WHAT MAKES 'THE LITEBOOK'® UNIQUE?

Why does The Litebook use LED's instead of the more prevalent fluorescent tubes?

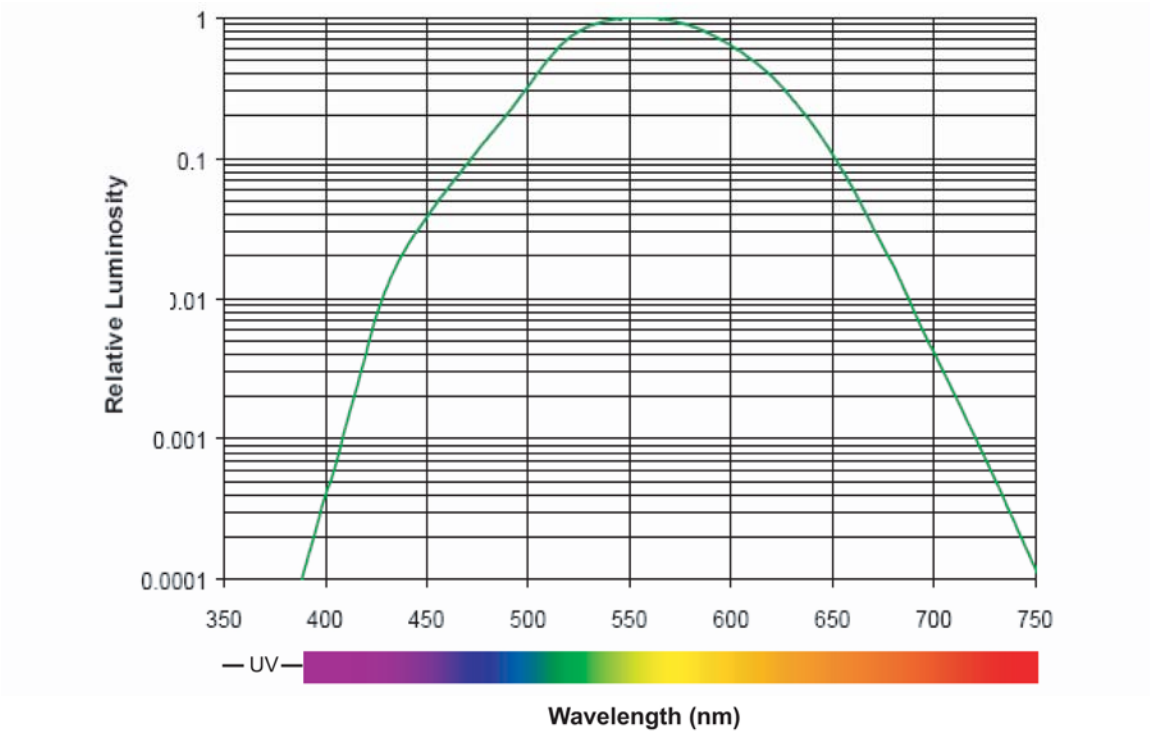
It is not about "lux" and raw spectral energy. It is about selecting the proper shorter wavelength and the effect of that light on the human circadian rhythm (our internal 'body clock').

Research has proven that bright light treatment is a preferred way to induce melatonin suppression. Melatonin is a naturally-occurring hormone in our body. Researchers believe that melatonin suppression plays an important role in diminishing the Seasonal Affective Disorder (SAD) and Winter Blues, a condition that describes seasonal changes in mood, energy, sleep, appetite etc.

