with lower maturity often show “green” and astringent notes, while those at higher maturity present stronger sweetness and flavor intensity.

Instrumental analysis (SPME–GC–MS) shows that fig aroma consists of a complex mixture of volatile compounds, including alcohols, aldehydes, esters, and terpenes. Key compounds such as hexanal, (E)-2-hexenal, and limonene contribute significantly to the aroma of fresh figs (Gündeşli et al., 2024). Principal component analysis often indicates that the maturity index (MI) and pulp color parameters are important predictors of sensory quality.

3.4 Nutritional composition (sugars, vitamins, phenolic compounds)

Fresh figs are characterized by relatively high carbohydrate content, especially glucose and fructose, which dominate in both peel and pulp and vary among cultivars. SSC reflects both sugar accumulation and water content and is a core indicator of fresh quality.

In addition, figs are rich in vitamin C, minerals (especially potassium and calcium), dietary fiber, and small amounts of protein, with significant differences among varieties and tissues (Maatallah et al., 2024).

In recent years, phenolic content and antioxidant activity have gradually been included in quality evaluation systems. This is particularly important for dark-skinned varieties, whose peels usually contain higher levels of phenolic compounds and show stronger antioxidant capacity.

3.5 Shelf life and postharvest performance

For fresh consumption, shelf life is a key evaluation indicator because figs have high moisture content and soften easily, making them highly perishable fruits. Postharvest performance mainly includes weight loss rate, firmness retention, color stability, decay incidence, and the maintenance of SSC and bioactive compounds during storage (Byeon and Lee, 2020).

There are differences among varieties in maintaining firmness and external quality. Varieties with higher initial firmness can be harvested at higher maturity while still maintaining good transport tolerance.

Postharvest treatments such as modified atmosphere packaging (MAP) and UV-C treatment can significantly extend shelf life. For example, under low-temperature conditions, combining UV-C with MAP can effectively maintain fruit firmness, reduce decay rate, and preserve good appearance (Souza et al., 2022). Cold storage can also alter metabolite composition, indicating that different varieties respond differently to storage conditions.

4 Evaluation Indicators of Drying Suitability

4.1 Dry matter content and moisture characteristics

The initial dry matter content determines how much water needs to be removed and has a clear effect on drying time, energy consumption, and final texture. The target moisture content of safe dried fig products is usually around 18%~24% (wet basis), which corresponds to a relatively low water activity and helps long-term storage (Pandidurai et al., 2021). Varieties or treatments with higher solid content can reach this target moisture faster and usually show a lower dehydration ratio.

Moisture loss generally follows thin-layer drying kinetics and is mainly in the falling-rate period. Effective moisture diffusivity and equilibrium moisture content are often used to compare drying behavior among different varieties and product forms. Osmotic pre-dehydration and sugar solution treatments can remove part of the water before drying and make the initial moisture more consistent, which improves process control and helps retain nutrients.

4.2 Sugar accumulation and caramelization potential

High total soluble solids (TSS) and sugar contents (glucose, fructose, sucrose) are important for achieving proper sweetness, water activity, and texture in dried figs. During drying, sugars become concentrated, and TSS can increase to about 30~35 °Brix or even higher (Villalobos et al., 2016).