

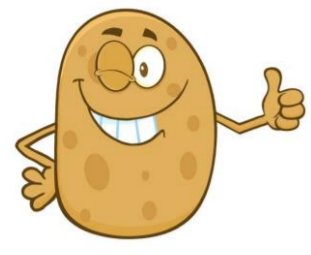
AN ATTEMPT TO THE NONDESTRUCTIVE INVESTIGATION OF

PHOTO-INDUCED POTATO POSTHARVEST

BiosysFoodEng 2021

QUALITY DEGRADATION - PRELIMINARY RESULTS

MATE MAGYAR AGRÁR- ÉS ÉLETTUDOMÁNYI EGYETEM



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Introduction:

Potato tubers are really sensitive to pre- and post-harvest greening due to (sun)light induced chlorophyll development associated with the formation of poisonous glycoalkaloids (α -chaconine & α -solanine).

Aims:

Preliminary investigation of photo induced formation of chlorophyll related compounds indirectly by the detection of chlorophyll development via the noninvasive determination of chlorophyll related spectral and fluorescence indices in case of market potato (*Solanum tuberosum L. cv. Pannónia*) during room storage.



sunlight induced stress
59 days room storage

initial groups:

spotted green (G)

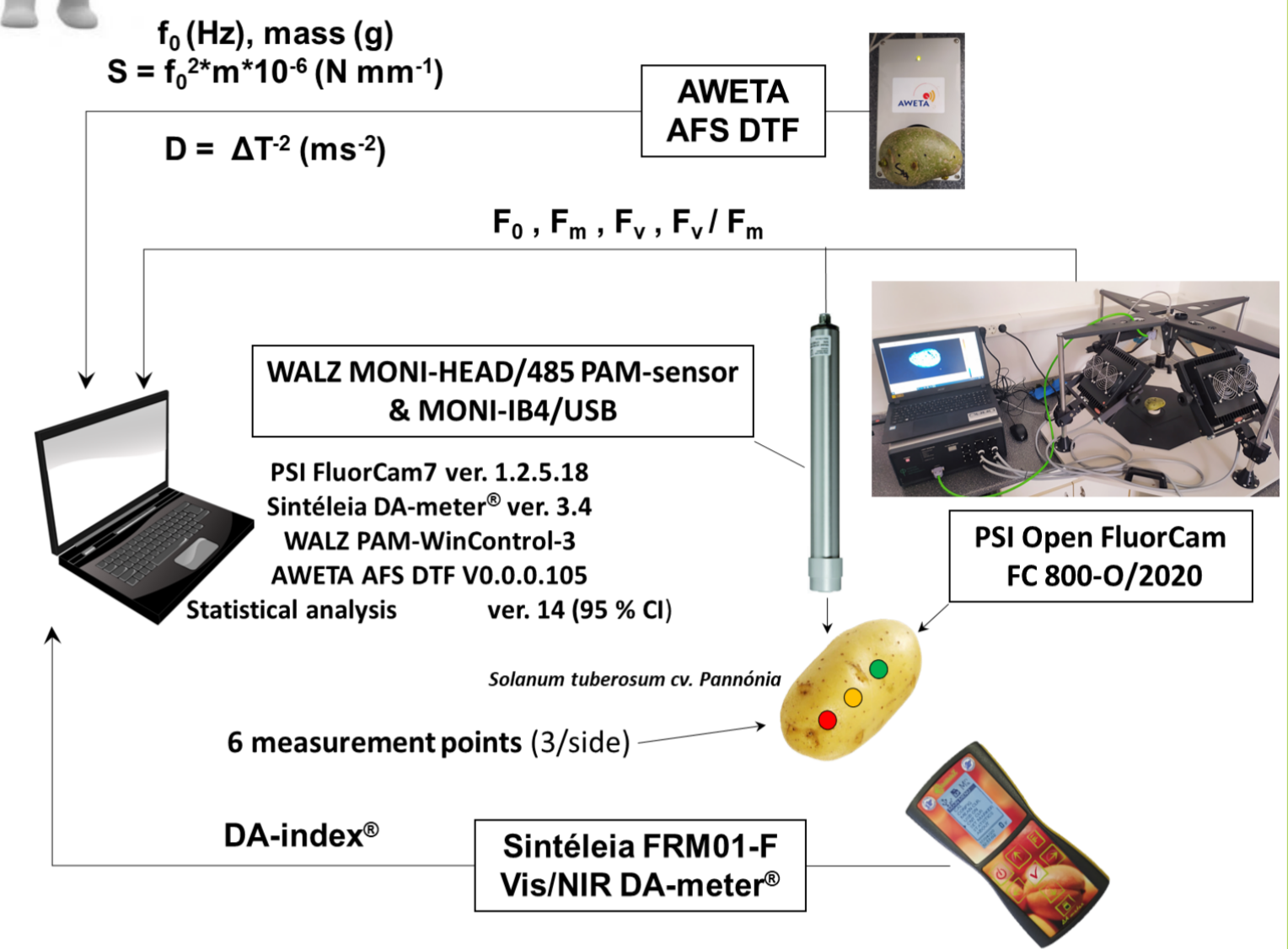
yellow (Y)

