

BIO

ARALAB

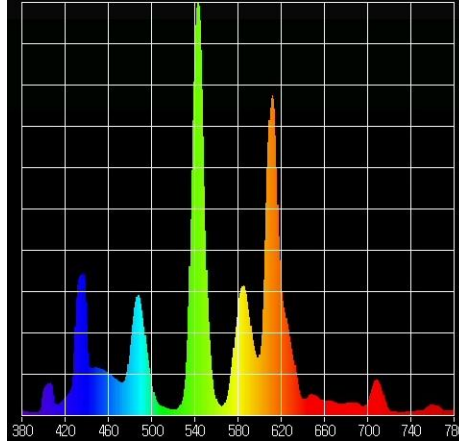
LIGHTING SOLUTIONS FOR PLANT RESEARCH APPLICATIONS



I - LIGHTS FOR MULTI-TIER 'WALK-IN' CHAMBERS

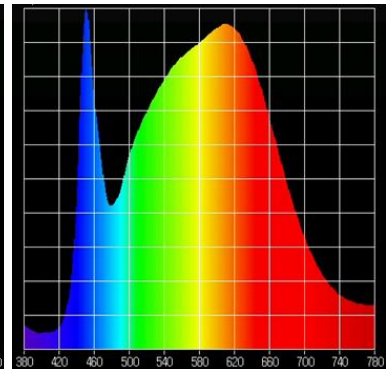
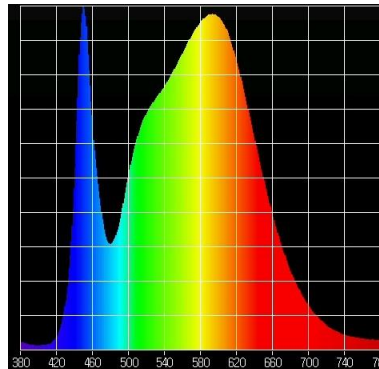
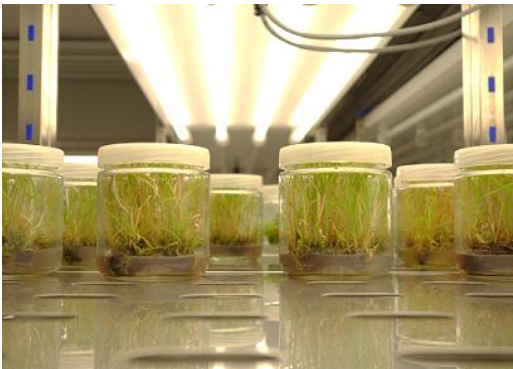
(Aralab Fitoclima PL/PLH Controlled Environment Rooms)

Standard cool-white fluorescent lights



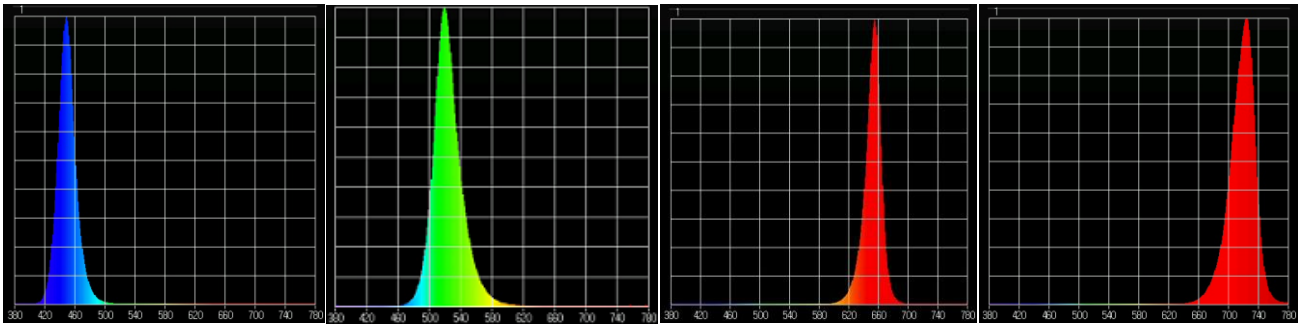
Light type	Cool-White Fluorescent 840
Make & Model	Philips and Osram
Light Intensity (at 150mm)	4 lamps per shelf: Up to 250 $\mu\text{mol}/\text{m}^2/\text{s}$ 8 lamps per shelf: Up to 450 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 10% to 100% intensity control