THE SCIENCE

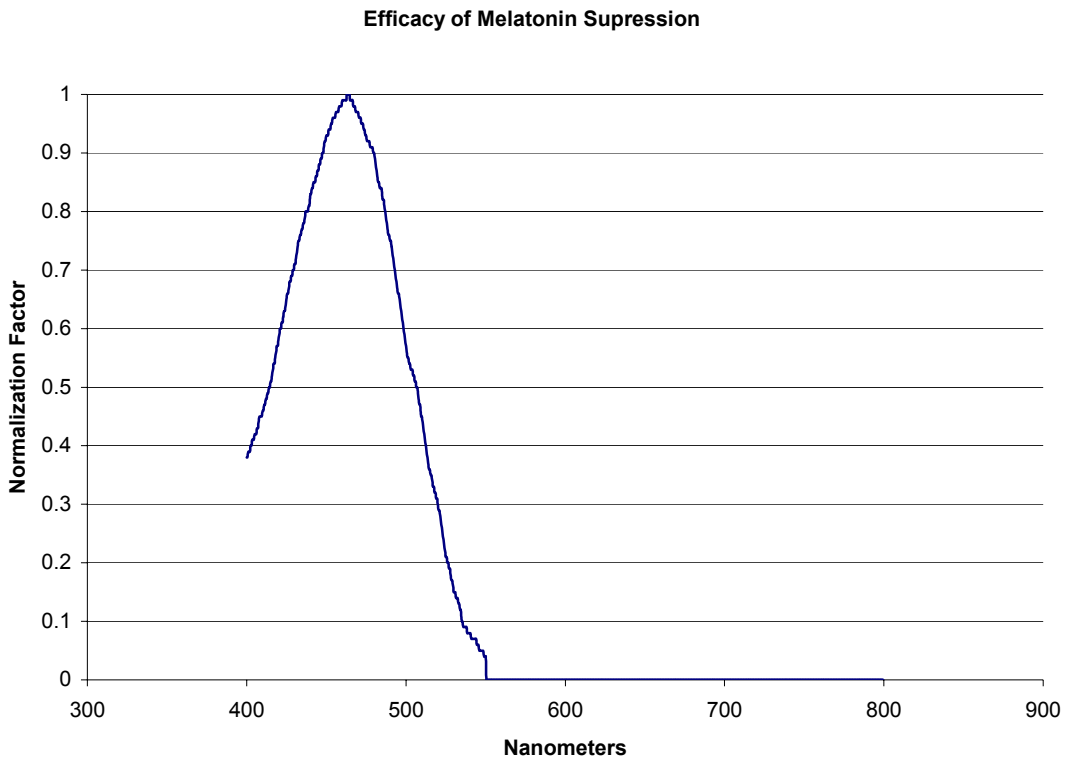
The human eye has a varying range of sensitivity to light, depending on the wavelength. 'Lux' is a unit of measurement for light that was developed to account for the eye's sensitivity curve, known as the *photopic response curve.* Simply put, this means that light of one color may appear brighter than light of another color, even if their actual intensity is the same. As shown in the chart, a yellow light will appear much brighter than a deep blue light, even though their actual output may be the same.

