Comparing the MPM-100/S and "SPADa" parameter (Opti-Sciences, Hudson, USA) **with the SPAD® Meter** (Konica-Minolta, Osaka, Japan).

The MPM-100/S version is now available, with 940nm and 660nm LEDs. The MPM-100/S will measure approximate SPAD® units "SPADa". Anthocyanin and Flavonol functions remain the same as with the MPM-100.

The parameter "SPADa" is calculated using the formula:
SPADa = (log(940nm)-log(660nm)) * (a scaling factor) + offset.

Note: If you work with the scripting functions (defining how MPM-100 calculates parameters), you will find that T850 now represents T940, and T720 represents T660.

In a comparative study carried out by Prof. Chiara Cirillo, University of Naples, [Department of Agricultural Sciences, Division of Plant Biology and Crop Protection], the MPM-100/S was proven to provide "SPADa" values which closely matched the SPAD® values obtained by the SPAD-502Plus Meter® by Konica Minolta, Osaka, Japan.

"The MPM-100/S values obtained were very similar to SPAD-502 values"

MPM-100/S was tested and compared with a portable chlorophyll meter SPAD-502 (Konica-Minolta, Osaka, Japan). Both instruments were tested on a leafy vegetable, namely *Lactuca sativa* L. cv Canasta (Pagano Costantino & F.lli S.R.L, Scafati (SA), Italy. This cultivar has a crisp head typology and a red/green pigmentation.

The experiment was held in Mediterranean greenhouse conditions in autumn, for a period of 40 days. Lettuce plants were cultivated in pots filled with sandy or loamy soil and amended with crescent concentration of an organic substance. Each treatment consisted of 3 replicates made of 5 plants each.

Before harvest, both instruments were used to measure SPAD® index on the different plants cultivated in different substrates and treated with different concentrations of an amendment, in order to have a non-destructive measurement of leaf chlorophyll concentration and depict the utility of the amendments on the physiological state of the plants.

"The measuring head of MPM-100/S is longer than the one of SPAD-502, which renders it easier to be used in inconvenient positions of some leaves or plants"

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At harvest, 10 measurements by replicate were taken into consideration by applying the instrument on 2 leaves by plant by avoiding the central vein. The chosen leaves were young and fully expanded. Both instruments were used consecutively on the same leaves and spots to increase the accuracy of the measurements. At the end, the mean of the values/replicate was calculated and presented as one datum/replicate and then the mean of the replicates was calculated and presented as the value of each treatment.

The MPM-100/S values obtained were very similar to SPAD-502 values as illustrated in Figures 1 & 2:

Plots comparing MPM-100/S with the Konica Minolta SPAD-502Plus Meter® [credit to Prof. Chiara Cirillo, University of Naples, Italy, March 2022].

Figure 1: Raw Data

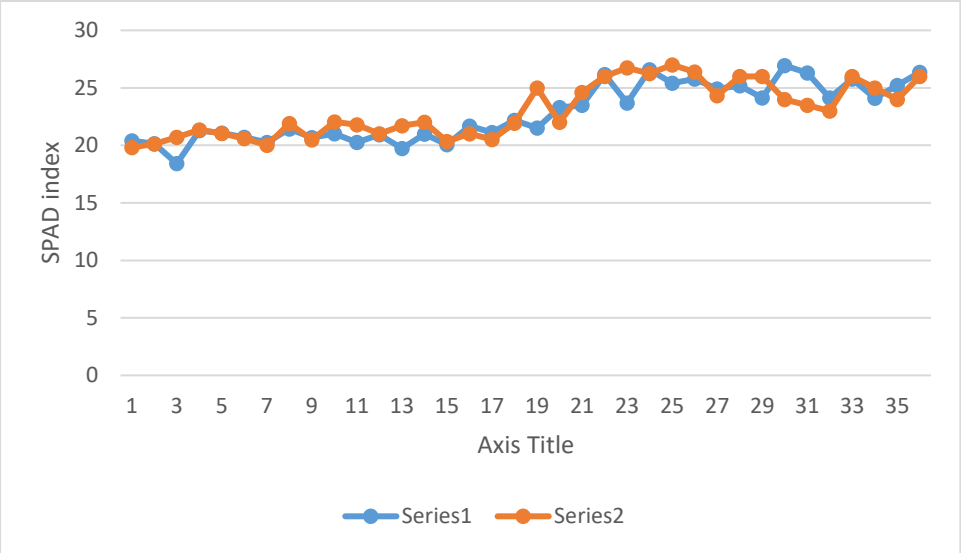
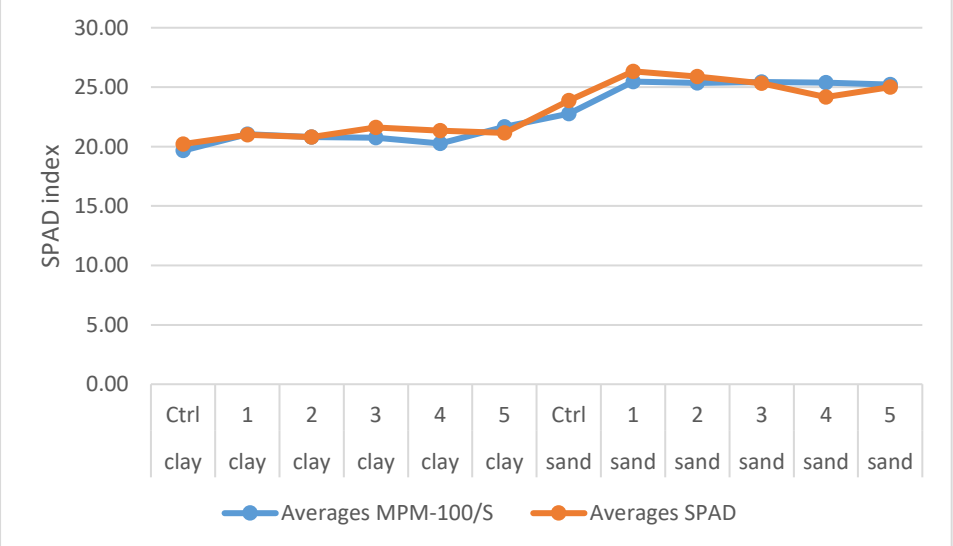