sunny (top) side

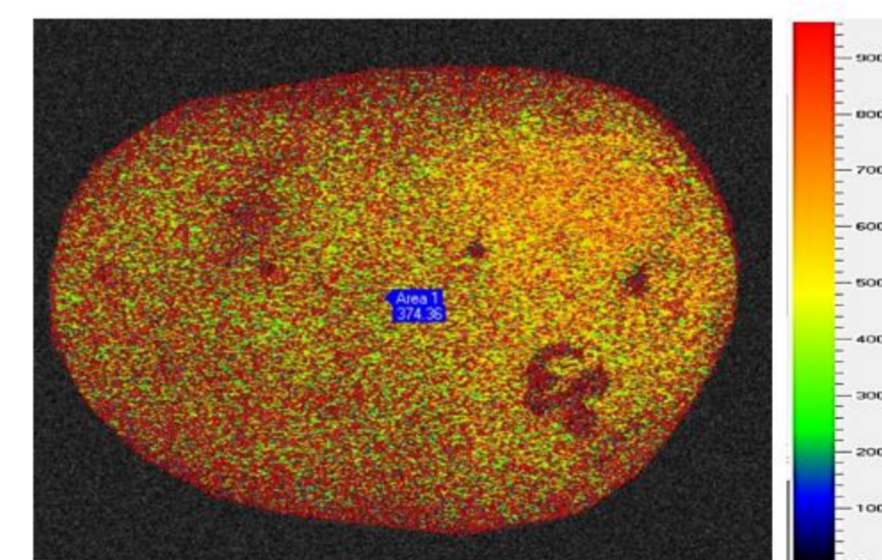
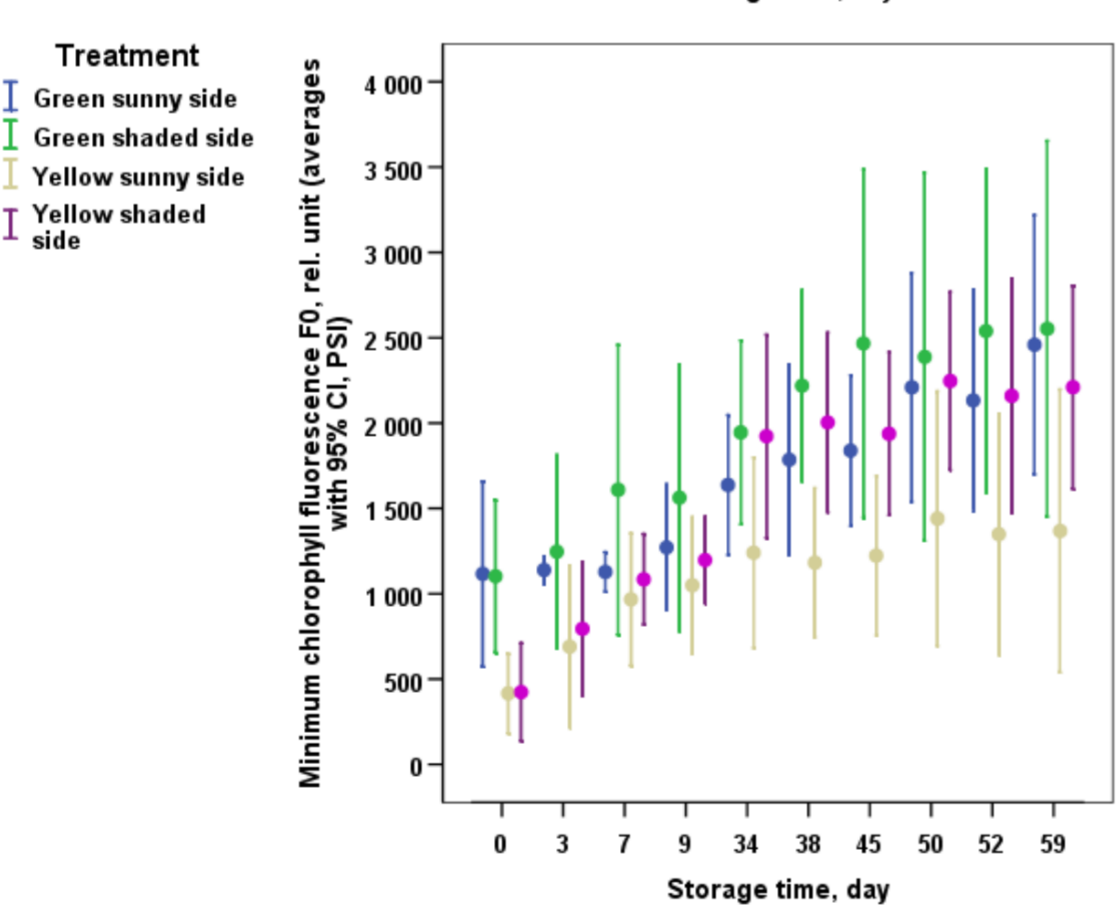