Photopic response curve



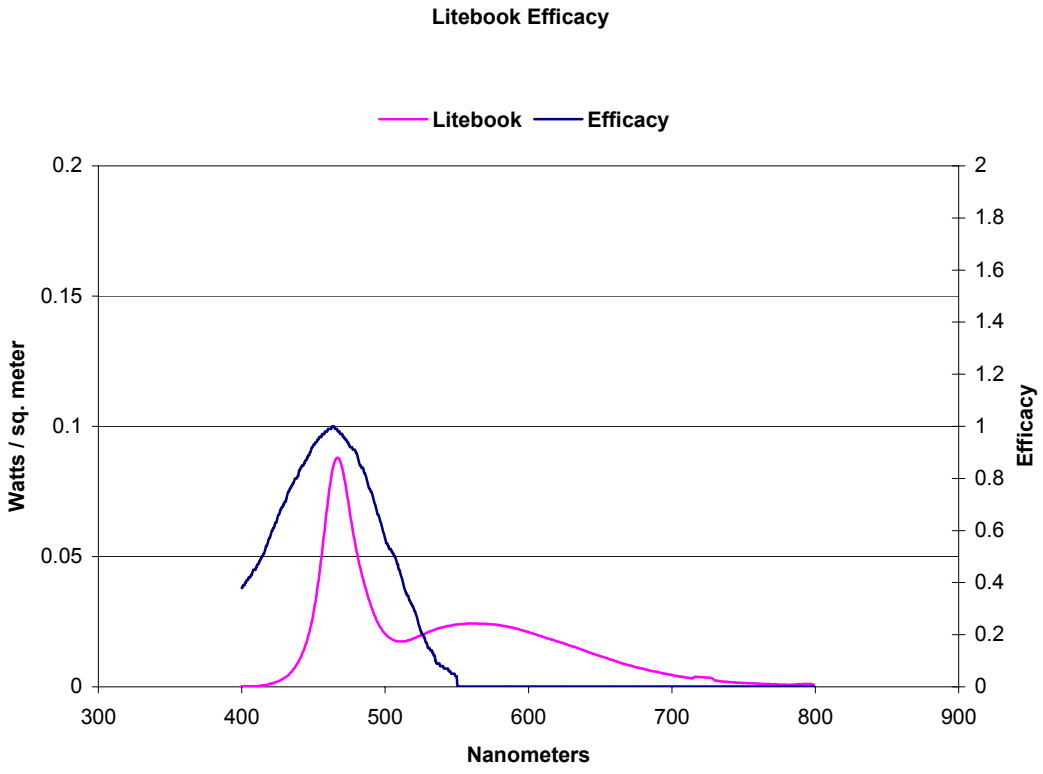
For most applications, the Lux measurement is a very good approximation of how we will perceive the intensity of a particular light source. But, for our particular application, i. e. melatonin suppression, Lux appears to an inappropriate unit of measurement.

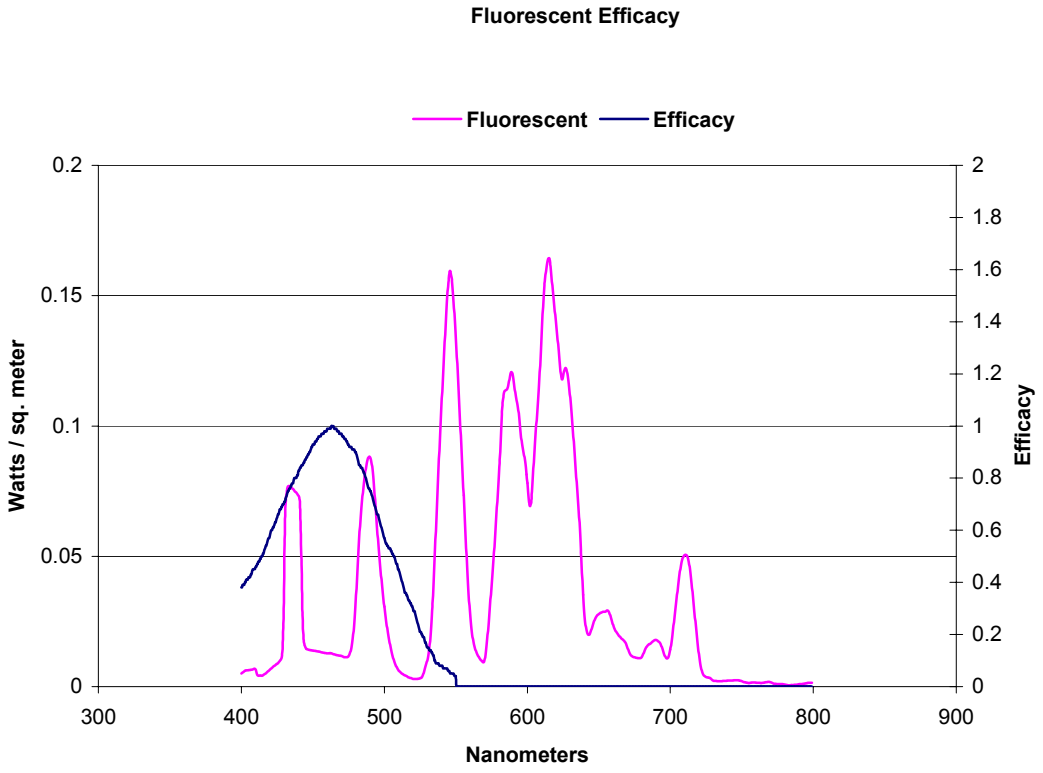
The melatonin suppression response curve is shown below. (Brainard et al, 2001)



