

CHAPTER 7: CONCLUSIONS & RECOMMENDATIONS

Sponge cake quality is effected by whether fresh, frozen or dehydrated forms of egg were used. In general, spray-dried egg powder performs better compared to other egg forms.

The proximate composition, pH, foaming overrun and coagulation temperature of egg affect the baking performance of sponge cakes. Frozen egg pulp and the egg powder mixture sponge cake samples have low baking volume due to their low protein content leading to low foaming overrun and higher coagulation temperature. Although it had low foaming overrun, the high baking volume of spray-dried egg powder sponge cake samples is due to an emulsifier added in the sponge cakes batter.

The hypothesis that the shelf-life of sponge cakes baked with different forms of egg will differ, is confirmed by this study. The water activity of the cakes and the temperature of storage play the largest role. The water activity of the cakes is not directly related to the water-holding capacity of the egg samples.

All the samples soften after baking over a period of 4 days due to the action of the emulsifier. The hardening of sponge cake samples is not a linear increase over the storage period. Fresh shell egg sponge cake samples harden after 24 days of storage whereas spray-dried egg powder and egg powder mixture sponge cake samples had noticeable hardening of texture after 12 days of storage.

The sensory attributes of sponge cake were directly influenced by the functional properties of egg samples. In this research, pH played a major role on the functional properties while the protein and fat contents of fresh shell egg, frozen egg pulp and spray-dried egg powder samples do not contribute major differences. Water-holding capacity is also affected by pH; the higher the pH, the more the water binding due to

the gel structure formed and high gel strength. The ingredients of the egg powder mixture samples also affect the functional properties and sensory properties of the batter and sponge cake samples, respectively, especially the inclusion of skim milk powder, Nutrifat and black pepper.

The hypothesis that the sensory properties of sponge cake samples are affected by different forms of egg products is partly accepted. Spray-dried egg powder sponge cakes do not show more compact texture, but paler colour was found on its crumb than fresh shell egg sponge cake samples.

The frozen egg pulp sample that was supplied is not performing similarly to fresh shell egg due to the poor and inconsistent quality. This however, is not a true reflection of the potential of freezing technology. The quality of frozen egg pulp sample varied from different batches. This can be improved by more efficient freezing method and addition of other substances such as sugar or salts. In addition, the total solid contents of frozen egg pulp is also important.

The egg powder mixture that was supplied is not suitable for sponge cake baking. However, spray-dried egg powder with emulsifier added replace beautifully in sponge cake baking. Hence, spray-dried egg powder with emulsifier can replace liquid whole egg in sponge cake baking. Adaptation of the formulation of the egg powder mixture is therefore recommended.