Productsheet: Infra red lamp

Quality Differences

A. Why does the infrared lamp has longer life span?

The reason why conventional infrared lamps have short life span of about one month when continuously used all day long is that they cannot endure the generated heat. The lamps are designed to have structural advantage of heat-resistance.

The life span of the infrared lamps is identical to that of filament. They can be continuously used for more than 6 months unless the glass bulb is broken.

B. Why does the infrared lamp has higher heat value?

We have confidence in the life span and produces its lamps with filament at light center in order to concentrate all heat energy on the center.

On the next page, you can find study results showing heat values of the infrared lamp and "A" company's lamp having the largest market share in the world.

C. Why does the infrared lamp not have the loose base problem?

The fundamental reason of loose base problem is that the glass bulb and base are assembled by base cement and such adhesive material is burned by heat. Therefore, the cement comes to lose its adhesive property. If an infrared lamp is made by assembling the glass bulb and base with use of adhesive, the insistence of "we are using superpower adhesive" is just a poor excuse and cannot be a true solution.

We do not use the adhesive, which is the very reason of loose base problem. Instead, the glass bulb is made in the form of male screw for mechanical assembly with female-screwed base. There is no loose base problem arising from use of adhesive.

Please enjoy the high quality lamp and customer satisfaction program.

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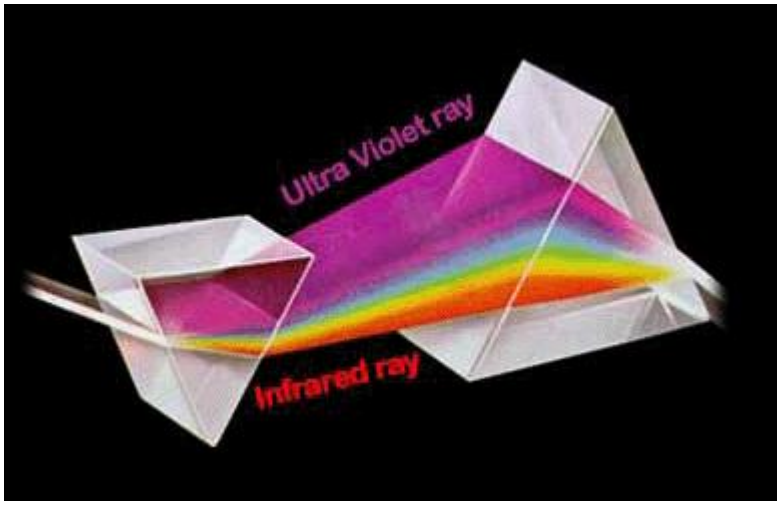
Physical Meaning of Rays

The light closely related with our living is a kind of energy in the form of electromagnetic waves or particles. The energy from natural or artificial light source contains the visible ray, infrared rays (of longer wavelength), and ultraviolet rays (of shorter wavelength).



The light is a part of energy transferred in the form of electromagnetic waves or particles. However, it is also a kind of sense captured by our eyes and perceived by our brain in the form of physiological energy.

The process of transferring or emitting the energy in the form of electromagnetic waves or particles is generally called "radiation." Especially, radiation of light energy is called "optical radiation," while radiation of heat energy is called "thermal radiation."

There are three kinds of methods in transferring the heat energy; convection, conduction, and radiation. In the case of infrared rays, the heat energy is transferred in a manner of thermal radiation. The wavelength of infrared rays being radiated from our skin is 3㎛ ~ 50 ㎛, corresponding to far infrared rays. Especially, the wavelength of 8㎛ ~ 14㎛ amounts to 46% of all radiation energy. Indeed, the human body with average temperature of 36.5 ° is a kind of natural heat source. In other words, our body is a biological source radiating the infrared rays.