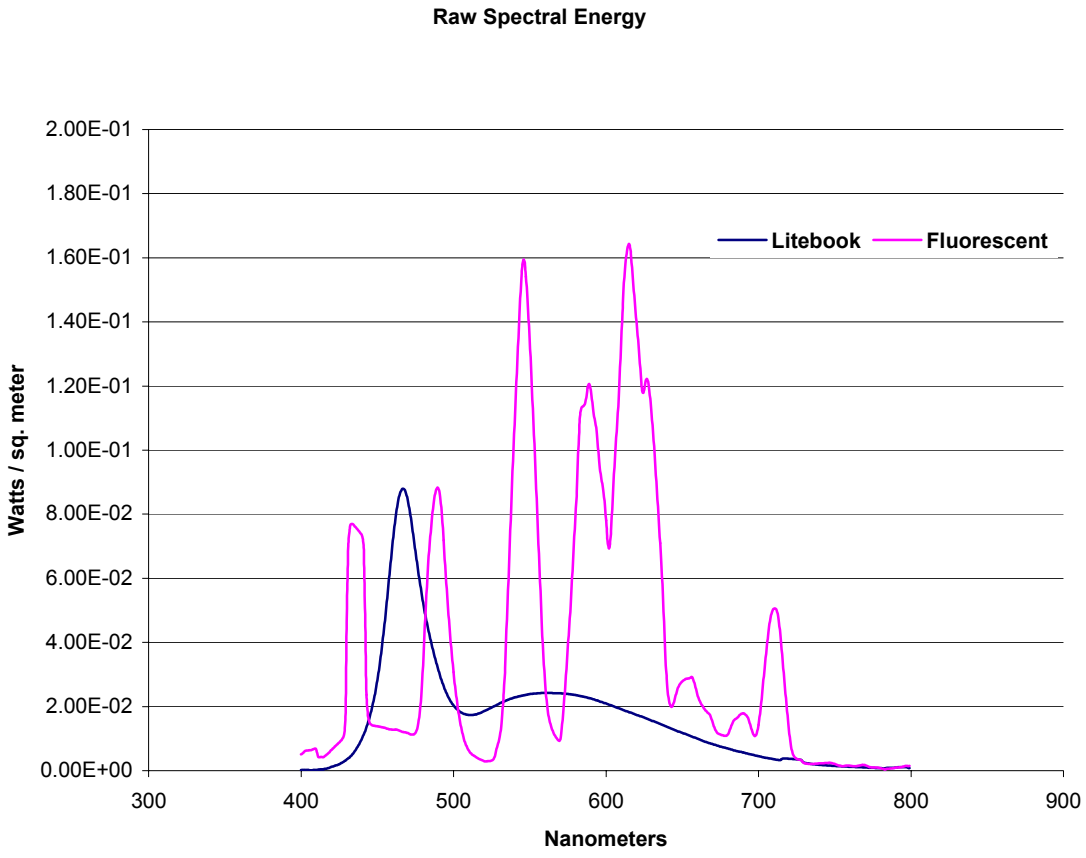
LED technology allowed the Litebook inventors to match the peak light emission with the melatonin suppression curve, at around 460 nanometers, for maximum efficiency. Since many experts believe that treatment of seasonal changes are related to effects of light on the circadian rhythms system and that the seasonal changes may be mediated by the effect of light on melatonin suppression, it makes sense to try to exploit light in the desired wavelength. There have been several research papers published in the last 24 months that confirm the efficacy of the short wavelength light for treating various conditions. You can find some of those abstracts at www.litebook.com under 'Research'.

Further, it becomes clear that it is much less effective, and may even be counterproductive to use a bright light that produces energy outside of the efficacy envelope.


