

# Small Scale Processing of Locally Produced Edible Oils

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## Introduction

Most edible vegetable oils used in the United States are processed in the Midwestern United States or in Western Canada. With a growing interest in locally produced foods, edible oil production has the potential to be decentralized with the seed grown and processed in a wide range of locales. In the Northeastern US, canola, sunflower, safflower, flax and other oilseed crops are able to be grown. Post-harvest processing of these oils on a small scale is not well understood and is the focus of a Northeast Sustainable Agriculture Research and Education (NESARE) grant. This project is shared between the Penn State College of Agricultural Sciences and University of Vermont Extension.

## Edible oil processing steps

Vegetable oils sold on the grocery store shelf are “RBD” oils, meaning they have been:

R – Refined: filtering removes particulates and some gums  
B – Bleached: removes colorants and other compounds that are blamed for rapid oxidation and reduced shelf life  
D – Deodorized: removes odor and taste components

RBD processing results in a virtually tasteless, odorless, colorless edible oil. All oils will have similar characteristics regardless of the source or quality of the initial seed stock.

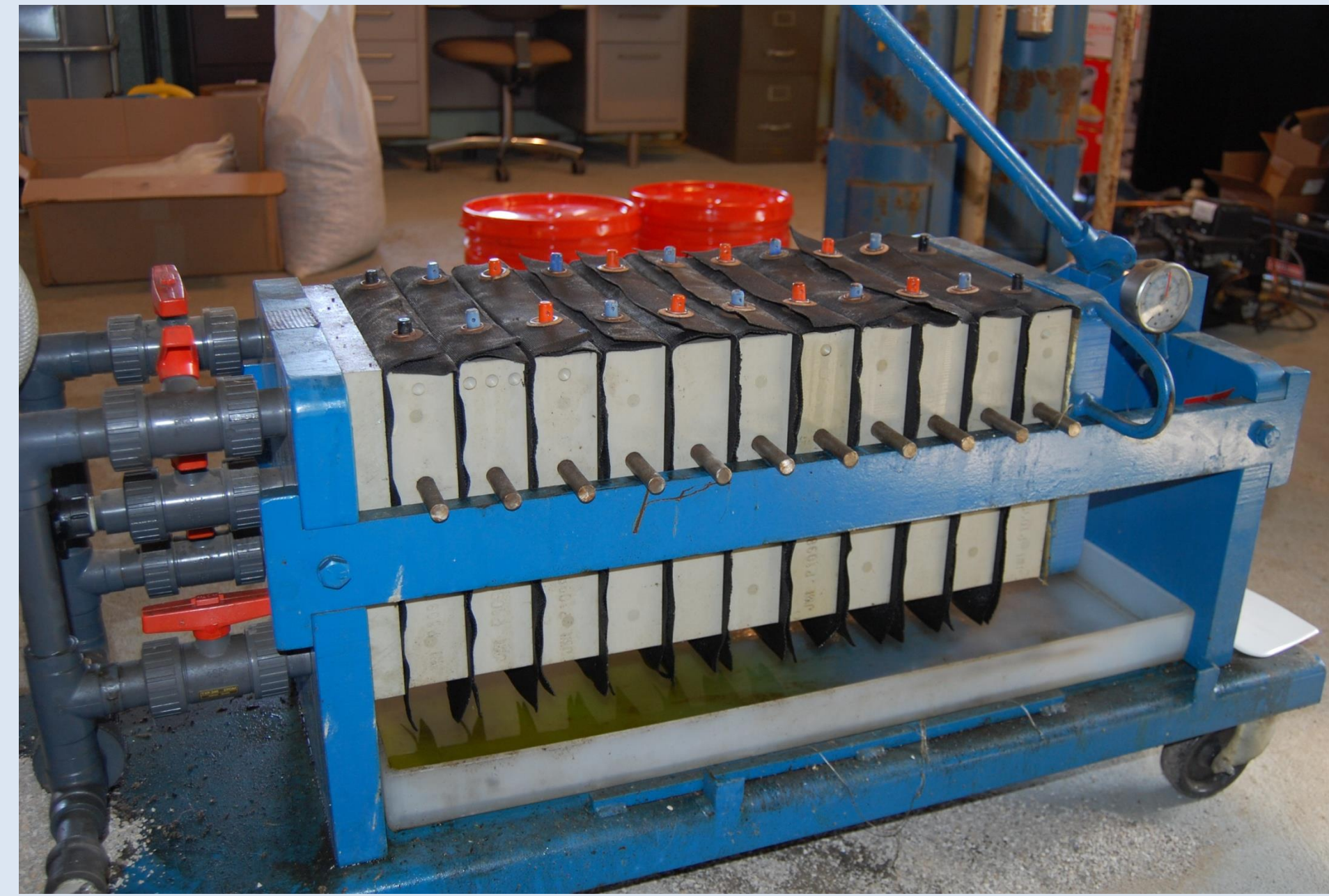
## Minimally processed edible oils have characteristic flavor



Conventional oil processing removes the distinctive flavors of freshly pressed oils. Minimally processed canola oil has a nutty flavor, sunflower oil has the characteristic sunflower taste. These oils used fresh or for cooking impart that particular flavor to the food. Olive oil has been successfully marketed for a particular flavor; can locally grown oils be marketed using their characteristic flavor as an asset?

