Fat performs many important functions within a food, such as flavor, appearance, texture and shelf life, but excessive intake of dietary fat causes some metabolic disorders, such as cardiovascular diseases, obesity, cancers, hypertension and diabetes. Thus, developing low-fat or skimmed food products has received much attention from scientists and industry. Low-fat and skimmed Mozzarella cheeses are usually characterized as having textural, functional and sensory defects such as rubbery texture, poor meltability and undesirable color. Fat replacers are used for improving the properties of these cheeses. Konjac glucomannan (KGM) is a natural polysaccharide with several desirable nutritional characteristics, and has potential functional properties as a fat-replacer in dairy products.

In our study, physicochemical, textural (firmness and stickiness, analyzed by TPA test), pizza baking properties and microscopic structural characteristics (by confocal laser scanning microscopy) of low-fat and skimmed Mozzarella cheese with KGM (LFKGM and SKKGM) were compared with those of full-fat, low-fat and skimmed Mozzarella cheese control (FFC, LFC and SKC) during 0, 7, 14, 21 and 28 days storage at 4 °C. Generally, addition of KGM to Mozzarella cheese had no significant effects on composition, moisture level and pH. The moisture level was stable while pH increased during storage. The LFKGM and SKKGM exhibited higher whiteness (L*), greenness (-a*) and yellowness (b*) hues compared with those of LFC and SKC. The L* decreased, a* remained stable and b* increased for all the cheeses after heating compared with those of unheated samples during storage. Addition of KGM to low-fat and skimmed Mozzarella cheeses increased meltability (length change after heating) and gave LFKGM similar meltability to FFC. Addition of KGM to low-fat Mozzarella cheese gave similar firmness to FFC blocks, which was lower than that of LFC during storage. There was no significant difference in stickiness of LFKGM and SKKGM from LFC and SKC during storage. KGM addition did not affect free oil in low-fat and skimmed cheeses. The pizza bake test of LFKGM and SKKGM performed at D 7 and D 28 showed more adequate meltability and less scorching of the cheese shreds compared with LKC and SKC. Additionally, KGM addition increased stretching property in low-fat and skimmed cheeses. FFC and LFC showed long serum channels with fat located inside, while SKC, LFKGM and SKKGM showed densest protein matrix as observed by confocal microscopy. Results indicated that KGM may be a good fat-replacer to develop reduced-fat Mozzarella cheese with desired characteristics.

-All Are Welcome-