Cheese Flowers Are Shaped by Friction

Scraping the surface of a Tête de Moine cheese wheel produces frilly ribbons whose flower-like forms depend on the local friction.

By **Marric Stephens**

Tête de Moine is a Swiss cheese traditionally served in fan-shaped, flower-like ribbons. The pieces' ruffled edges, which resemble lettuce leaves, supposedly enhance the gustatory experience through their large surface-to-volume ratios. Now Jishen Zhang and colleagues at ESPCI Paris have studied how Tête de Moine flowers acquire their frilly forms [**1**]. It turns out that spatial variations in the properties of the cheese wheel from which the flowers are removed are responsible. That insight, the researchers say, could help to improve the processing of soft materials.

Tête de Moine flowers are scraped from the surface of the cheese wheel by a rotating, near-vertical blade that is fixed at the wheel's hub. The blade "bulldozes" the cheese in front of it, shearing and shortening it along a plane angled between the surface of the cheese and the face of the blade. If this angle were constant across the face of the wheel, the degree of shortening would be uniform, and the process would scrape off a corkscrew-shaped ribbon with a smooth outer edge. But the angle varies, with the shear plane being closer to horizontal nearer the hub. As a result, the cheese near the edge is shortened much less than the cheese near the center, producing a geometric incompatibility that is resolved by the cheese ribbon buckling along one side.

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Surprisingly, the researchers found that, although the maturing process causes various of the cheese's mechanical properties to vary across its radius, the one parameter that controls the orientation of the shear plane, and therefore the degree of shortening, is friction between the cheese and the blade. Near the edge, the cheese slides easily along the blade, whereas the higher-friction cheese near the center sticks and piles up.

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REFERENCES

1. J. Zhang *et al.*, "Morphogenesis of cheese flowers through scraping," Phys. Rev. Lett. 134, 208201 (2025).