

# Design and Development of a Low Cost Prototype Food Penetrometer to Evaluate Quality of Foods

A. P. Hashini I. Abeysuriya, S. B. Navaratne, P. L. A. G. Alwis

**Abstract**— This study was undertaken to design and develop a low cost food penetrometer to measure quality of solid, semi-solid and liquid foods. This equipment specifically has designed to measure the force required for the penetrant to travel a constant distance into food sample. Two types of penetrants were tested with the developed equipment. A penetrant fabricated with aluminum and which is a half hollow cone with  $90^{\circ}$  of internal angle was used for liquid and semi-solid foods. A penetrant fabricated with nylon and which is a solid cone with an internal angle of  $20^{\circ}$  was used for solid foods. The developed food penetrometer was tested with different types of food samples including bread, yoghurt and a sugar solution. Reading of the fabricated food penetrometer for fresh bread was 0.1755N and readings were increased during the storage period. Food penetrometer readings for fresh yoghurt and spoiled yoghurt were 0.1704N and 0.1242N respectively. In sugar solution samples, readings from fabricated food penetrometer were gradually decreased during fermentation.

**Index Terms**— Food rheology, Food texture, Low cost food penetrometer, Penetrant, Prototype food penetrometer, Quality of foods, Texture measurement