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Types of Ra s

Rays		Wavelength	Effects
Ultraviolet Ray	Far Ultraviolet Ray (UV-C)	100nm~280nm	Photosynthesis, Sterilization, Formation of Red Spots, Ophthalmia, Creation of Vitamin D, etc.
	Mid Ultraviolet Ray (UV-B)	280nm~315nm	
	Near Ultraviolet Ray (UV-A)	315nm~380nm	
Visible Ray		380nm~780nm	Purple Color (380nm~435nm) Blue Color (435nm~500nm) Green Color (500nm~565nm) Yellow Color (565nm~600nm) Orange Color(600nm~630nm) Red Color (630nm~780nm)
Infrared Ray	Near Infrared Ray (IR-A)	780nm~1.4μm	Thermal action, Drying, Physiological effects, Activation of water, Aging and growth promotion, Penetration, Radiation, etc.
	Mid Infrared Ray (IR-B)	1.4μm ~ 3μm	
	Far Infrared Ray (IR-C)	3μm~1,000μm	

The visible ray causing the sense of light is an electromagnetic wave of 380nm ~ 780nm, which is categorized into several color areas. There are ultraviolet and infrared areas on either side of visible ray.

The ultraviolet rays of shorter wavelength than visible ray have the sterilization function and photochemical actions causing discoloration or fading. The ultraviolet rays are divided into 3 areas.

The infrared rays were known to the world in 1800 by a Germany scientist, F. W. Herschel. The infrared rays of longer wavelength than 780nm and shorter wavelength than microwave do not cause sensation of light, but have many thermal effects. Therefore, the infrared rays have the drying and heating functions.

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Effects of Infrared Rays

Temperature range of our daily life is usually 280° to -20°, equivalent to the wavelength of far infrared rays, 5.2μm to 11.5μm, when calculated according to the Wien's displacement law. In the case of far infrared rays, only the wavelength band of
3μm to 30μm is commercially utilized, which does not have any chemical function,
but has physical and biological actions. Infrared rays' physical effects include the radiation, resonance absorption, and penetration, while the biological effects include expansion of fine blood vessels and reinforcement of metabolism.

Generally known major effects of far infrared rays can be summarized as follow.

A. Physiological and deodorization effects

Our body is mainly consisted of water and protein. Especially, water amounts to 75%. Our body is generally activated when the oscillatory wavelength range of molecular movement of organic compounds is identical to that of far infrared ray radiated. Absorption spectrum of organic compounds is usually the wavelength range of 6μm to 14μm. Far infrared rays absorbed are penetrating into our body due to its property, causing generation of heat. Accordingly, the thermal effect and perspiration are resulted.

Such effects result in expansion of fine blood vessels, promotion of blood circulation, activation of tissues, promotion of metabolism, and excretion of waste materials and hazardous metals, leading to activated regeneration and physiological metabolism. Therefore, far infrared rays ensure healthy life. Further, far infrared rays generate
an ion for neutralization of cation, resulting in removal of bad smells.

B. Activation of water

Water is a cluster of 5 to 12 water molecules (H2O). When such cluster of water molecules is stimulated by far infrared rays, ultrasonic waves, magnetic field, or other external factors, the water molecular movement is activated due to resonance absorption and the number of water molecules forming the cluster is decreased, leading to activation of water.

If far infrared rays of about 10μm, equivalent to oscillatory wavelength range of water molecule, are irradiated, the resonance absorption occurs, leading to decrease of clusters and faster movement of water molecules. In other words, the water is activated. And such activated water is tasty.

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C. Aging and growth promotion

Aging refers to a process that the protein, lipid, or carbohydrate contained in food is digested or fermented by enzymes or microorganisms. Aging of proteins, lipids, or carbohydrates usually results in unique flavors. Irradiation of far infrared rays can cause activation of microbial growth in the course of vinegar production and promote aging of fermented soybean paste. Likewise, there have been lots of studies showing that far infrared rays activate water and promote aging. For example, two months are required for aging of fruit wine under natural conditions. However, irradiation of far infrared rays accelerates the aging process and makes the fruit wine only in one day.

Activated water promotes the growth of plants. Vibration of water molecules increases, friction occurs, and water becomes cohesive. All these contribute to absorption of water. Metabolism is activated and roots take in nutrient elements, leading to promotion of growth. Further, far infrared rays promote the growth of flowering plants and enables flowers to last for longer time.

D. Economic effects

Since far infrared rays penetrate deep into material, cause self-generation of heat in the deep part, and heat the inside evenly, they can be used for more efficient heating of painting, food, or human body. Far infrared rays ensure more economic effects than others (such as gas).

