

Lights, Bean Plants, Action: Starch Printing, a Student Exercise

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Photosynthetic production of carbohydrates and starch is dependent on light intensity. The primary leaves of a young bean plant which has been stored in the dark for 24 hours are depleted in starch; these leaves will rapidly produce starch when provided with light and sufficient CO₂. Because light intensity greatly affects the rate of photosynthesis, the amount of starch produced will depend on the availability of light. If a photographic negative or a stencil is placed over the leaf, starch production will be the greatest where the light reaching the leaf is most intense (Reiss, 1994). The duration of the light exposure can be greatly reduced by placing a piece of black felt soaked in a bicarbonate solution on the back of the leaf. The leaf is then removed, placed in boiling water for a few seconds, then placed in 95% ethyl alcohol to remove chlorophyll. Finally, the leaf is placed in an iodine solution, which will stain the newly produced starch, giving a positive image of the photograph. This exercise is fun and easy to do. It would be appropriate at the high school level, but is entertaining for the college student as well. The amount of detail present in the final starch prints always surprises the students and encourages them to consider the importance of available light for photosynthesis.

References

Reiss, C. 1994. Experiments in Plant Physiology. Prentice Hall, Englewood Cliffs, NJ, 292 pages.