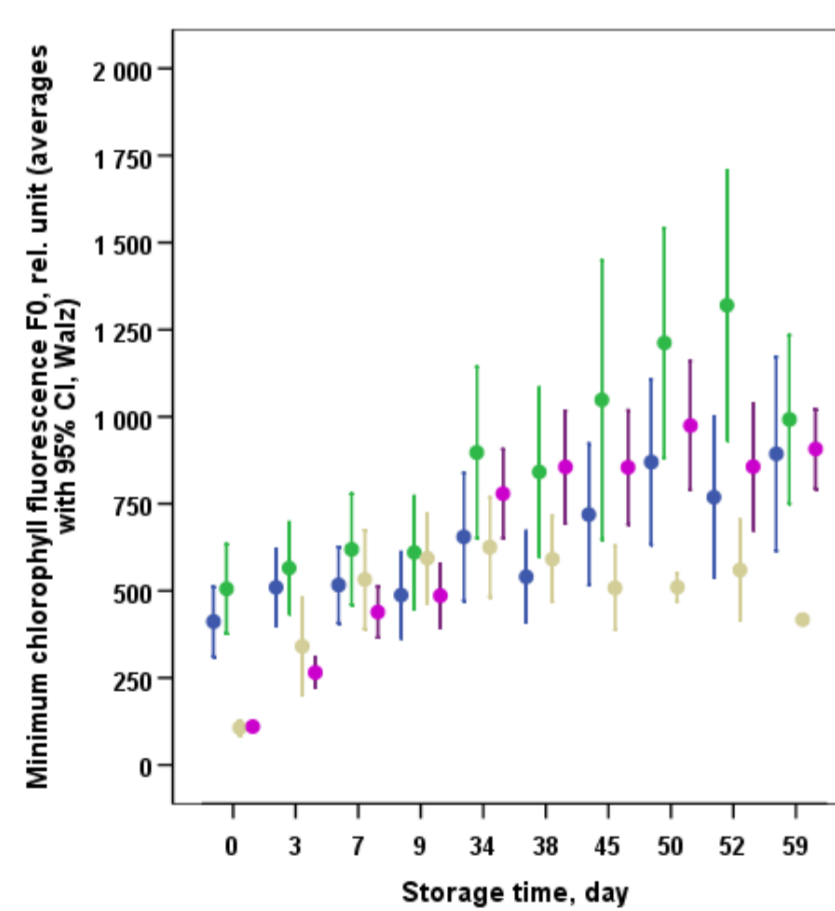
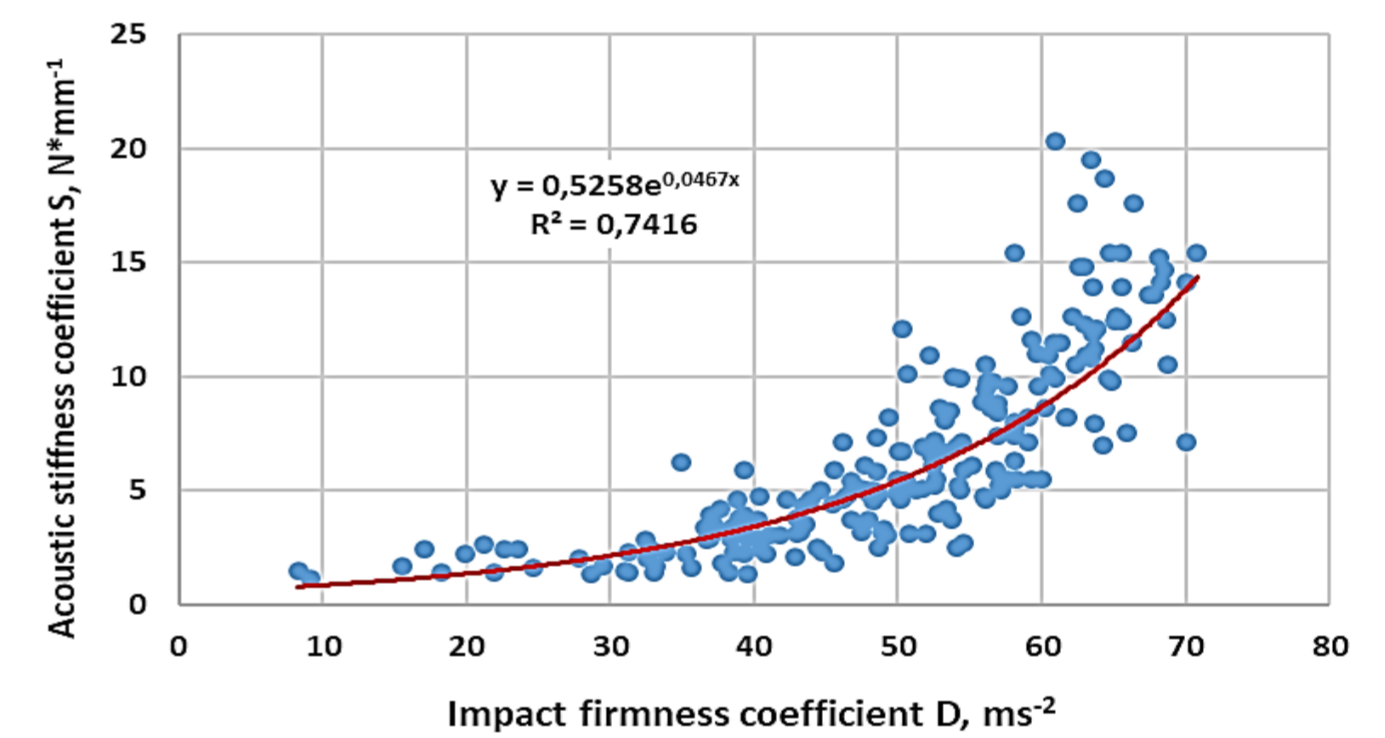
