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Production and quality evaluation of watermelon (*Citrullus lanatus*) jam using pectin extracted from lemon (*Citrus limon* L.) peels

S. Dhushane* and T. Mahendran

Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Chenkalady (E.P),
Sri Lanka

*dhusha111@email.com

One of the major challenges facing the food industry throughout the world, is the full utilization of the waste material. Huge amount of solid fruit waste cause environmental health hazards, which is on the increase. During processing, citrus peels contribute almost 15-20% of the total fruit waste. Citrus fruit peels are very rich in pectin and can be used as a source of pectin for commercial production. Moreover, the citrus fruit peels contain several bioactive compounds including carotenoids, essential oils, antioxidants and flavours that are widely incorporated into food products in order to enhance their sensory properties and to develop their nutritional and health benefits. This study is aimed to determine the suitability of lemon peels as a source of pectin for watermelon jam production with different combinations of sugar and pectin levels. The extracted pectin content from lemon peel is 20.4% with methoxyl content of 1.56%, which can be considered as low methoxyl pectin. The physico-chemical, sensory and microbiological properties of the jams prepared according to different formulas were assessed using standard methods. The physico-chemical analysis of freshly made watermelon jam revealed an increasing trend, in *titratable* acidity from 0.27% to 0.61% (as citric acid), moisture from 52.9% to 63.1% and decreasing trend in pH from 3.95 to 3.31, total soluble solids from 68.04 to 66.11°Brix and total sugar from 50.4% to 16.5%, when the pectin levels increased from 1.8 g to 3.3 g for 500 g watermelon pulp. According to Turkey's test, the mean scores of the sensory evaluation showed that there were significant differences ($p>0.05$) between treatments in terms of colour, taste, texture, aroma and overall acceptability in freshly formulated jam. There were no significant ($p>0.05$) differences observed in total plate count in the all treatments. Heating of jam may have eliminated a large number of microorganisms. The results of this study revealed that the watermelon jam formulated with 65 g sugar and 2.8 g pectin to be the best combination and could be stored at 30 ± 1 °C and 70-75% RH for 12 weeks without any significant changes in the quality characteristics. Therefore, the lemon peel is a good source of pectin and could be used for the production of watermelon jam that has as no deleterious effect on consumer acceptability.

Keywords: Pectin, Lemon peels, Jam, Quality characteristics, Watermelon