

# Salad Greens

Kimberly P. Wright

Wright is with Dole Fresh Vegetables, Salinas, CA.

## Scientific Names and Introduction

Various greens other than lettuce are used in raw salads. These include corn salad; lamb's lettuce; field salad; mâche (*Valerianella locusta* [L.] Latterrade em. Betcke [*V. olitoria*]); dandelion (*Taraxacum officinale* Wiggers); French or round sorrel (*Rumex scutatus*); garden sorrel (*R. acetosa* L.); miner's lettuce; winter purslane; claytonia (*Montia perfoliata* [*Claytonia perfoliata*]); mizuna (*Brassica rapa* L. subsp. *japonica* group Japonica); purslane (*Portulaca oleracea* L.); and rocket salad, roquette, arugula, rucola, or rugula (*Eruca vesicaria* [L.] Cav. subsp. *sativa* [Mill.] Thell).\* Young leaves are generally used.

## Quality Characteristics and Criteria

Greens used in raw salads must be fresh, tender, and turgid with no yellowing, decay, or insect or mechanical damage. Whole plants of rocket and lamb's lettuce are sometimes sold with roots attached, which lengthens postharvest life.

## Horticultural Maturity Indices

Greens are harvested as individual leaves, leaf clusters, or whole plants and should be young, tender, and mild flavored. Plants that have flowered are usually too strong in flavor and tough in texture for use in raw salads.

## Grades, Sizes, and Packaging

These crops are not graded or sized in the United States. Salad greens may be packed in fiberboard cartons lined with perforated polyethylene bags or in small sealed plastic bags, trays, or clamshell containers. These greens may also be packed as bunches of leaves or plants (Rubatzky and Yamaguchi 1997, Péron and Rees 1998).

## Precooling Conditions

Greens for salads should be cooled to 0 °C (32 °F) as soon as possible after harvest. Vacuum-cooling is effective for removing field heat.

## Optimum Storage Conditions

Salad greens should be stored at 0 to 2 °C (32 to 36 °F) with 95 to 100% RH. Rocket salad typically lasts 7 to 10 days and other leafy greens 10 to 14 days (Cantwell 1997). Top icing can be used.

## Controlled Atmosphere (CA) Considerations

CA is generally not beneficial. MAP is mostly beneficial for controlling RH. However, lamb's lettuce retains acceptable quality after 28 days in sealed plastic bags with reduced O<sub>2</sub> and elevated CO<sub>2</sub> at <4 °C (39 °F) (de Leiris 1987). MAP reduces yellowing and decay of sorrel (Aharoni et al. 1993).

### **Retail Outlet Display Considerations**

Use of water sprinklers is acceptable. Leafy greens are highly susceptible to water loss and wilting.

### **Chilling Sensitivity**

Salad greens are not sensitive to chilling and should be stored as cold as possible without freezing.

### **Ethylene Production and Sensitivity**

Salad greens have very low ethylene production but are highly sensitive to ethylene exposure (Cantwell 1997), which typically results in loss of chlorophyll leading to yellowing of leaves.

### **Respiration Rates**

Temperature	Rocket salad	Lamb's lettuce
	-----mg CO <sub>2</sub> kg <sup>-1</sup> h <sup>-1</sup> -----	
0 °C	42	12
5 °C	113	-
7 °C	-	67
10 °C	-	81
20 °C	-	139

Data from Cantwell and Reid (1993), Cantwell (1997), Peiris et al. (1997), Rubatzky and Yamaguchi (1997), and Piergiovanni et al. (1999).

Respiration rates for other greens are not reported, but would be expected to be similar.

To get mL CO<sub>2</sub> kg<sup>-1</sup> h<sup>-1</sup>, divide the mg kg<sup>-1</sup> h<sup>-1</sup> rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg<sup>-1</sup> h<sup>-1</sup> by 220 to get BTU ton<sup>-1</sup> day<sup>-1</sup> or by 61 to get kcal tonne<sup>-1</sup> day<sup>-1</sup>.

### **Physiological Disorders**

Because of the delicate texture of the leaves, greens are highly susceptible to mechanical damage, which may result in discoloration and decay.

### **Postharvest Pathology**

Low temperatures must be maintained throughout the cold chain to minimize pathological

disorders and prolong shelf-life. Salad greens are typically susceptible to the same bacterial soft rot and fungal decay as lettuce.

### **Quarantine Issues**

There are no known quarantine issues.

### **Suitability as Fresh-Cut Product**

Intact leaves are sometimes included in packaged salad mixes.

### **Special Considerations**

Greens must be handled carefully to avoid mechanical damage and water loss.

### **References**

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