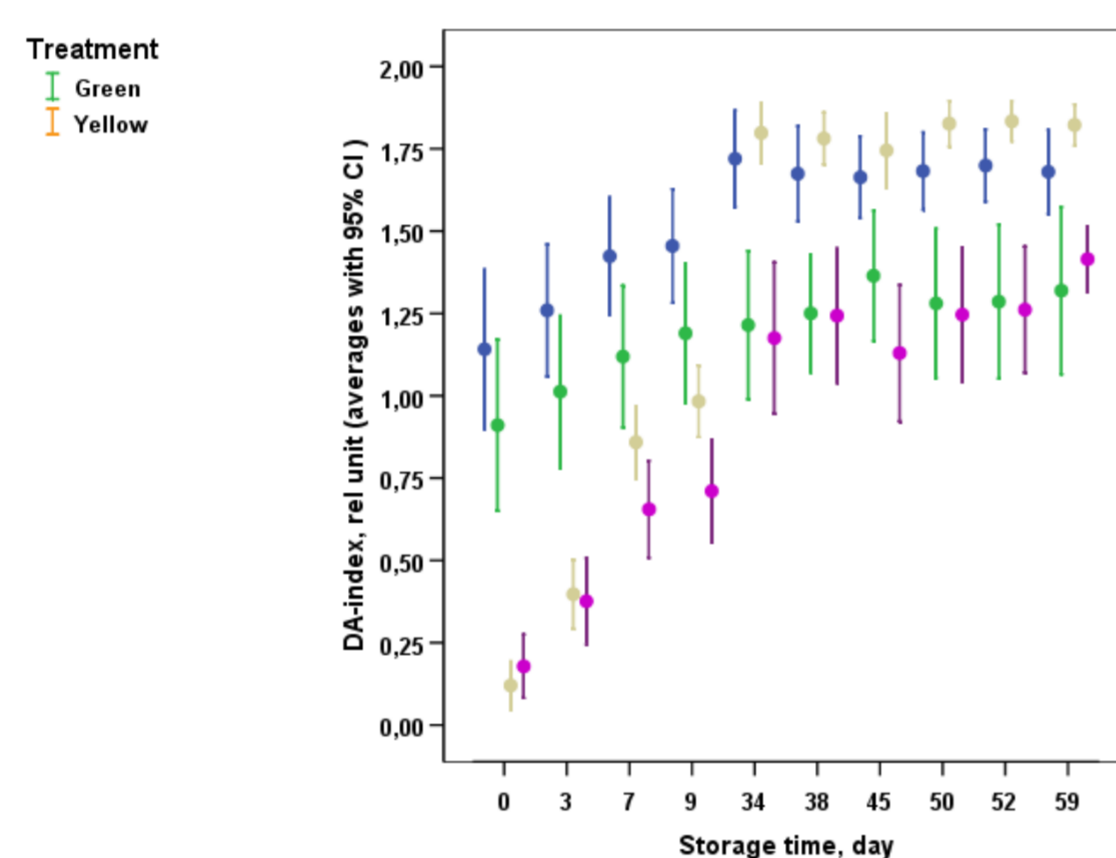
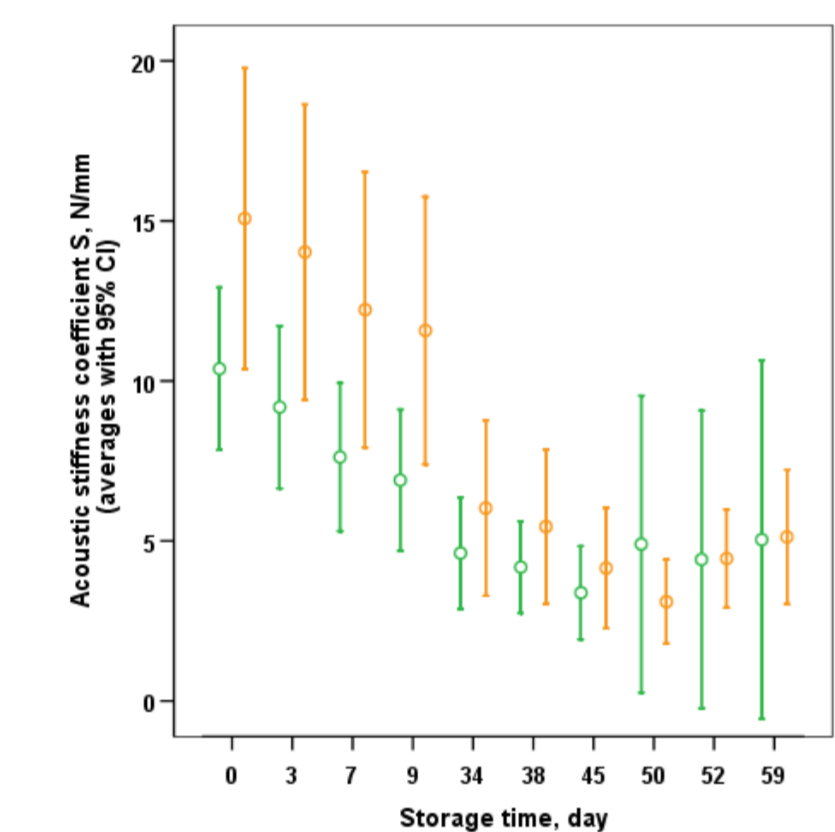
shaded (bottom) side



