

## Non-Food Usages

### Description

Although the early history of starch usage is mainly unrecorded, some very early examples exist of its industrial use. In the pre-dynastic period (4000 BC), Egyptians cemented strips of papyrus together with starch adhesive made from wheat. At a later date, Chinese documents were first coated with a high-fluidity starch to provide resistance to ink penetration, then covered with powder starch to give weight and thickness.

In the Middle-Age (14th and 15th century), starch was used in the laundry to stiffen fabrics, mainly kerchiefs, altar cloths, and other church linens. At the beginning of the 16th century, starch-making became more organized and commercial in Northern Europe. Flanders, home of the famous Flemish lace, was one of the earliest centers of starch manufacturing and skilful use. The custom of powdering the hair with starch appears to have become popular in France in the sixteen century, and by the end of the eighteen century, this became a general practice.

However, during these times, none of these industrial applications of starch as a material have jeopardized its use as a nutritional element. It is only recently that the use of starch as the world's first example of composite mortar has been discovered. This discovery highlighted the competition between using rice as a material and its use for nutritional purposes. Workers built the Ming dynasty sections of the Great Wall about 600 years ago by mixing a paste of sticky rice flour and slaked lime, the standard ingredient in mortar. The ancient mortar is a special kind of organic and inorganic mixture. The inorganic component is calcium carbonate, and the organic part is amylopectin, which comes from the sticky rice soup added to the mortar. Amylopectin helped create a compact microstructure, giving more stable physical properties and higher mechanical strength. The sticky rice mortar bound the bricks together so tightly that weeds still cannot grow in many places. This technical innovation was accompanied by widespread resentment against the Wall in South China because the Ming emperors requisitioned the southern rice harvest to feed the workers on the Wall and make the mortar. The use of sticky rice, a staple in East Asian food, was one of the highest technical innovations of the time and helped Ming dynasty tombs, pagodas and walls weather earthquakes and other disasters.

### Category

1. News