Why fresh ginger curdles milk tea (and how to stop it)

From the teas.co.uk wiki

Fresh ginger contains a protein-cutting enzyme called zingibain. It does to milk almost exactly what rennet does in cheese-making: it snips the casein proteins so they clump together. Add raw ginger, or ginger juice, to warm milk and the drink can thicken, go grainy or split into curds and whey within minutes.

This is a different problem from a lemon-and-milk split. Lemon curdles milk with acid; ginger curdles it with an enzyme. Both end in curds, but only one of them is fixed by heat.

The fix, in one line: simmer the ginger in water before the milk goes anywhere near it.

How to make ginger chai that stays smooth

1. Put the sliced or grated fresh ginger in the pan with the water and any whole spices.
2. Bring it to the boil and simmer for 3 to 5 minutes. This is the step that matters: the enzyme is destroyed by a proper boil, so from here it cannot touch the milk.
3. Add the tea and brew for a couple of minutes.
4. Now add the milk and bring it back to a simmer.
5. Strain and serve.

That is the traditional masala chai order, and it is traditional for a reason. Our how to make chai at home guide follows the same sequence.

What not to do

- **Don't stir raw ginger juice into a warm milky cup.** That is exactly the condition that sets it.
- **Don't add ginger to milk that is only warm and hold it there.** The enzyme works best in warm conditions, roughly body temperature up to around 60°C, so a mug left to cool is at more risk than one that gets properly hot.
- **Don't add lemon as well.** Acid plus milk is a second, faster route to a split cup.
- **Don't rely on straining the pieces out.** The enzyme is in the juice, not just the fibres.

Proof the effect is real: ginger milk curd

There is a classic Cantonese dessert, ginger milk curd, made by pouring hot milk onto a spoonful of fresh ginger juice. Left alone for a few minutes it sets into a soft, silky custard with no gelatine and no eggs. It is the same reaction people accidentally create in a mug, which is why the fix is about the order of the steps,

not about avoiding ginger.

The underlying dairy science is well documented: proteases extracted from fresh ginger act on caseins, including kappa-casein, and coagulate milk. Journal of Dairy Science · University of Guelph, milk proteins

What about dried ginger and tea bags?

Dried ground ginger and ready-made ginger tea bags are not a problem. Drying and processing knock out the enzyme activity, which is why Tea India Ginger Chai or Tea India Masala Chai can be brewed straight into hot milk with no drama. If you like the convenience but still want the fresh kick, brew the bag first and add a little fresh ginger to the pan while it simmers.

If your chai has already split

- **Ginger caused it?** The drink is still safe; it is just unpleasant to drink. Start again and simmer the ginger first.
- **Milk near its date?** Older milk is slightly more acidic and splits more easily. Check the use-by date, and if the milk's condition or storage is in doubt, throw it away rather than tasting it. FSA food safety guidance
- **Plant drink?** Soya splits most readily in hot, acidic tea; oat is the most stable, especially barista versions. See oat milk in tea.

For the other everyday causes (heat, acidity, hard water), see why does milk curdle in tea.

Common questions

Does ginger always curdle milk?
No. Boiled or dried ginger will not. Raw ginger in warm milk usually will.

Will boiling for exactly two minutes save it?
Boil the ginger with the water before the milk goes in and you have dealt with it. There is no need to boil the finished milky drink hard.

Is a curdled ginger chai safe to drink?
If the milk was fresh and properly stored, curds are a texture problem rather than a safety one. Off milk is a different matter: bin it.

Can I use ginger with lemon and honey instead?
Yes, and that is the safer combination: just leave the milk out of that cup. See ginger tea.

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