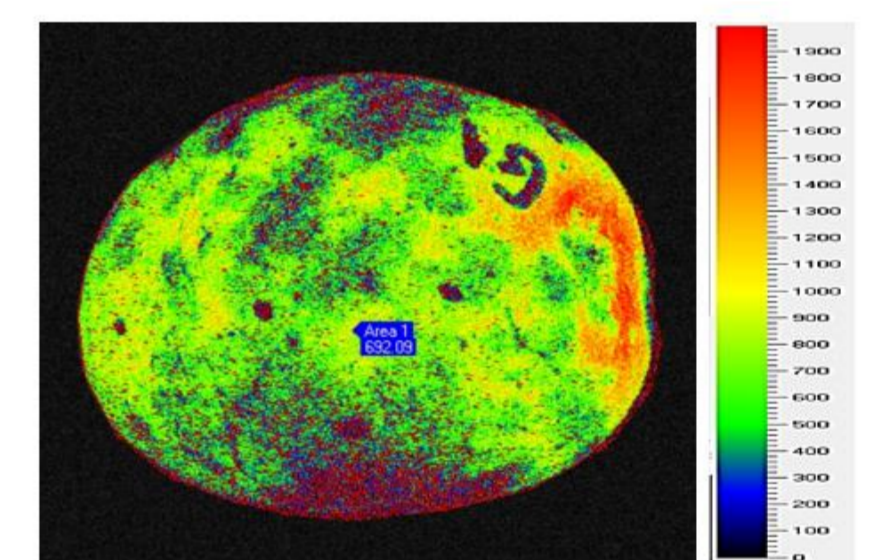
Materials & Methods :