White tubular LED lights



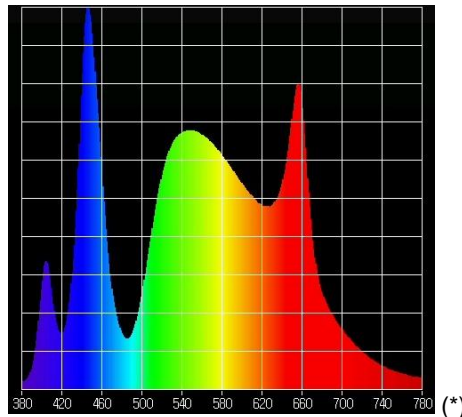
Light type	White LED. Two options, with more or less Blue, Red and Far Red spectrum
Make & Model	Aralab (powered by OSRAM LEDs)
Light Intensity (at 150mm)	4 lamps per shelf: Up to 250 $\mu\text{mol}/\text{m}^2/\text{s}$ 8 lamps per shelf: Up to 450 $\mu\text{mol}/\text{m}^2/\text{s}$ 10 lamps per shelf (special shelf for 18.000 PLH model): 600 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 10% to 100% intensity control
Other	<ul style="list-style-type: none"> Can allow up to 50% energy savings when compared to traditional fluorescent lamps With much less heat load being dissipated by these white tubular LEDs, they are most suitable for tissue culture and also applications requiring high relative humidity levels with lights on

Blue, Red and Far Red tubular LED lights



Light type	Single color LED tubes available in Blue, White, Green, Red and Far Red. Any color combination with 4 or 8 tubes can be configured.
Make & Model	Aralab (powered by OSRAM LEDs)
Light Intensity (at 150mm)	4 lamps per shelf: Up to 250 $\mu\text{mol}/\text{m}^2/\text{s}$ (dependent on LED colour combination) 8 lamps per shelf: Up to 450 $\mu\text{mol}/\text{m}^2/\text{s}$ (dependent on LED colour combination) 10 lamps per shelf (special shelf for 18.000 PLH model): 600 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 10% to 100% intensity control
Other	<ul style="list-style-type: none"> Can allow up to 50% energy savings when compared to traditional fluorescent lamps With much less heat load being dissipated by these tubular LEDs, they are most suitable for applications requiring high relative humidity levels with lights on or heat sensitive canopies

Valoya LEDs (multiple spectral options)



Light type	LED with multiple spectra combinations					
Make & Model	Valoya C75 with AP673L spectrum					
Light Intensity (at 250mm)	Up to 350 $\mu\text{mol}/\text{m}^2/\text{s}$ with 3 LED modules (intensity dependent on number of LED modules installed)					
Dimming	Yes. 10% to 100% intensity control					
Other	Other spectral options available from Valoya:					
			AP67	AP673L	G2	NS1 / NS12
	Ultraviolet	< 400 nm	0 %	0 %	0 %	1% / 0,5%
	Blue	400-500 nm	14 %	12 %	8 %	20% / 21%
	Green	500-600 nm	16 %	19 %	2 %	39% / 38%
	Red	600-700 nm	53 %	61 %	65 %	35% / 35%
Far-red	700-800 nm	17 %	8 %	25 %	5% / 6%	
PAR	400-700 nm	83 %	92 %	75 %	94% / 94%	
	(*) graphical representation of NS12 spectrum.					

Custom made projects in multi-tier controlled environment rooms

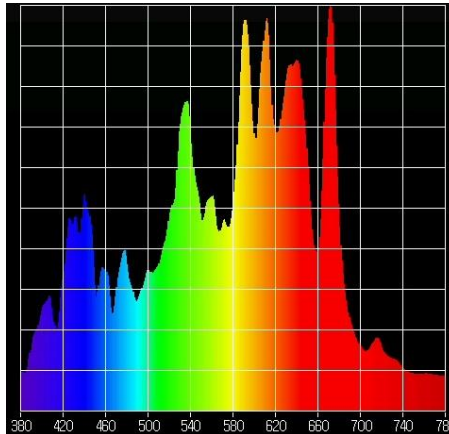


Make & Model	Philips, Valoya, Heliospectra, Hortilux and other manufacturers already tested
Light Intensity and Dimming	Adjusted and integrated according to project specifications
Other	Aralab can integrate light solutions from many suppliers according to customer specifications

