

1.CONTEXT OF THE STUDY

What is knefeħ?

A traditional Lebanese dessert built on three pillars: a semolina-based dough, a melting cheese filling (akkawi or ricotta-type), and a hot sugar syrup soak that delivers the signature sweetness and moisture.

A double exclusion

- Celiac disease: ~1% global prevalence; semolina is wheat – gluten triggers villous atrophy and acute GI symptoms.
- Type 2 diabetes: ~14% of Lebanese adults; the syrup soak delivers a high glycemic load that triggers sharp postprandial glucose spikes.

Objective

Reformulate knefeħ into a gluten-free, sugar-free version whose taste, texture and golden appearance remain comparable to the traditional product, while being safe for celiac and diabetic consumers.



2.R&D METHODOLOGY

Replacing the semolina dough

- Almond flour: naturally gluten-free, low GI, high in protein and unsaturated fats; provides nutty colour and rich flavour.
- Xanthan gum: polysaccharide hydrocolloid that mimics gluten’s viscoelasticity, binds the dough and prevents crumbling. Dose: 0.25–0.5% w/w of flour.

Replacing the sugar syrup

A ternary sweetener system was selected to replicate the full sucrose function set with GI ≈ 0:

- Erythritol: bulk and viscosity carrier; ~70% sweetness of sucrose, mimics syrup body.
- Monk fruit (mogroside V): ~250× sucrose, heat-stable to 170 °C, no bitter aftertaste.
- Stevia (Reb-A 95%): complements monk fruit, rounds the sweetness profile, GI = 0.

Aroma carriers: rose water & orange blossom water preserve the cultural identity.



3.ENSURE THE QUALITY

Analytical methods

- Gluten ELISA: R5 antibody method (Codex limit < 20 ppm) to confirm gluten-free status.
- Benedict’s test: qualitative confirmation of the absence of reducing sugars.
- Water activity (a_v): target a_v < 0.85 to prevent microbial growth in the cheese-filled product.
- Colour comparison: verifies the golden surface despite no reducing-sugar Maillard substrate.

Sensory evaluation

Triangle test (n=30) to detect differences vs. control, then 9-point hedonic scale on appearance, aroma, sweetness, cheese pull, syrup absorption, overall liking. Paired t-test, α = 0.05.



4.CONVIVIAL MEAL

Knefeh as a shared experience

Knefeh is rarely eaten alone, it is a Sunday-morning kaak sandwich, a wedding dessert, a celebration centrepiece. The reformulated product allows celiac and diabetic family members to share the same plate, not a separate one.

Service & pairings

- Served warm with a light orange-blossom syrup made with erythritol – monk fruit – stevia in place of sucrose.
 - Akkawi cheese desalted by traditional water bath; ricotta variant for a milder profile.
 - Topped with crushed pistachios; paired with unsweetened Lebanese coffee.
- One knefeħ, one table — tradition kept, no one excluded.*



5.CONCLUSIONS & PERSPECTIVES

- Dual reformulation achieved: almond flour + xanthan gum dough, erythritol – monk fruit – stevia syrup — both gluten-free and effectively zero-glycemic.
- Quality benchmarks met: gluten content < 20 ppm, negative Benedict’s, a_v < 0.85, texture and colour comparable to traditional knefeħ.
- Sensory acceptance: traditional taste, cheese pull and aroma preserved through rose & orange-blossom water carriers.
- Next steps: in-vivo glycemic index measurement, shelf-life trial.