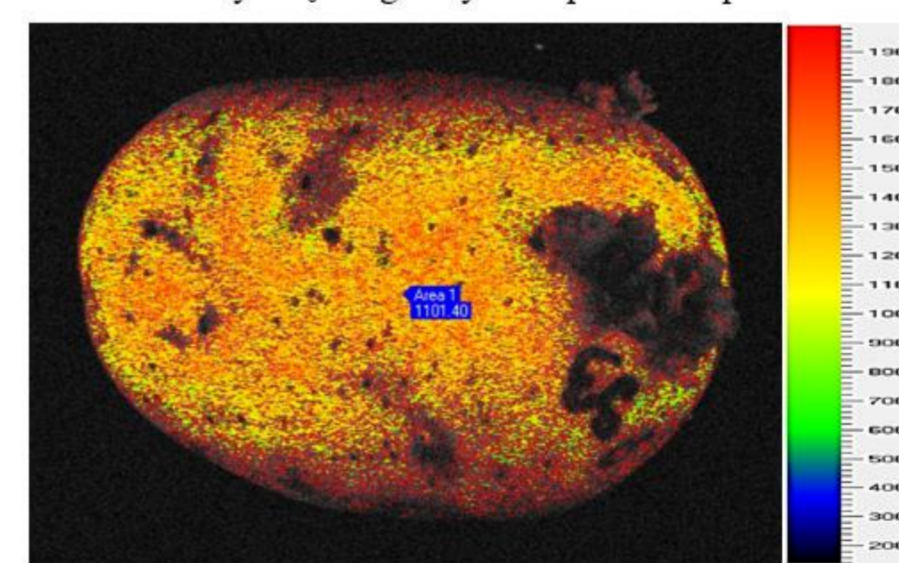
Results :