II - LIGHTS FOR SINGLE-TIER 'WALK-IN' CHAMBERS

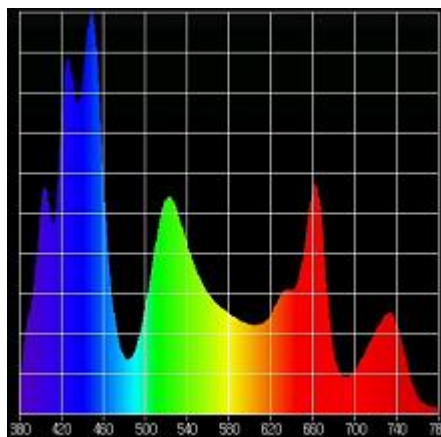
(Aralab FitoClima HP Controlled Environment Rooms)

Latest generation 'full spectrum' CMH lamps with electronic ballasts



Light type	Ceramic Metal Discharge
Make & Model	Philips 315W 'Full Spectrum' CMD
Light Intensity (at 1.000mm)	Single bulb Fixture: Up to 600 $\mu\text{mol}/\text{m}^2/\text{s}$ Double bulb Fixture: Up to 1.200 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 40% to 100% intensity control
Other	<ul style="list-style-type: none"> Installed inside separately cooled lamp barrier with self-refrigeration for keeping environmental conditions stable at the growth area Powered by electronic ballasts and installed in high performance reflectors this solution allows for energy savings up to 70% when compared with traditional ceramic metal halide lamps

Custom made projects with high performance LEDs in single-tier controlled environment rooms

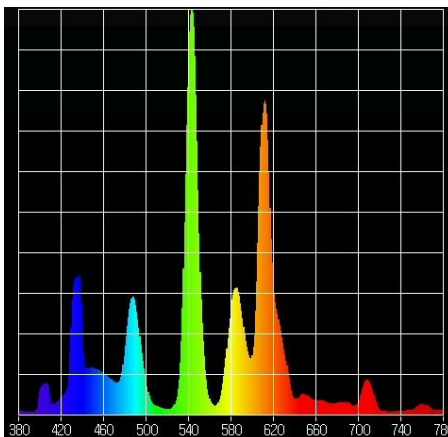


Light type	LED
Make & Model	Heliospectra RX30 (Other models available from Heliospectra)
Light Intensity (at 1.000mm)	Up to 600 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 5% to 100% intensity control in each wavelength channel
Other	<ul style="list-style-type: none"> • Can manage 9 channels independently: 380nm, 400, 420, 450, 520, 630, 660, 735nm, and 5700K white • Lamps installed inside separately cooled lamp barrier with self-refrigeration for keeping environmental conditions stable at the growth area

III - LIGHTS FOR REACH-IN CHAMBERS / CABINETS

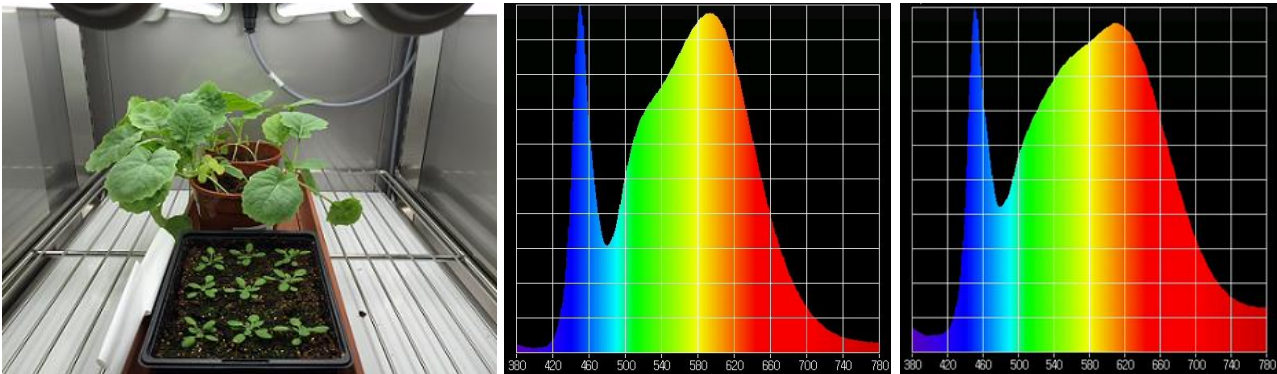
(Aralab FitoClima 600 / 1200 and 2500 HP models)

