



Figure 2 Role of selected PGRs on plant growth and development (Adopted from Sabagh et al., 2021)

4.2 Promotion of pollen germination and pollen tube growth

PGRs, particularly auxins and gibberellins, are said to induce pollen germination and pollen tube growth that is fundamental in successful fertilization and fruiting. With ideal hormonal conditions, these regulators facilitate the elongation of pollen tubes within the style, enhancing ovule fertilization possibilities and the development of fruit growth (Gill et al., 2023; Singh et al., 2024).

4.3 Inhibition of physiological fruit drop

Among the key benefits of PGR application is reducing physiological fruit drop. Auxins and gibberellins are predominantly used in an attempt to minimize pre-harvest fruit fall by maintaining the hormonal cues in the direction of fruit retention. The hormones reverse abscission signals, strengthening fruit attachment, and enhancing the rate of fruit retention, leading to enhanced yields (Suman et al., 2017). Ethylene regulators can be used to slow down abscission and enhance the life of fruit retention on the tree (Singh et al., 2024).

4.4 Influence on carbon-nitrogen metabolism and nutrient transport

PGRs control carbon-nitrogen metabolism and nutrient transport, which have significant roles in fruit development and quality. For instance, paclobutrazol enhances the accumulation of carbohydrates and stimulates the transport of nutrients to developing fruit, resulting in increased fruit size, weight, and quality. This is achieved through modifying the metabolic activities of the plant and increasing water and nutrient utilization efficiency, which favors extended fruit development under various environmental conditions (Desta and Amare, 2021; Zahid et al., 2023).

5 Application Strategies of Plant Growth Regulators for Improving Loquat Fruit Set

5.1 Spraying and smearing techniques

The effectiveness of plant growth regulators (PGRs) in enhancing loquat fruit set is highly dependent on the timing and concentration of application. Spraying is most effective when performed at critical developmental stages, such as the onset of flowering, early fruit set, and during the rapid fruit enlargement phase. For example, the application of synthetic auxins like 3,5,6-TPA at 15 mg/L during the early fruit growth stage or one month later significantly increased fruit size and accelerated ripening, with a 10% increase in fruit diameter compared to controls (Reig et al., 2016). Similarly, forchlorfenuron (a cytokinin-type PGR) applied at 20 mg/L at 24 and 38