Especially, when raising pigs or other livestock, irradiation of far infrared rays will promote their appetite and growth, and improve their immunity. Further, they will make straws dry and maintain the breeding farm in the clean and sanitary conditions. Moreover, sufficient heat will ensure that piglets will not huddle up in one corner. Accordingly, the hog-raising farmers can expect the improved production.

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Temperature Increase Experiment

• Background and Purpose

Infrared lamp emits less visible ray, but emits considerable infrared rays having lots of actions, including thermal effects, drying, and biological action. In the case of biological action, infrared rays cause rapid increase of temperature at subcutaneous layer of human body or other animals. Further, infrared rays have excellent skin penetration property and induce activation of cells and tissues, resulting in expansion of fine blood vessels, promotion of blood circulation, and reinforcement of metabolism. Infrared lamp emitting infrared rays with such actions has been used for medical treatment.

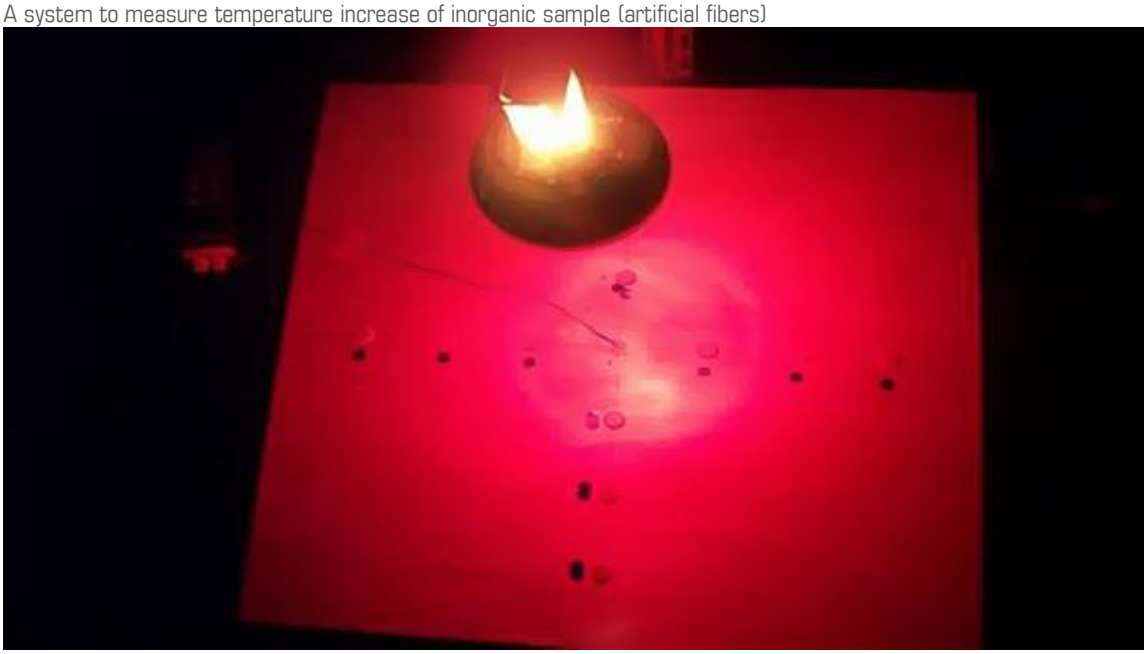
Such actions and effects of infrared lamp were studied in indirect method because there are lots of factors affecting the experimental conditions and results when human beings or other living creatures are subject to the study. In other words, a measurement system was designed while considering the importance of temperature increase and distribution depending on radiation time. In addition, the measurement distance and space were determined to simulate actual illumination conditions of horses.

The purpose of this study is to comparatively show the temperature increase and distribution over time when various kinds of infrared lamps are used to irradiate infrared rays. In this study, inorganic materials, such as artificial fibers, and organic materials, such as hog meat, were used.

※ These study results are the summary of "Final Report of Research Contracted under Small & Medium Business Technology Innovation Project" initiated by the Korean Small & Medium Business Administration.