Litebook Efficacy
Litebook
Efficacy
Watts / sq. meter
Efficacy
Nanometers
0.2
0.15
0.1
0.05
0
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
300
400
500
600
700
800
900


Fluorescent Efficacy
Fluorescent
Efficacy
Watts / sq. meter
Efficacy
Nanometers
0.2
0.15
0.1
0.05
0
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
300
400
500
600
700
800
900

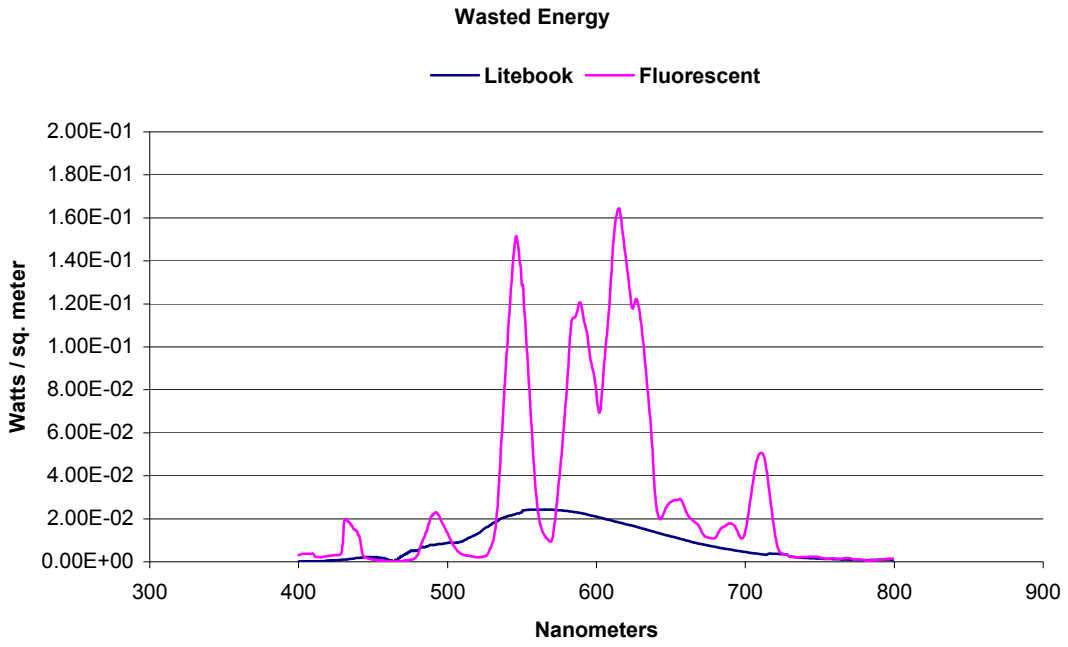
The charts above and below illustrate the 'raw' output of two sources of bright light at the same distance from the eye. The Litebook uses carefully selected white LEDs, and are compared to a typical fluorescent tube type light therapy device. LEDs deliver a sharply focused, very narrow beam of light. By specifying the appropriate wavelength, one can control the nature of the treatment. On the other hand, fluorescent tubes were designed to illuminate rooms, flooding the space indiscriminately with what amounts to 'generic' quality light.



Clearly, the fluorescent light produces more light energy within the visible spectrum. While this is useful for illuminating workspaces, much of the light produced is ineffective for the suppression of melatonin.

The particular fluorescent bright light therapy device tested -- Northern Light Technologies 'Sadelite' (Montreal, Canada) -- emits 10,000+ Lux at a distance of 50 cm. It has plenty of power, but mostly in the 'wrong' wavelength for therapeutic treatment. On the other hand, most of the light emitted by The Litebook falls closely within the useful wavelength.

This final chart illustrates that wasted energy produced by the fluorescent light source is almost 3 ½ times greater than that of the Litebook. No wonder fluorescent lights use so much power (avg. 85W vs. 6.0W for Litebook).



Much of the energy produced by the fluorescent light is wasted with regard to the suppression of melatonin. What the results of the spectral analysis show is that in fact, The Litebook produces a superior quality of light for the desired purpose, with an overall intensity that is less than half of the fluorescent tubes.

