

IFPRI Review Brief
Relaxation of Surface Properties of Dry-Milled Materials

Dry milling of materials often results in surface structural disorder / amorphousness and/or changes in surface chemistry. These effects are often transient, and materials show relaxation behavior over time, leading to changes in apparent particle size distribution, drifting specific surface area, changes in cohesion, all of which may change their bulk properties and performance. Heterogeneity of surface characteristics at varying length scales can also influence their properties.

The aim of this review is to survey the existing scientific literature to establish the current understanding of the surface modification of milled particles. It should focus both on the physics and chemistry of transient surface behavior induced by dry milling and on the current and emerging analytical tools that can be used to study transient surface properties.

Given the diversity of IFPRI member companies, it is critical that both organic and inorganic materials be covered in the review. The relaxation behavior considered should include, but not necessarily be limited to changes in surface crystallinity, surface morphology (specific surface area), surface energy, triboelectrification, and cohesion/adhesion. Characterization techniques should include but not be limited to imaging, spectroscopies, surface probe techniques, and nano-scale mechanical measurements.

Changes to bulk properties are out of scope.