## Refining

On a small scale, refining is handled by filtration. This is readily accomplished using a filter press and diatomaceous earth as the filter media.



Filter press removes particulates from oils

## Bleaching

Removing colorants: if necessary, bleaching clay in the presence of heat and absence of oxygen removes chlorophyll and other substances that increase oxidation of the oil. Oxidation leads to rancidity in edible oils. Bleaching increases the useful life of the oil in deep fat frying applications.



Small-scale bleaching unit (left) and unbleached vs. bleached canola oil (right)

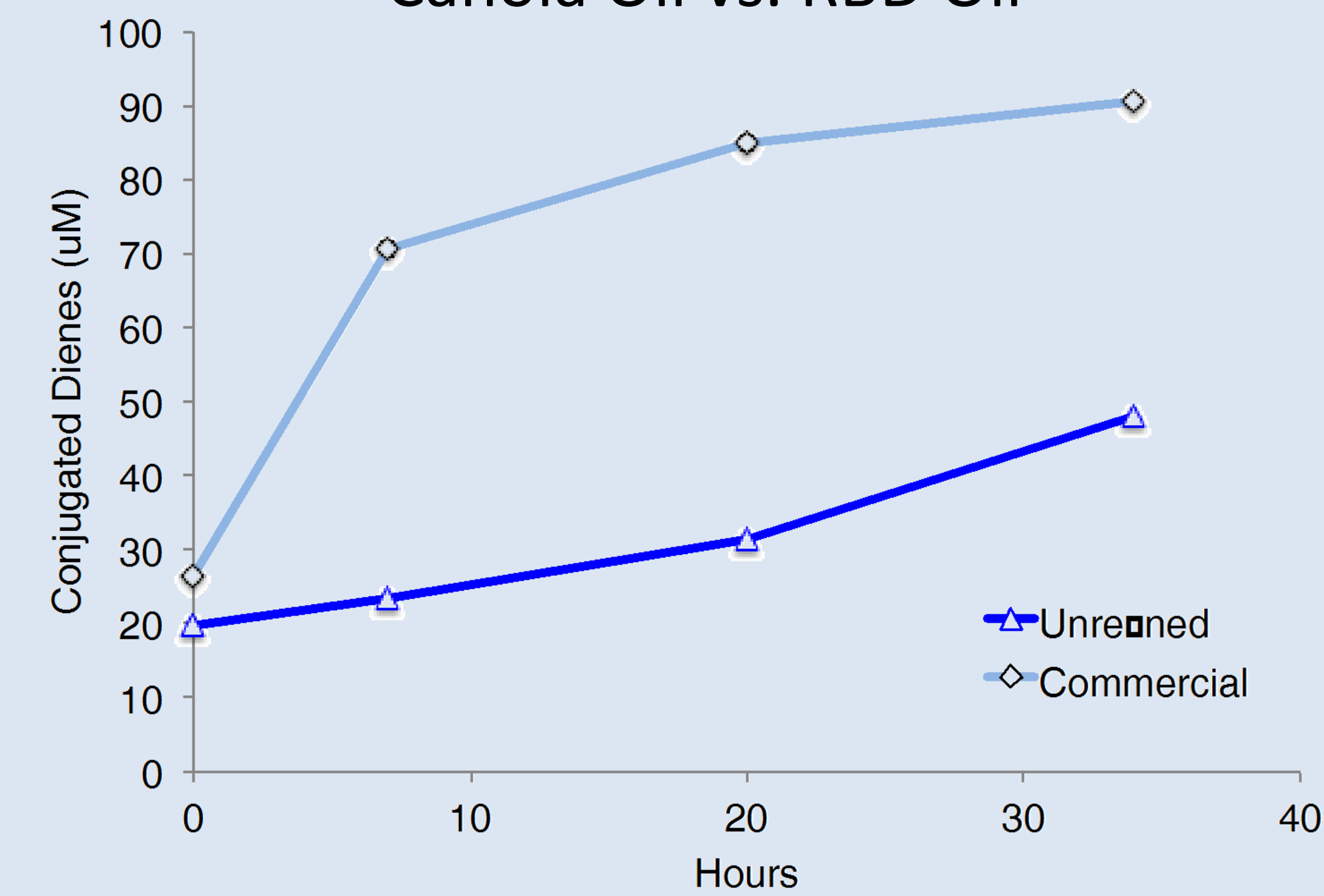


## Deodorizing

Deodorizing uses steam, vacuum and other processes and will likely not be used by small-scale processors.

## Results

### Accelerated Shelf Life Study of Filtered Canola Oil vs. RBD Oil



Lightly refined raw canola oil (filtered only) shows slower oxidation than commercially processed RBD canola oil. This indicator of longer shelf life is a positive selling point for a locally produced, minimally processed oil.

