

## Handheld arduino-based near infrared spectrometer for non-destructive quality evaluation of siamese oranges

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<b>First Author</b>	
<b>Last Author</b>	
<b>Authors</b>	Sulistyo, SB; Siswantoro; Margiwiyatno, A; Masrukhi; Mustofa, A; Sudarmaji, A; Ediaty, R; Listanti, R; Hidayat, HH;
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<b>Abstract</b>	Quality evaluation, in particular chemical properties, of orange fruit commonly conducted by destructive method by extracting its juice. A near infrared spectrometer (NIRS) can be used to quantify orange chemical properties with non-destructive method. This research aimed to design a handheld NIRS using AS7263 sensor and Arduino programming to estimate the Siamesa orange quality in its acidity (pH), total soluble solids (TSS) and vitamin C. The AS7263 sensor has six NIR channels for different wavelengths, i.e. R (610 nm), S (680 nm), T (730 nm), U (760 nm), V (810 nm) and W (860 nm). For that, a performance test was carried out using 300 samples of orange. Result show that evaluation of orange quality in acidity and TSS has mean absolute percentage error (MAPE) < 10%, and the vitamin C shows > 10%. In addition, the estimation of orange chemical properties by backpropagation neural network (BPNN) yielded better results compared to simple regression and multiple regression methods.
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<b>Author</b>	SUSANTO BUDI SULISTYO, S.TP, M.Si, PhD