• Measurement

A system to measure temperature increase of inorganic sample (artificial fibers)



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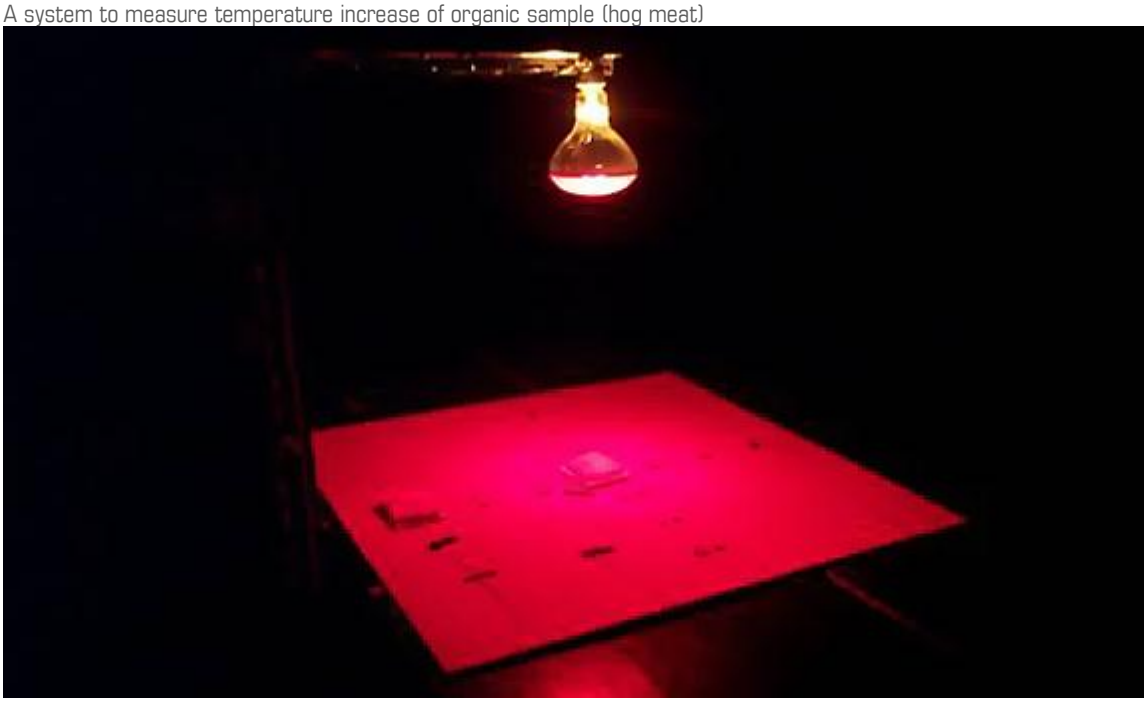
A system to measure temperature increase of organic sample (hog meat)



• Temperature increase of inorganic sample

- Figure 1 shows the temperature increase depending on light sources when infrared rays were irradiated over artificial fibers placed at 50㎝ distance directly under infrared lamp.
- Our 250W red-colored lamp shows the largest temperature increase of 20.8°, followed by Our 250W Clear lamp (about 17.1°)
- "A" company's 250W red-colored lamp (a foreign company) and Our 175W red-colored lamp show similar level of temperature increase, 12.4° and 12.2°, respectively, which is higher than temperature increase by "B" company's 250W lamp (another foreign company)
- In the case of 250W red-colored lamp, Our lamp and "A" company's lamp show different temperature of 20.8° and 12.4°, respectively. Temperature increase by Our' product was 1.8-fold higher than that by "A" company's lamp.

