补光处理对大棚栽培下的小浆果果实品质的影响

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摘 要：【目的】主要研究大棚基质栽培条件下，补光处理对小浆果果实品质的影响，分析光照对小浆果果实品质的调控机理，为大棚基质栽培条件下的小浆果的光照管理提供科学依据。【方法】本研究以小浆果黑莓‘宁植 4 号’、蓝莓‘灿烂’为试验材料，在大棚栽培条件下对结果期的蓝莓和黑莓进行补光处理 30 天，并对成熟果实品质相关指标进行测定。【结果】果实的大小是反应果实外观品质的重要指标，在补光条件下，黑莓和蓝莓果实横径、纵径及果实重量均有所提高，但差异不明显，黑莓果实分别比对照提高了 5.57%，7.52%和 12.66%，蓝莓果实分别比对照提高了 1.01%，1.45%和 7.12%。果实的内在品质是反应果实质量的重要因子。果实中的糖、酸及花色苷和多酚在形成过程中受内外诸多因子调控。在补光条件下，黑莓果实的花色苷、多酚含量显著升高，分别比对照增加了 13.54%和 23.04%，可溶性固形物和可滴定酸含量有所升高，但差异不显著，分别比对照增加了 3.49%和 5.22%；与对照相比，补光条件下蓝莓果实可溶性固形物含量、多酚和花色苷含量差异显著，分别比对照增加了 20.14%、15.32%和 46.79%，可滴定酸差异不显著，比对照增加了 6.49%。【结论】综合各项指标可以看出，在大棚基质栽培条件下，进行补光可以促进黑莓蓝莓果实膨大，并显著改善果实品质，其中补光对黑莓蓝莓花色苷和多酚的含量影响效果最显著。推测认为在补光条件下，黑莓蓝莓果实的光合效率进一步提高，促进了蔗糖等能量代谢物的生成，从而进一步促进果实多酚和花色苷的积累。

关键词：补光；大棚栽培；黑莓；蓝莓；果实品质

Effects of Supplementary Light on Fruit Quality of Greenhouse Small Berries

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Abstract: 【Objective】In order to provide a scientific basis for the greenhouse light managenment of small berries, the effects of supplementary light on fruit quality of small berries were studied and the regulatory mechanism was analyzed. 【Method】In this study, the blackberry cultivar ‘Ningzhi 4’ and the blueberry cultivar ‘Brightwell’ were used as the experimental materials. Plants were treated with the LED supplementary light for 30 days during fruiting period, and related indicators of fruit quality were measured.【Result】Fruit size is an important indicator of fruit appearance quality. In present study, fruit across diameter, vertical diameter, and fruit weight of balckberry and blueberry were all increased under supplementary light treatment, but the difference was not significant. As compared with control, blackberry fruit across diameter, vertical diameter, and fruit weight increased 5.57%, 7.52% and 12.66%, respectively, and blueberry fruit across diameter, vertical diameter, and fruit weight increased 1.01%, 1.45% and 7.12%, respectively. Fruit internal quality is also an important factor of fruit quality. In fruits, the formation of sugar, acid, anthocyanin and polyphenols are regulated by a number of factors. In blackberry, fruit anthocyanin and polyphenols contents significant increased 13.54% and 23.04% under the supplementary light treatment, soluble solid and titratable acid contents increased 3.49% and 5.22%, but they had no significant difference with the control. In blueberry, the contents of soluble solid, anthocyanin and polyphenols significant

increased 20.14%, 15.32% and 46.79% as compared with the control, titratable acid content increased 6.49% and has no significant difference.【Conclusion】 The results indicated that supplementary light had a certain promoting effect on the quality of small berry fruits. In greenhouse, under supplementary light treatment, fruit size and fruit anthocyanin and polyphenols contents were remarkably improved. It was suggested that the enhanced photosynthetic efficiency of the berry fruits under the supplementary light accelerated the carbohydrate synthesized, which further promoted the fruit polyphenols and anthocyanin accumulation.

Key words: *Supplementary light; greenhouse, blackberry; blueberry; fruit quality*