Standard Cool-white Fluorescent lights



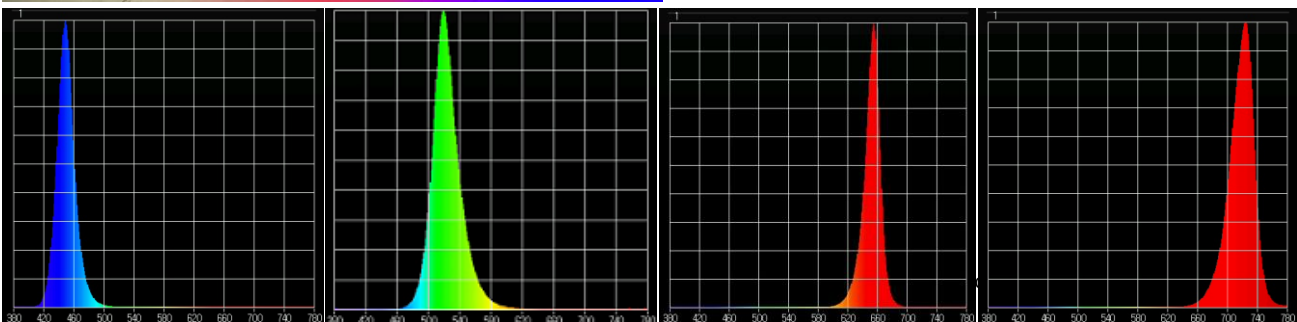
Light type	Cool-White Fluorescent
Make & Model	Philips or Osram
Light Intensity at 150mm	4 lamps per shelf: Up to 200 $\mu\text{mol}/\text{m}^2/\text{s}$ 8 lamps per shelf: Up to 400 $\mu\text{mol}/\text{m}^2/\text{s}$ 10 lamps per shelf: Up to 1000 $\mu\text{mol}/\text{m}^2/\text{s}$ (FitoClima PLLH model)
Dimming	Yes. 10% to 100% intensity control
Other	PLLH model is a single-shelf model which includes a self-refrigerated lamp canopy where lamp fixture is installed, thus allowing for high light intensities while keeping stable environmental conditions inside the growth area.

White tubular LED lights



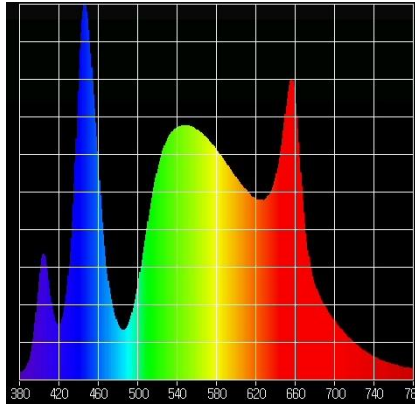
Light type	White LED. Two options, with more or less Red and Far Red spectrum
Make & Model	Aralab (powered by OSRAM LEDs)
Light Intensity (at 150mm)	4 lamps per shelf: Up to 260 $\mu\text{mol}/\text{m}^2/\text{s}$ 8 lamps per shelf: Up to 520 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 10% to 100% intensity control
Other	<ul style="list-style-type: none"> Can allow up to 50% energy savings when compared to traditional fluorescent lamps. With much less heat load being dissipated by these white tubular LEDs, they are most suitable for applications requiring high humidity with lights on

LED tubes available in Blue, White, Red and Far Red



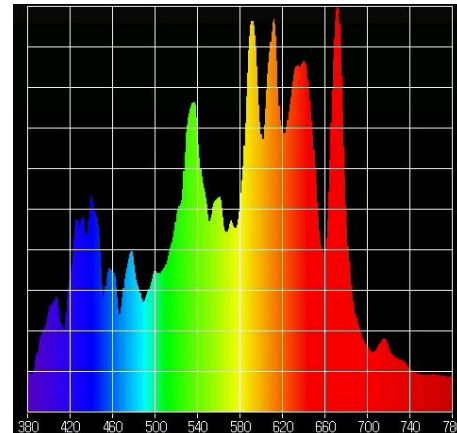
Light type	LEDs
Make & Model	Aralab (powered by OSRAM LEDs)
Light Intensity (at 150mm)	With 8 LED tubes per shelf: Up to 500 $\mu\text{mol}/\text{m}^2/\text{s}$ (Light intensity will vary with wavelength colour combination)
Dimming	Yes. 10% to 100% intensity control. Dimming function can be configured to manage each color independently and simultaneously on each shelf.
Other	Shelves can be configured to have from 4 to 8 LED tubes with any color combination