This combination shows the error in using only Lux as a measurement of the effectiveness of a bright light device for treatment of SAD, Winter Blues, jet lag, etc. Rather, it is not the overall intensity of a bright light device, but rather the bright light at the appropriate wavelength that produces desired results. We believe this explains why Litebook users consistently report positive results in less time than with previous fluorescent light devices.

RESEARCH:

The hypothesis that The Litebook is effective in the treatment of SAD is the subject of a major clinical trial currently being conducted by leading researchers in the field of light therapy at the University of British Columbia (CANADA), Yale University (USA), and several other leading institutions in North America and Europe. Results are anticipated in 2004.

TESTIMONIALS

The Litebook Company has received numerous testimonials from customers who have experienced a marked improvement and in some cases complete suppression of their symptoms. Melatonin has also a proven role in treating jetlag. Here are a few examples:

""...I'm baking cookies this morning, when normally this winter, I'd be looking at the clock and wondering when I could lay down again...The Litebook is as important to me as eating -- and I feel great. Even my hubby notices the difference it makes in me. And he was definitely a skeptic..." -- **Chris M.**

"The Litebook came into our home mid-February and on the first day of our 17 year old daughter using it I noticed that there was a difference. I picked her up from school, and whereas normally she is quite down and not talkative at all, on this particular day, she came out in a better mood, and told me about her day... Since she has been using The Litebook for 15 minutes in the morning while putting on her make-up, her depression is not totally gone, but she does seem to be coping much better. Having seen the effect it has had on my daughter, I would certainly recommend it to anyone suffering with depression or SAD. Thank you so much." – **Sheila S.**

"Over the past several months, I have traveled on separate occasions on 'long-haul' flights with a time difference of 7, 8 and 9 hours…By using the Litebook 'Time Traveler' as directed by its computer, I find that I have virtually no jet lag on these trips. I have done these trips many times over the years…and I used to dread the jet lag both on the going and returning portions. With the 'Time Traveler', there are productivity increases because one doesn't spend the beginning and ending of the trip in a jet lag induced 'fog'. And generally, one feels better. It is a leading-edge product and a boon for the international traveler." -- **Richard Husfloen, President, Augustana University College**

The "Time Traveler" is an effective tool in combating jet lag when used as designed. The application of the program and its usefulness is very dependant on the individual. Each user must establish the priority to be given to the program in consideration of schedule and lifestyle. Whenever conversion to local time is more important to an individual than other factors, the "Time Traveler" is a very valuable asset. All long haul pilots suffer from jet lag. In my opinion, all pilots at Korean Air, or any other long haul air carrier, will want the opportunity to use the "Time Traveler." Fatigue from jet lag is such a big factor in their lives that they will jump at the opportunity to relieve the symptoms. The effectiveness of the program will be dependant on their schedule and willingness to take the time to allow the program to work. The introduction of aircraft such as the A340-600 and A380, with flight times of up to 22 hours, will only increase the jet lag induced fatigue problem. Anyone who travels through time zones and desires to make the conversion to local times quickly, without any side effects, needs this device. -- **Robert K. Wade, Airbus A330 Captain**

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  Action Spectrum for Melatonin Regulation in Humans: Evidence for a Novel Circadian Photoreceptor

George C. Brainard[1], John P. Hanifin[1], Jeffrey M. Greeson[1], Brenda Byrne[1], Gena Glickman[1], Edward Gerner[1], and Mark D. Rollag[2]

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➢ Neuroscience Letter 2003 May 15; 342(1-2): 37-40

Phase advancing human circadian rhythms with short wavelength light.

Warman VL, Dijk DJ, Warman GR, Arendt J, Skene DJ.

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➢ Journal of Clinical Endocrinology & Metabolism 2003 Sep; 88(9): 4502-5.

High sensitivity of the human circadian melatonin rhythm to resetting by short wavelength light.

Lockley SW, Brainard GC, Czeisler CA.

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