

# **Physicochemical properties of cross-linked and acetylated starches from large and small wheat starch granules**

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## **Abstract**

The large and small wheat starch granules were used for cross-linking and acetylation to determine effects of granule sizes on physicochemical properties of the modified starches. The large wheat starch granules showed higher reactivity with cross-linking and acetylation reagents than did the small granules. The cross-linked starches (CSs), acetylated starch (AS) and acetylated cross-linked starch (ACS) from the large granules had lower gelatinization temperature and higher enthalpy than did those from the small granules. The paste viscosities and swelling factors of CSs from the large granules reduced more rapidly as compared with those from the small granules. In contrast, the pastes of AS and ACS from the large granules had significantly higher viscosities and swelling factors than those from the small granules. However, the pastes of CSs from the small granules exhibited more stable than those from the small granules under the same modification conditions, while the pastes of AS and ACS from the large and small granules had similar resistance to freeze-thaw. Scanning electron microscope (SEM) also showed less damage granules of the small granules after modification than the large granules. Thus, the different granule sizes resulted in the different physicochemical properties of starch after modification.

**Keywords:** acetylation, cross-linking, modified starch, wheat starch granule.