Pea and Lentil Flour Quality as Affected by Roller Milling Configuration

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Abstract

This study examined the effects of roller mill configuration on pulse flour quality. Dehulled yellow pea and green lentil were ground to flour using a laboratory roller mill characterized by its flexibility to control particle size reduction while maintaining a constant feed rate. The milling diagram length (long, six passes vs. short, four passes) and sieve sizes (large, 300 μm vs. tight, 180/150 μm) were adjusted for a total of four milling configurations. Each flour stream was characterized with respect to its physical properties and chemical composition. No notable differences were identified between pea and lentil based on how the milling configuration influenced flour characteristics. Overall, combining streams to produce a whole flour did not affect the chemical composition but resulted in variability for physical characteristics as indicated by a tendency toward increased levels of damaged starch with the shorter milling diagram. Damaged starch content was found to be indirectly associated ($p < 0.05$) with the particle size distribution, where the highest concentrations were noted in flours with median distributions below 30 μm. When individual streams were compared across milling configurations, the stream itself was rarely found to significantly influence flour physicochemical properties. However, the variation exhibited in particle-size distribution, protein, starch, ash, and damaged starch content could have practical relevance given the many significant ($p < 0.05$) correlations with functional properties that could subsequently affect the end-use applicability of flours. This would imply that specialized flours could be made with the intention of being used for defined food applications.

Keywords: damaged starch, flour functionality, lentil flour, particle size, pea flour, roller mil

Published in: *Legume Science* **2021**, 1-15. https://doi.org/10.1002/leg3.97

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