Seed germination persuasive essay

Business, Industries

The time that a seed germinates, and whether or not it actually does germinate, depends on many factors. These factors include; the chemicalenvironment, which must be the right conditions; oxygen must be present, and inhibitory chemicals must not be present. Germination also depends on the physical environment. Temperatures must be suited to the seed, and light quality and quantity must also be suited to the needs of the seed. In some cases, all these conditions are met, and still, the seed fails to germinate. This is because the seed is said to be dormant (Bewley and Black 1985).

Seed dormancy is a short-lived deficiency, or block of an able seed to complete germination under suitable conditions. There are two different types of dormancy, embryo, and coat dormancy (Kucera et al. 2005). Embryo dormancy is mostly common in woody species, but can also be found in blossoming plants as well. Coat dormancy is when the tissues that enclose the seed are too tight and the seed cannot overcome the constraint. Seeds can be released from dormancy through being chilled, sometimes for several weeks, or sometimes even months, at temperatures of one to five degrees Celsius. This means that seeds that rely on such ways of dormancy must wait for the cold seasons to pass before they can germinate (Bewley and Black 1985).

Many seeds can germinate with, or without light, but the plants that require light, are called photoblastic, and are controlled by the phytochrome (Kendrick and Russell 1975). Phytochrome has two descriptions, the first one, Phytochrome red (Pr), is transformed by red light, to the second form, phytochrome far red (Pfr). Far red radiation can reverse the whole process.

Phytochrome far red absorbs far red light (730nm), and phytochrome red absorbs red light (660nm) (Toyomasu et al. 1997).

Seeds that are grown in darkness don’t germinate unless they are exposed to red light for a short period of time. For a red light to be effective, water content in the seed must be at 15%, because dry seeds do not respond to red light. In lettuce seeds that are matured naturally, phytochrome is most commonly in the form of phytochrome red, and in the dehydrated form, the conversion to phytochrome for red light is not possible (Kendrick and Russell 1975).

Lettuce is an important vegetable cultivated worldwide, and requires high quality seeds. Lettuce seeds are unable to germinate in the dark, and are unable to germinate at high temperatures. These characteristics affect the rates that new seeds are developed (Metzger et al. 2009). Light is a very important factor in releasing seeds from dormancy. Seeds can be affected by being exposed to white light from just a few seconds, to or even minutes, others require intermittent light. The light frequency that is required depends on the temperature. Lettuce seeds that are bought in stores are usually treated to improve the germination process, even when lots of light is unavailable. Although, light sensitive leaves need a lot higher levels of phytochrome far red light to bring the seed out of dormancy (Kendrick and Russell 1975).

Using all the information I have gathered, I hypothesised that the red light and white light would cause a greater percentage of germination than the other lights, because they produced more far red light.

Methods The lettuce seeds that we used (Lactuca sativa L. cv Tango), were dried and stored at 22oC until we used them. We used gibberellin acid (GA3) of ≥ 90% purity, at the following concentrations; 10-3, 10-4, 10-5, and 10-6. The red light source we used was gathered by filtering white light that came from a twenty-five watt fluorescent bulb, through two layers of dark red cellophane paper. We got the far red light by a forty watt incandescent bulb. The light was then filtered through a container containing 10cm of water, which was placed above the two layers or red and blue cellophane. The white light we obtained was taken from a sixty watt light bulb. Twenty to thirty-five lettuce seeds were placed on two layers of whatman No. 1 filter paper, and all seeds were equally controlled in a room with a green light bulb.

In each dish, 5ml of distilled water was added, along with 5ml of its appropriate GA3 solution. The dishes were wrapped in one layer of tin foil, and put in a darkened box. A control was also prepared. The seeds were added to a dish with distilled water. All the experiments were conducted at the same temperature, 24oC. When everything was ready, to figure out how many seeds were germinating, we counted how many seeds in each petri dish had a white radical coming out if it. When we were done, we recorded our results, and pooled them with the rest of the class (Migabo 2011).