safe plates

EFFECT OF VACUUM CYCLING ON MARINATION

Marinating is a traditional cooking technique that enhances flavor and tenderizes food. Typically, this process involves submerging food in a marinade within a plastic bag or container and allowing it to rest for several hours or overnight.

Recently, vacuum technology has gained popularity as a marination method. This approach can significantly reduce the time required for effective marination, thereby shortening overall preparation and cooking time.

This study examined two vacuum-assisted marination methods—vacuum cycling and static marination in a vacuum container—to determine which is more effective in marinating foods. Red food dye was used as the marinade. Using daikon radishes, these vacuum methods were compared to traditional marination, where the food simply sits in the marinade without any vacuum assistance. To measure the effectiveness of each method, a colorimeter was used to record redness as measured by a* before and after the marination process. Additionally, colorimeter readings were taken from slices of the food samples after the marination process for each treatment.

KEY FINDINGS

Vacuum Cycling Parameters

- Hold at -12psi for 60 seconds; releasing for 30 seconds; returning to -12psi for a total of 10 cycles
- Hold at -8psi for 60 seconds; releasing for 30 seconds; returning to -8psi for a total of 10 cycles
- Cycling at -12 psi resulted in greater uptake of marinade as measured by larger increases in a* values
  - a* measures the redness of a sample; higher a* values means more intense red color
  - a* measurements taken before and after marination to determine change/uptake of red dye (Δ)

Vacuum vs Traditional Marination Method

- Radishes marinated using three different methods and uptake of red dye measured with colorimeter
  - Vacuum cycling (resulted the greatest uptake of red dye/ highest values of a*): Δ 11.6
  - Straight vacuum: average Δ 5.2
  - Traditional marination: average Δ 4.4

Vacuum Cycling vs Marinating in Refrigerator

- Samples using vacuum cycling for an average 25 minutes resulted in a greater a marinade (Δ 10.9) compared to samples resting in the refrigerator for 2 hours (Δ 4.0)

KEY TAKE-AWAYS

For the home chef, vacuum technology can reduce the amount of time needed to marinate foods, thus reducing the overall time needed for preparation and cooking. Vacuum cycling, in particular, showed the greatest amount of marinade uptake compared to traditional and straight vacuum method during the same amount of time. Additionally, vacuum cycling resulted in a considerably larger uptake of marinade in shorter duration of time of compared to traditional methods. Future studies on vacuum cycling could focus on different food items; types of marinades; and its use in other food preparation areas such as brining and pickling.