



Formulation and Quality Evaluation of a Value-Added Hot Sauce Incorporating Scotch Bonnet (*Capsicum chinense*) and Traditional Lime Pickle (*Citrus aurantifolia*)

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Scotch Bonnet (*Capsicum chinense*) and lime (*Citrus aurantifolia*) are locally available ingredients in Sri Lanka that remain underutilized in high-value food products. Scotch Bonnet is rich in capsaicinoids, carotenoids, vitamins, and antioxidants, while traditional lime pickle provides strong acidic and aromatic characteristics. However, no scientifically validated formulation has combined these ingredients into a single value-added condiment. This study aimed to develop a hot sauce using ripened Scotch Bonnet and lime pickle and to evaluate its sensory quality, physicochemical properties, microbial safety, and storage stability. Eight formulations (T1–T8) were prepared by varying Scotch Bonnet (5–26%) and lime pickle (10–26%) proportions. Sensory evaluation was conducted using a five-point hedonic scale, and physicochemical and microbial analyses were performed in triplicate. Sensory results revealed that the formulation with 20% Scotch Bonnet and 15% lime pickle (T8) received the highest overall acceptability score (4.52 ± 0.18), which was higher than that of commercial chili sauces. Proximate analysis showed $77.14 \pm 0.63\%$ moisture content, $2.84 \pm 0.12\%$ protein, $3.19 \pm 0.19\%$ fat, $1.99 \pm 0.05\%$ crude fiber, $2.76 \pm 0.41\%$ ash, $12.07 \pm 1.10\%$ carbohydrates, and an energy value of 83.38 ± 2.72 kcal/100 g. pH increased slightly from 3.39 to 3.86 and Brix rose from 25.03° to 27.40° over 12 weeks, while titratable acidity gradually decreased from 0.82 to 0.69%. Microbial counts after 6 weeks remained within acceptable limits for sauces, with an aerobic plate count below 1×10^4 cfu/g and yeast and mold below 1×10^2 cfu/g; observed values were 1.5×10^1 cfu/g and 1.0×10^1 cfu/g, respectively, and no *Escherichia coli* was detected. In conclusion, combining Scotch Bonnet and lime pickle produced a stable, nutritionally acceptable, and highly preferred hot sauce. The optimized T8 formulation, containing 20% Scotch Bonnet, 15% traditional lime pickle, and 65% other ingredients, shows strong potential for commercial production, value addition, and reduction of postharvest losses using locally available ingredients.

Keywords: Food preservation, Hot sauce, Lime pickle, Sensory, Scotch Bonnet