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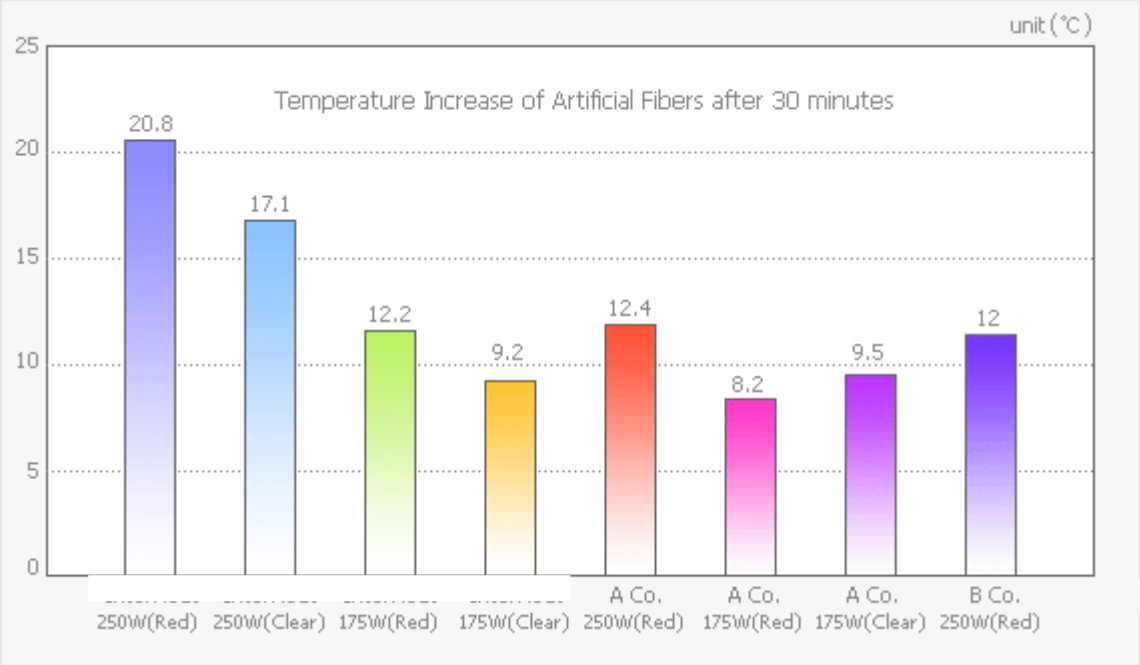

Figure 1. Temperature increase of artificial fibers placed at the center after 30 minutes of irradiation

• Temperature increase of hog meat (epidermis)

- Figure 2 shows the temperature increase after 30 minutes when infrared rays were irradiated over hog meat (skin-lard-lean meat layers) placed at 50cm distance directly under infrared lamp.
- When "A" company's two lamps (a foreign company) were compared with Our 250W infrared lamp, it was resulted that "A" company's 250W red-colored lamp induced 20.5° of temperature increase (67% when compared to that by Our lamp) and PAR-type 175W red-colored lamp induced 14.2° of temperature increase (44.2% when compared to that by Our lamp)
- Temperature increase by Our 250W red-colored lamp is about 1.5-fold higher than that by "A" company's 250W lamp and about 2.2-fold higher than that by "A" company's 175W lamp. From these results, it is concluded that Our lamp has higher temperature increase effect than "A" company's two lamps.

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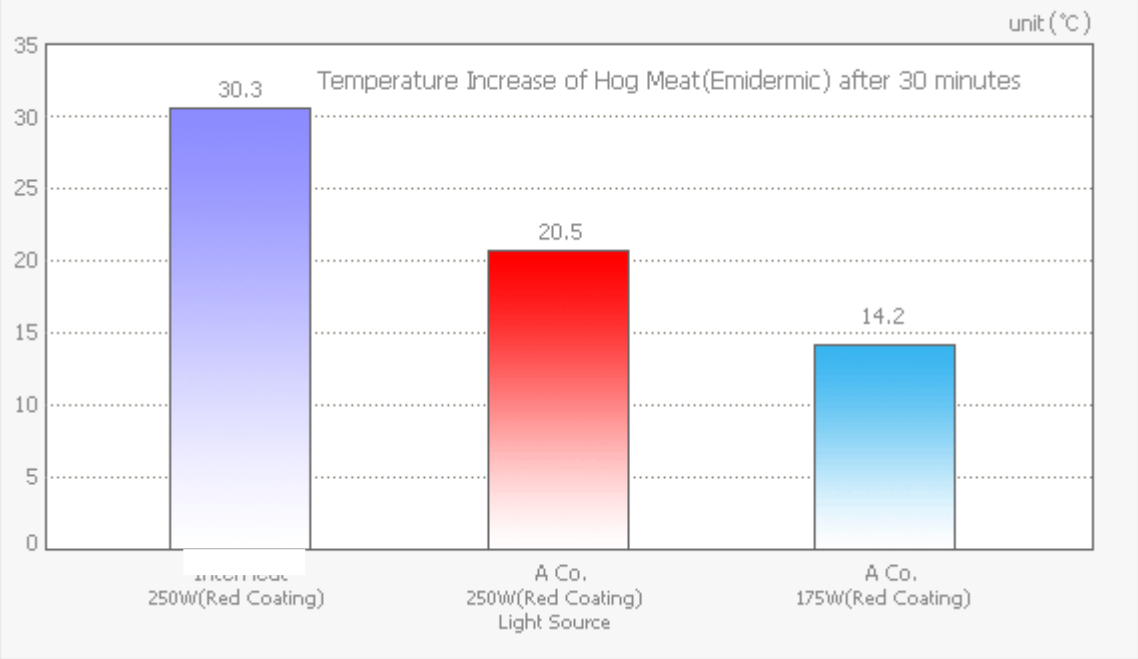

