

## Monitoring of Microbiological Quality of Ready-to-eat Baby Leaf Salads During the Storage

Alessia D'Alessio<sup>1</sup>, Mario Trupo<sup>2</sup>, **Rita Di Bonito**\*<sup>1</sup>, Ugo De Corato<sup>2</sup>

ENEA, Department of Biotechnologies, Agroindustry and Health Protection, <sup>1</sup>Casaccia Research Centre, Via Anguillarese, 301 – 00123 S. Maria di Galeria (Rome, Italy); <sup>2</sup>Trisaia Research Centre, S.S. 106 Jonica Km. 419,500 – 75026 Rotondella (Matera, Italy)

\*Corresponding author: [rita.dibonito@enea.it](mailto:rita.dibonito@enea.it)

### Abstract

The rocket (*Diplotaxis* spp.) and baby leaf lettuce (*Lactuca sativa* L.) are particularly appreciated in Italy and their use as ready-to-eat salads is increasing. In this work we have monitored the microbiological status of bagged samples from retail points of different regions in the spring and summer, in relation to the quality and shelf life of the product. A total of 78 samples of wild rocket and lettuce characterized by absence of decay symptoms were analyzed for presence of mesophilic bacteria, coliforms, yeasts and filamentous fungi by plate count. Several yeast isolates were identified by evaluation of single carbon source metabolism using the BIOLOG YT MicroPlates™ and the MicroLog™3 (ML3) software, while the fungi were identified by analysis of morphological characters. Diversity of microbial community was evaluated by the BIOLOG Ecoplates™. The monitoring was performed three times after packaging on samples stored at 6 – 8 °C. The total number of mesophilic bacteria presented a great variability and a difference in the microbiological load of the two types of greens was detected. Samples of wild rocket presented a total number of bacteria ranging from 10<sup>5</sup> to 10<sup>7</sup> cfu g<sup>-1</sup> at the 1<sup>st</sup> day of sampling while the lettuce ranged from 10<sup>4</sup> to 10<sup>6</sup> cfu g<sup>-1</sup>. All the samples from the same lot presented a constant increase of the total mesophilic bacterial population during the storage from the 2<sup>nd</sup> to the 8<sup>th</sup> day after the packaging. The coliforms were rarely found on the 1<sup>st</sup> day of sampling but reached a concentration of 10<sup>2</sup> cfu g<sup>-1</sup> or above in the following samplings in about 20% of the samples. The yeast and fungal populations were constantly detected and did not show numerical variation during the storage. In particular, the yeasts were mostly detected on baby leaf lettuce (10<sup>4</sup> cfu g<sup>-1</sup> average), while the filamentous fungi (*Cladosporium* spp.) were mostly found on wild rocket (10<sup>4</sup> – 10<sup>5</sup> cfu g<sup>-1</sup>). Variability in the initial load of bacteria as well as increase during the storage were observed even in relation to the season with presence of coliforms above 10<sup>2</sup> cfu g<sup>-1</sup> in some samples, while the populations of yeasts and fungi did not show significant variations. Thus, the control of contamination during the agricultural practices more than the processing procedures could improve the microbiological quality of the ready-to-eat product.

**Keywords:** Coliforms; *E. coli*; Mesophilic bacteria; Monitoring; Moulds; Minimal processing vegetables; Yeasts.