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Pollination as a key factor for strawberry fruit physiology and quality

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Insect pollination improves fruit quality [2, 5] by increasing the amount of fertilized achenes [4]. The achenes are considered to be the place of indolyl-3-acetic acid (IAA, phytohormone) formation [3] which is associated with receptacle development of non-climacteric strawberry fruits [1]. Exclusion of pollinating insects (mainly bees) bears the risk of marketable yield decline [2], which highlights the ecological and economic importance of insect pollination for strawberries. Our study evaluates the effects of pollination on IAA formation and quality parameters during strawberry fruit development and ripening. Pollination treatments included autonomous self-pollination (SP), hand pollination (HP) and open pollination (OP) by insects and wind. We harvested and analysed fruits in three developmental stages indicated by colour (green, white and red).

SP led to lowered pollination success, a non-typical phytohormone formation and a predominant share of deformed fruits (> 90%). SP plants produced the smallest and lightest fruits which reached by far the lowest commercial value. Moreover, shelf life decline of SP fruits during storage was accelerated. Compared to OP fruits, HP fruits reached the lowest ratio of total soluble solids to titratable acid, but showed no increase in commercial value calculated based on visible quality aspects. This study underlines the importance of maintaining ecosystem services like insect pollination for agricultural production.

Literature

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