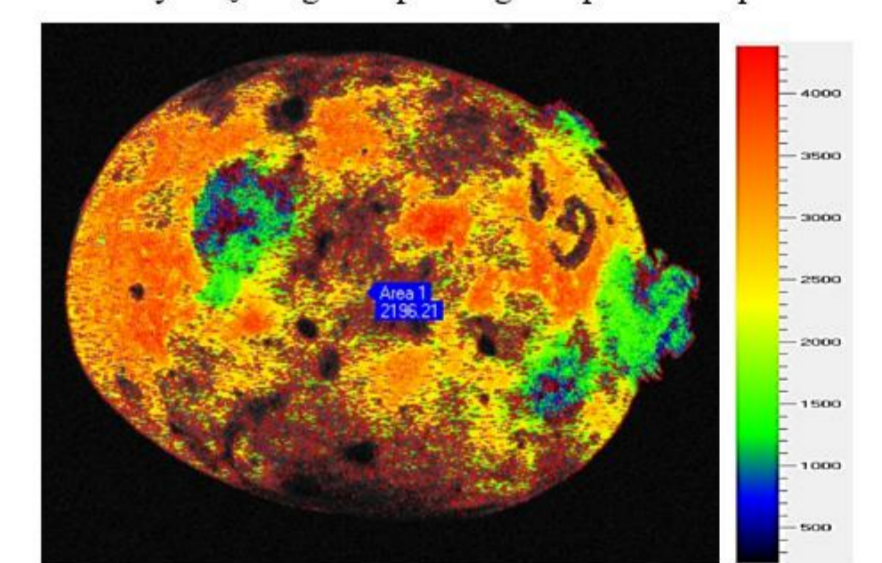
Day 0 F₀ image of yellow potato sample



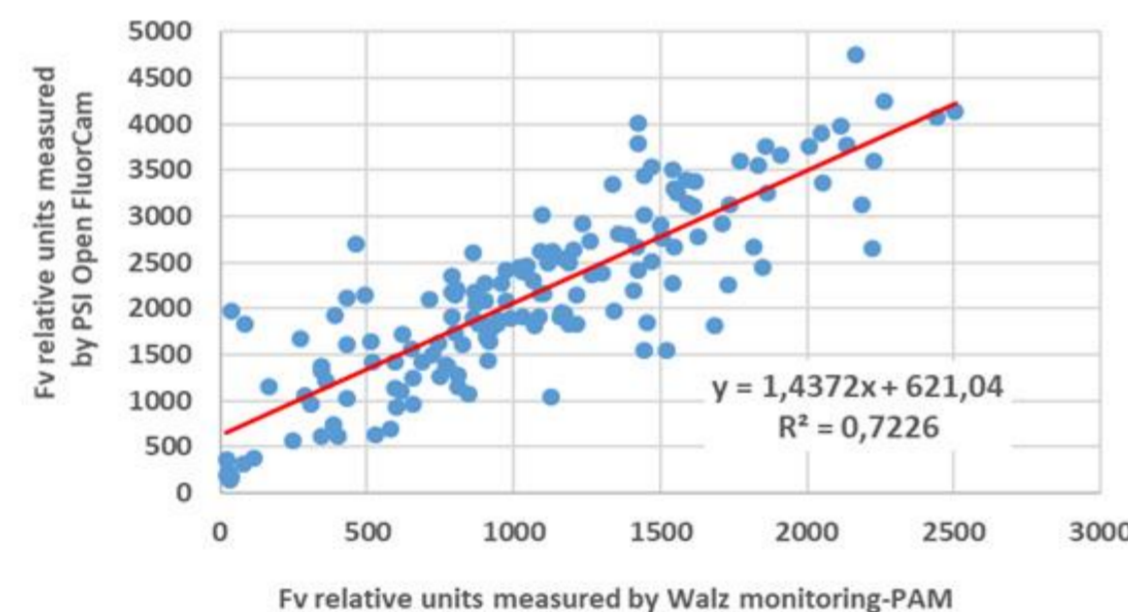
Day 0 F₀ image of spotted green potato sample



Day 59 F₀ image of yellow potato sample



Day 59 F₀ image of spotted green potato sample



Images of minimum chlorophyll fluorescence values (F_0) of potato samples measured by the PSI Open FluorCam device at the beginning (day 0) and at day 59 of storage. Colored intensity charts represent the F_0 intensities. In these false colored images, the redder is a pixel, the greener is the area of interest, so the higher is the photosynthetically active chlorophyll content related fluorescence light emission sensibly captured by the measuring device according to the intensity chart scaled in relative units.



Conclusions:

According to our preliminary results,

- the possibility of indirect detection of sunlight-induced formation of chlorophyll related human health hazardous compounds was investigated successfully by the noninvasive detection of chlorophyll development during simulated shelf-life storage of market potato,
- the evaluated quality indices (DA-index®, F_0 , F_m , F_v and F_v/F_m chlorophyll fluorescence parameters) objectively represented the sun-induced chlorophyll formation related quality changes of market potato stored at normal room conditions for an extended long period representing rough shelf-life storage conditions.
- the applied nondestructive devices as Vis/NIR DA-meter®, the monitoring-PAM and the chlorophyll fluorescence imaging fluorometers were found worth for further noninvasive investigations (e.g. effect of sort and intensity of illumination, potato cultivars, [cold and/or retail] storage conditions) of the postharvest chlorophyll formation based greening phenomena associated with potato glycoalkaloids (namely α -chaconine & α -solanine) development.

Thank you!

Acknowledgement

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