### Oilseed Press Comparisons

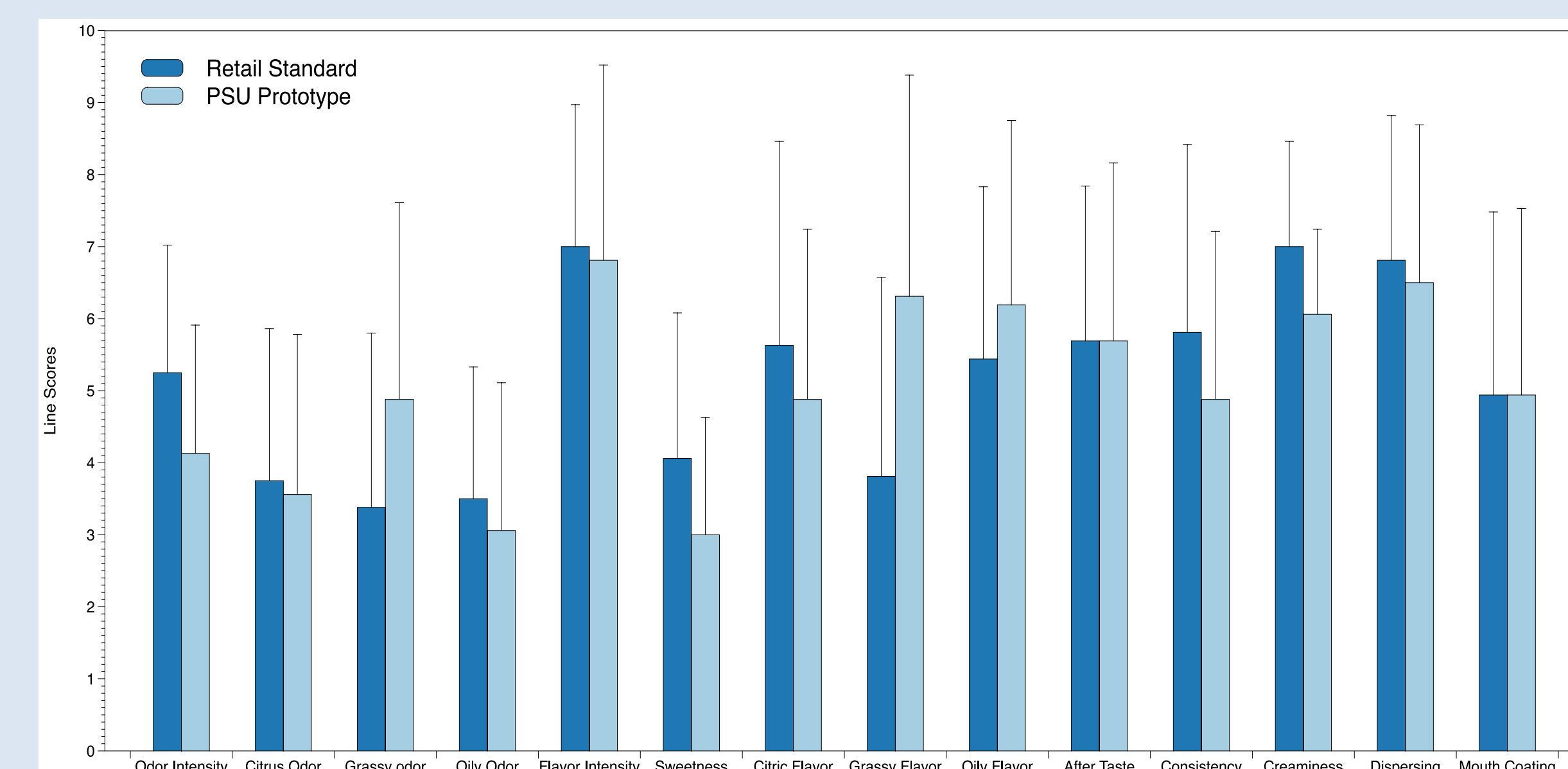


Same seed: 6 presses

Testing of different size and manufacturer small-scale oilseed presses has been completed on 4 presses used on farms in Vermont and 2 presses used in Pennsylvania. Three types of seed (sunflower, canola and soybean) from the same harvests were used to compare pressing temperature, oil extraction efficiency, meal characteristics, and other factors at various speeds and settings. Anecdotal information on press reliability and ease of use has also been gathered from the press owners. This information will aid a new entrant into oilseed pressing in deciding what press will work best for their process.

## Sensory Evaluation

A creamy-style Italian dressing using filtered but unbleached canola oil compared favorably to a commercial, off-the-shelf similar product, showing no significant differences in 14 sensory categories. If formulated correctly and in harmony with naturally occurring flavors locally produced and minimally processed oils can be used successfully in food preparations.



Sensory comparison of creamy-style Italian dressings: commercial vs. minimally processed