Figure 2. Temperature increase of hog meat (epidermis) placed at the center after 30 minutes of irradiation

• Temperature increase of hog meat (subcutaneous layer)

- Figure 3 shows the temperature increase after 30 minutes when infrared rays were irradiated over hog meat (skin-lard-lean meat layers) placed at 50㎝ distance directly under infrared lamp. Thermocouple sensor was inserted into sample (about 12㎜ depth) to measure the temperature.

- When "A" company's two lamps (a foreign company) were compared with Our 250W infrared lamp, it was resulted that "A" company's 250W lamp induced 15.9° of temperature increase (60% when compared to that by Our lamp) and PAR-type 175W lamp induced 9.8° of temperature increase (37.1% when compared to that by Our lamp)
  Temperature increase by Our 250W red-colored lamp is about 1.7-fold higher than that by "A" company's 250W lamp and about 2.7-fold higher than that by "A" company's 175W lamp. From these results, it is concluded that Our lamp has excellent penetration property, when compared with "A" company's two lamps.

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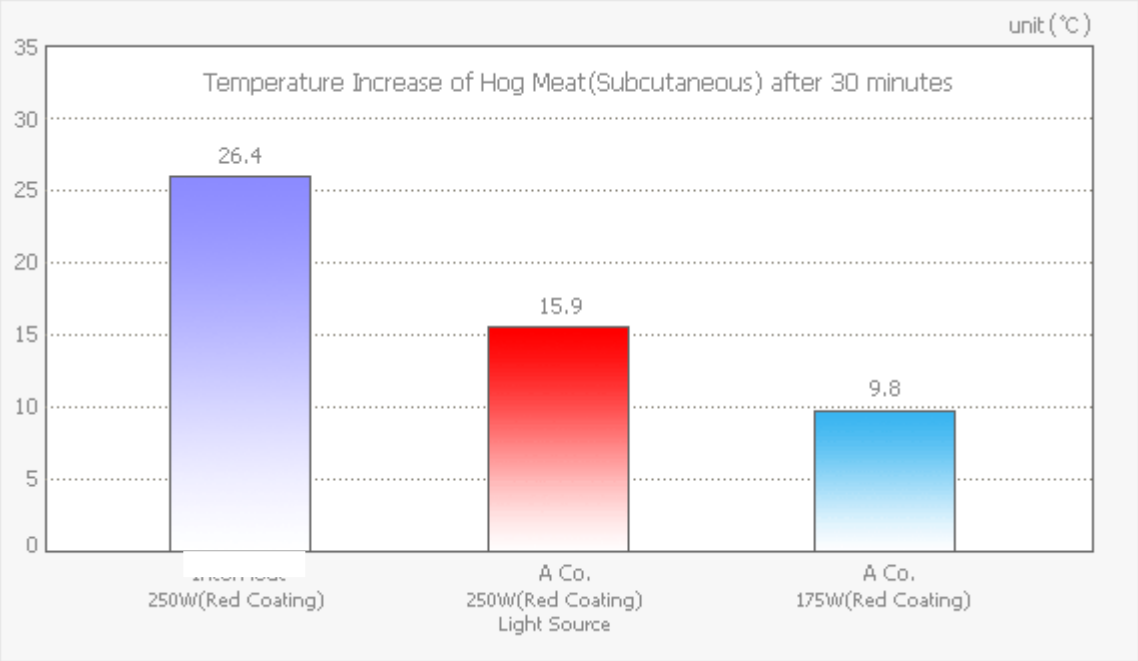

Figure 3. Temperature increase of hog meat (subcutaneous layer) placed at the center after 30 minutes of irradiation