddar cheese is the demand of present era, but lacks the quality and functionality. Guar gum shows stability during freeze-thawing cycles and it can retard ice crystal growth by slowing mass transfer across solid and liquid interfaces. Guar gum is added to low fat milk to maintain texture and rheology of cheese similar to full-fat cheese. Guar gum was used at 0.15, 0.30 and 0.45% in Cheddar cheese with 2% fat level of milk. The result regarding analysis of variance for low fat Cheddar cheese revealed highly significant ($p<0.01$) effect on gumminess and chewiness and Significant ($p<0.05$) effect on hardness, melt-ability and yield. Cohesiveness, springiness and flow-ability showed non-significant ($p>0.05$) effect of different levels of guar gum. By increasing the level of guar gum, cheese become softer, maximum hardness was found in cheese with less concentration of gum. Gumminess and chewiness decrease by increasing the level of gum. Melt-ability and flow-ability increased by increasing gum level. The decrease in hardness of cheese containing guar gum was probably due to change in protein matrix compactness since addition of guar gum increases water binding capacity of protein matrix. Decrease in fat with incorporated fat mimetic ingredients could increase protein water interaction enhancing adhesiveness in cheese. Scanning electron microscopy results showed that cheese with guar gum has better texture as compared with other samples, it shows more homogeneous structure. The addition of guar gum as fat replacement improved the sensory characteristics of low fat cheese samples when added up to the level of 0.45% guar gum.

Keywords: Cheddar cheese, Gumminess, Chewiness, Melt-ability, Flow-ability