

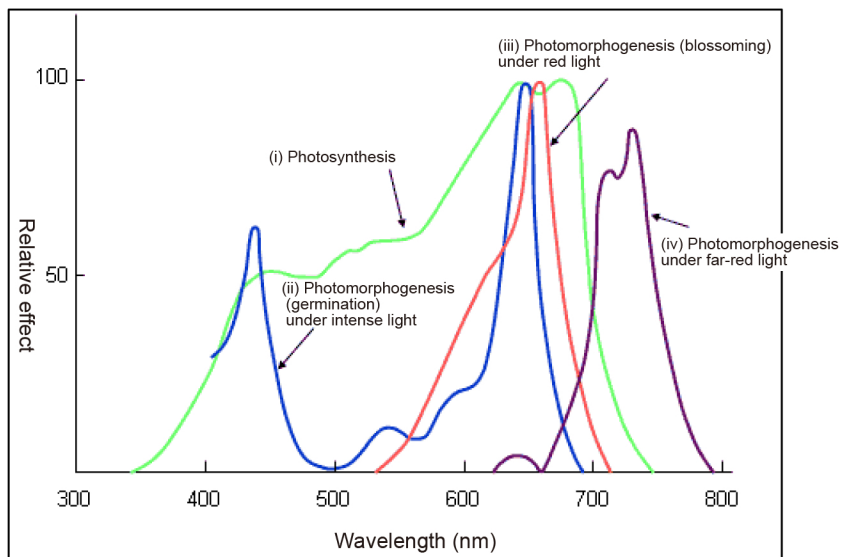
NF Board Visible Light Reflectance Measurement Test

-For use as a reflective panel application-

Introduction

Visible light is the portion of the electromagnetic spectrum which is visible to the human eye (wavelength: approx. 380-780 nm). Light with shorter wavelengths is called ultraviolet (UV), and light with longer wavelengths is called infrared (IR). In lighting, the main wavelength of fluorescent lamps is a continuous spectrum from 450 nm to 650 nm, while the main wavelengths of LEDs are 470 nm and 560 nm (white LEDs), 450 nm (blue LEDs) 520 nm (green LEDs) and 660 nm (red LEDs), although with some differences depending on the product.

In plant growth, visible spectrum wavelengths around 450 nm and 660 nm are favorable for germination, while mainly the wavelengths around 660 nm are the most important for photosynthesis (see website of the Ministry of Education, Culture, Sports, Science and Technology).



Source: Website of Ministry of Education, Culture, Sports, Science and Technology (MEXT)
http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu3/toushin/attach/1333537.htm

Experimental condition

Measuring instrument	: UV-Visible spectrophotometer (UV-3100PC, Shimadzu Corporation)
Measurement method	: Diffuse reflectance method
Incidence angle	: 8°
Measured wavelengths	: 380 nm - 780 nm
Light source	: Halogen lamp
Detector	: Photomultiplier
Slit width	: 7.5 mm

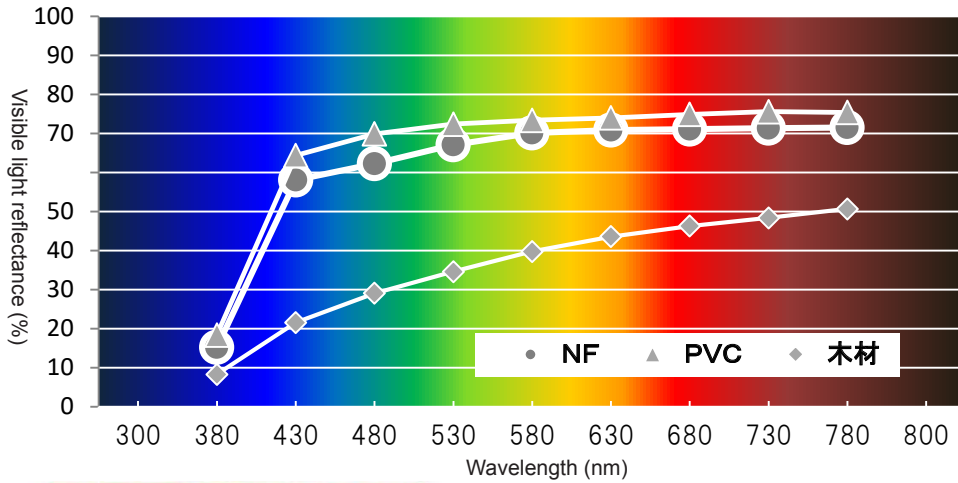
Experimental result

<For agriculture>

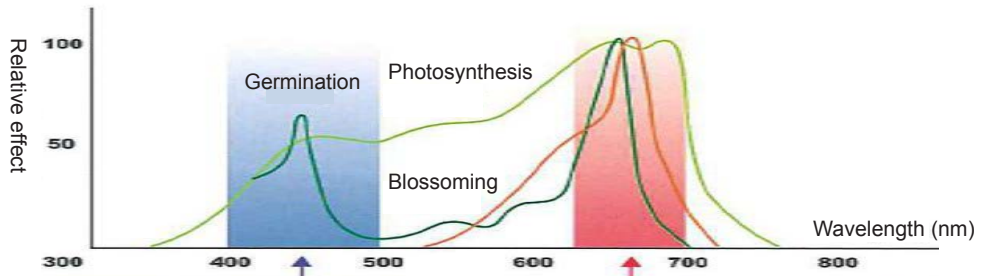
NF Board has approximately the same visible light reflectance as the polyvinyl chloride (PVC) boards generally used in cultivation facilities.

<For livestock industry>

Even if wood boards are used in the walls and ceiling of livestock buildings, the interior of the buildings is approximately 30 % brighter than at present when NF Board is used.



Relative effect of LED wavelengths



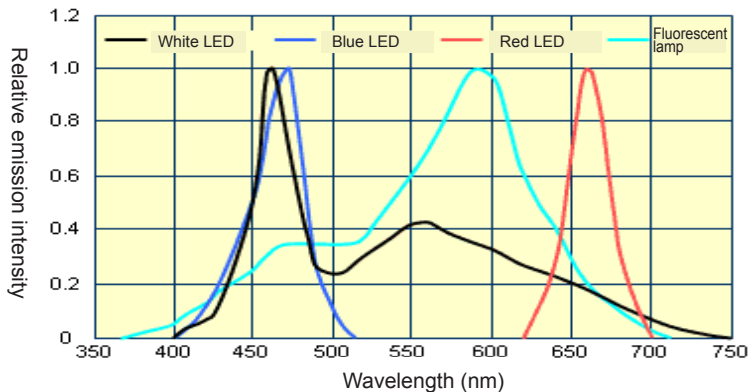
Blue LEDs with a wavelength of around 450 nm promote germination.

Red LEDs with a wavelength of around 660 nm promote photosynthesis, germination and blossoming.

Source : Nikkei Technology Online

techon.nikkeibp.co.jp

(arb. units)



Source : Website of Ministry of Education, Culture, Sports, Science and Technology (MEXT)

http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu3/toushin/attach/1333537.htm

Reference

<Pigpen wall/ceiling materials>

Comparing the following photographs before and after NF Board was installed on the walls and ceiling of an actual pigpen, the interior of the building after installation is NF Board is extremely bright.

buildings is approximately 30 % brighter than at present when NF Board is used

[Before installation]

Fluorescent lamp illumination 100 % + Reflectance of wood boards 40 % \Rightarrow 140 %

[After installation]

Fluorescent lamp illumination 100 % + Reflectance of NF Board 70 %
 \Rightarrow 170 %

30%UP

