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A Novel Foldable Instant Tea Cup with Integrated Ingredient Chamber and Removable Filtration Net

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Abstract

This work introduces a unique design for a collapsible instant tea cup that integrates an ingredient chamber, a detachable filtration mesh, and a liquid-permeable brewing mechanism for quick tea preparation. The cup eliminates the need for an external teapot or separate equipment. It is composed of three primary parts: the upper drinking section, a removable perforated net, and a sealed bottom compartment that stores pre-measured tea-making ingredients such as tea leaves, ginger, sugar, and spices. Once hot water is poured, it flows through the filtration net into the base chamber, extracting flavors before returning upward for consumption. The foldable design enhances portability, while the detachable net allows easy cleaning and refilling. This solution provides a convenient, eco-friendly, and resource-efficient method of preparing fresh tea, particularly beneficial for travelers, office workers, and outdoor users.

I. Introduction

Traditional tea preparation requires a kettle or brewing pot, a heating source, and separate storage for ingredients. Such arrangements are inconvenient in situations where portability and speed are essential. This paper presents a foldable instant tea cup that integrates brewing and consumption within a single unit.

The main objectives of the design are:

1. Self-contained — storage of all tea-making ingredients in a sealed compartment.
2. Reusable — inclusion of a refillable base chamber and removable filtration net.
3. Efficient — rapid brewing with minimal heat dissipation.

II. Design and Components

A. Cup Structure

The cup body is collapsible, fabricated from food-grade heat-resistant silicone or similar polymers. A side handle ensures comfortable use.

B. Ingredient Chamber (Base)

Located at the lower end, the sealed compartment contains tea ingredients such as tea leaves, ginger, sugar, and spices. Proper sealing prevents leakage and contamination.

C. Removable Filtration Net

A perforated, detachable mesh is placed above the base chamber. It permits hot water to pass into the ingredient space while preventing particles from mixing directly with the drink.

D. Brewing Mechanism

When hot water is added, it flows through the perforated net into the base, allowing flavor infusion. The prepared tea then rises back through the mesh, ready for drinking.

E. Foldability

The collapsible structure can reduce the cup's height by up to 70%, making it compact for travel, camping, or office use.

III. Working Principle

Hot water poured into the cup percolates through the perforated filter, reaches the stored ingredients, and extracts flavor molecules. The steeping duration can be adjusted by the user to control the strength of the tea.

IV. Advantages

Portability: Compact, foldable form factor for easy carrying.

Customizable: Chamber can be refilled with personalized blends.

Eco-friendly: Eliminates the need for disposable tea bags.

Quick Preparation: Produces tea in less than one minute.

V. Potential Applications

Travel and Camping: Convenient for journeys without access to kitchen setups.

Workplaces: Fresh tea preparation without requiring a pantry.

Emergency Relief: Provides a simple method to serve hot beverages in relief camps.

VI. Materials and Manufacturing

Cup Body: Food-grade foldable silicone with high thermal resistance.

Filtration Net: Stainless steel or BPA-free heat-resistant polymer.

Sealing Mechanism: Leak-proof silicone rings for airtight storage.

Manufacturing techniques may include silicone injection molding and precision laser perforation for the filter net.

VII. Future Enhancements

Temperature Indicator: To show optimal brewing range.

Self-heating Base: Integrated rechargeable or chemical heating units.

Pre-packaged Capsules: Single-use refillable ingredient packs.

Fig : - A Foldable Instant Tea Cup with Integrated Ingredient Chamber and Removable Filtration Net

VIII. Conclusion

The proposed foldable instant tea cup merges convenience with functionality by integrating ingredient storage, a removable filter, and a compact collapsible body. This innovation offers a sustainable and portable alternative to traditional brewing methods, ideal for fast-paced lifestyles and outdoor activities.

References

[1] S. Sharma, “Tea Preparation Methods and Innovations,” Food Technology Review, vol. 12, no. 3, pp. 45–52, 2021.

[2] L. Zhang et al., “Portable Beverage Brewing Systems: A Review,” Journal of Food Engineering, vol. 289, p. 110197, 2021.

[3] K. Patel, “Collapsible Drinkware and Material Innovations,” International Journal of Design Engineering, vol. 14, no. 2, pp. 78–85, 2020.