Valoya tubular LEDs



Light type	LED
Make & Model	Valoya L10 NS12 spectrum (other spectra options available from Valoya)
Light Intensity (at 150mm)	300 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Not available in this model. Aralab can integrate manual on/off switches on each shelf to control groups of LED tubes thus allowing intensity control

Latest generation 'full spectrum' CMH lamps with electronic ballasts



Light type	Ceramic Metal Discharge
Make & Model	Philips 315W 'Full Spectrum' CMD
Light Intensity (at 1.000mm)	Single Bulb Fixture: Up to 500 $\mu\text{mol}/\text{m}^2/\text{s}$ Double Bulb Fixture: Up to 1.000 $\mu\text{mol}/\text{m}^2/\text{s}$
Dimming	Yes. 40% to 100% intensity control
Other	<ul style="list-style-type: none"> Installed inside separately cooled lamp barrier with self-refrigeration for keeping environmental conditions stable at the growth area Powered by electronic ballasts and installed in high performance reflectors this solution allows for energy savings up to 70% when compared with traditional ceramic metal halide lamps

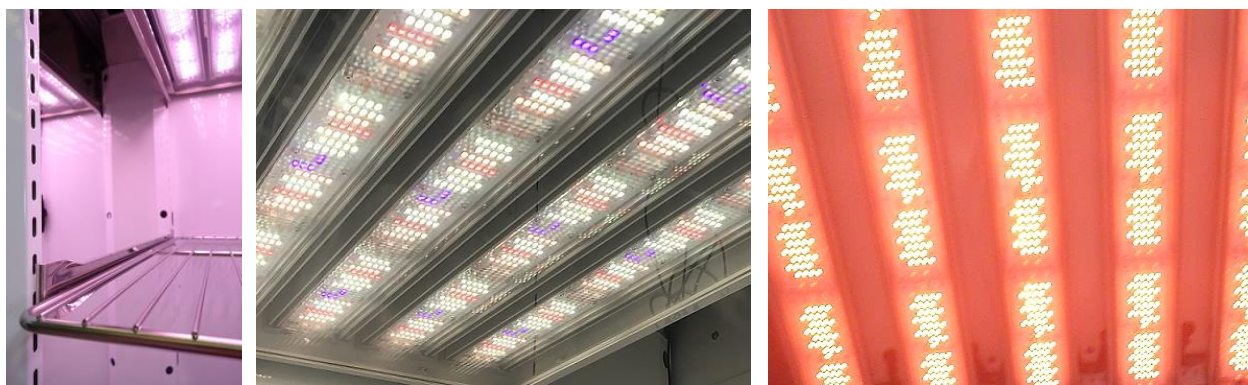
CUSTOM MADE PROJECTS FOR FITOCLIMA 600/1200 PLH/PLLH and HP CHAMBERS

Special FitoClima 1.200 PLH LED. Also available for 600 PLH model



Light type	LEDs
Make & Model	Heliospectra RX30 (with 9 channels for wavelength control). Other models also available from Heliospectra
Light Intensity (at 500mm)	Up to 600 $\mu\text{mol}/\text{m}^2/\text{s}$ when all 9 channels are on.
Dimming	Yes. 10% to 100% intensity control.
Other	<ul style="list-style-type: none"> Can manage 9 channels independently: 380nm, 400, 420, 450, 520, 630, 660, 735nm, and 5700K white LEDs managed by Heliospectra system assistant software

Special FitoClima 1.200 HP LED. Also available for 600 model



Light type	LEDs
Make & Model	Valoya B50 or C30 (multiple spectra options available)
Light Intensity (at 500mm)	Up to 1000 $\mu\text{mol}/\text{m}^2/\text{s}$ (dependent type of LED modules and spectra)
Dimming	Yes. 10% to 100% intensity control.
Other	High Intensity LEDs installed inside separately cooled glass barrier keeping environmental conditions stable inside the growth area

- New lighting options are frequently introduced and tested. Please consult Aralab for any specific lighting requirements –



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