Figure 2: Averaged Data



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Advantages:
The measuring head of MPM-100/S is longer than the one of SPAD-502, which renders it easier to be used in inconvenient positions of some leaves or plants.
The digital screen is easy to see even under direct sunlight.
The data are registered and can be downloaded easily, which save time in the field in general during the measurements.

Area for improvement:
But a few aspects can be improved such as the batteries' duration, which lasted for 2 hours. The manual is not that clear, maybe additional information can be useful; for example we did need time to be able to figure out how to have a single value after one measurement, it was set differently as default (5 measurements to get one value). After each measurement, the data were not instantaneous on the screen like SPAD-502, so it is a bit more time consuming, but it is definitely understandable since lot of data are elaborated with one measurement. In addition, we were not sure at the beginning if the measured data were saved automatically (they are).

Figure 3: Spreadsheet of raw data

RAW DATA

Soil	Treatment	Replica	MPM-100/S	SPAD
clay	Control	1	20.41	19.82
clay	Control	2	20.15	20.11
clay	Control	3	18.41	20.71
clay	Ammendante dose1	1	21.3	21.35
clay	Ammendante dose1	2	21.08	21.03
clay	Ammendante dose1	3	20.71	20.6
clay	Ammendante dose2	1	20.26	20.01
clay	Ammendante dose2	2	21.43	21.9
clay	Ammendante dose2	3	20.68	20.48
clay	Ammendante dose3	1	21.02	22.05
clay	Ammendante dose3	2	20.27	21.8
clay	Ammendante dose3	3	20.94	21
clay	Ammendante dose4	1	19.72	21.7
clay	Ammendante dose4	2	20.99	22
clay	Ammendante dose4	3	20.07	20.33333333
clay	Ammendante dose5	1	21.68	21
clay	Ammendante dose5	2	21.13	20.5
clay	Ammendante dose5	3	22.17	21.93
sand	Control	1	21.5	25
sand	Control	2	23.28	22
sand	Control	3	23.49	24.6
sand	Ammendante dose1	1	26.17	26
sand	Ammendante dose1	2	23.67	26.75
sand	Ammendante dose1	3	26.57	26.25

sand	Ammendante dose2	1	25.4	27
sand	Ammendante dose2	2	25.77	26.37
sand	Ammendante dose2	3	24.92	24.33
sand	Ammendante dose3	1	25.2	26
sand	Ammendante dose3	2	24.14	26
sand	Ammendante dose3	3	26.95	23.99
sand	Ammendante dose4	1	26.3	23.5
sand	Ammendante dose4	2	24.12	23
sand	Ammendante dose4	3	25.76	26
sand	Ammendante dose5	1	24.09	25
sand	Ammendante dose5	2	25.21	24
sand	Ammendante dose5	3	26.36	26

Figure 4: Spreadsheet of averaged data points

AVERAGE DATA

Soil	Increasing Soil Improver Treatment	Averages MPM-100/S	Averages SPAD
clay	Ctrl	19.66	20.21
clay	1	21.03	20.99
clay	2	20.79	20.80
clay	3	20.74	21.62
clay	4	20.26	21.34
clay	5	21.66	21.14
sand	Ctrl	22.76	23.87
sand	1	25.47	26.33
sand	2	25.36	25.90
sand	3	25.43	25.33
sand	4	25.39	24.17
sand	5	25.22	25.00

Please contact ADC BioScientific or local, approved reseller for pricing and information on MPM-100 and available variations: MPM-100/S *and* MPM-100/C, for CCI unit measurement.

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