

Ideal ratio of pasta sauce to pasta

Surya Narayanan

March 2025

1 Introduction

The lead author of this paper has a habit of making penne al forno with Marinara. However, research to find the ideal ratio of pasta sauce to pasta yielded more confusion than clarity, finding a very varied range between 1x and 2x [Reddit, 2024]. To explore the taste profiles, we decided to conduct a dilution with the hopes of finding the ideal ratio.

2 Methods

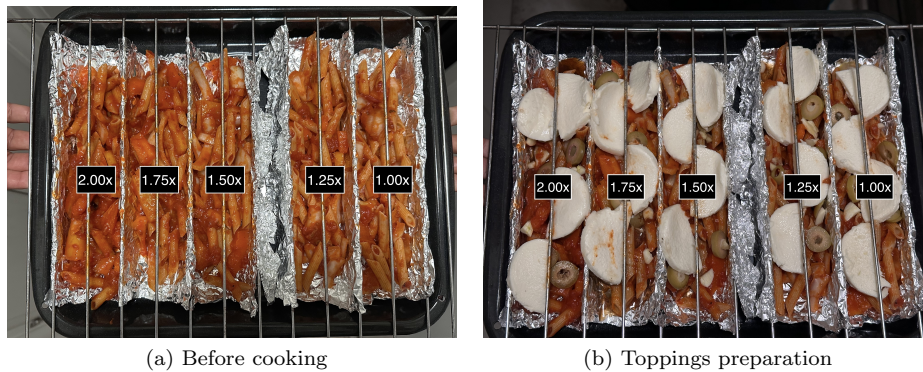


Figure 1: Experimental setup and preparation for testing pasta - pasta ratios.

We took a baking tray and divided into 5 sections, creating wells using household aluminum foil. A single well held 225gm waterweight ($25\text{ cm} \times 3\text{ cm} \times 3\text{ cm} = 225\text{ cm}^3$). We used 45gm of Garofalo penne pasta and 5 concentrations of Rao's Marinara sauce (1x, 1.25x, 1.5x, 1.75x, 2x), by weight. To impart moisture, nutrition and flavor, we added 50gm of veggies (20gm onion, 30gm bell peppers) to each well. The pasta, sauce, onions and bell peppers were mixed and placed in each well (Figure 1a). On top of this mixture, we placed two slices of low fat mozzarella cheese, cut into halves, with two halves on each side of the

midline dividing the well (Figure 1b). Apart from the cheese, toppings included two storebought stuffed olives cut into slices, per well, two spoonfulls of water which was previously used to boil dried mushrooms (for umami flavor and to mitigate the fear that the 1x dilution looked too dry), a spoonfull of Trader Joe's Extra Virgin Olive Oil, and diced fresh garlic, which was sprinkled randomly over all the wells. While preparing the pasta, the different dilutions presented varying appearances, and the extremes could be easily visually distinguished. The pasta was baked for for 35 min at 430F. The comparison metric was overall taste profile, chewiness of the pasta (whether the sauce imparted enough water to cook the pasta) and the interaction between the toppings and the pasta.

3 Results



Figure 2: Final result after cooking, showing the different pasta sauce to pasta ratios.

Much to the surprise of the authors, the lower concentrations brought out the flavor of the sauce perfectly and coated the pasta but did not soak it, while the higher ones were too saucy and overwhelming. The color profile of the cooked 1x dilution suggested a mix on the drier side (Figure 2), but this appearance was betrayed by the balanced flavor profile it imparted. The authors also noted merits of the 1.5x dilution, where the veggies presented a great mix of their original flavors and the acquired flavor from the sauce. The peppers in the 1x dilution presented a great crunch, which were appreciated by the authors, and the cheese had molten across all dilutions, which was a pleasant surprise. While some of the pasta was undercooked because the authors had pulled the experiment too early, the penne under the cheese had acquired a significant amount of moisture from the cheese overhead and presented pleasantly.

4 Future work

Given the difficulty in assembling the experiment, there were quite a few limitations in the study. The dimensions of each trough in the baking dish were not uniform, which may have affected the distribution of ingredients and cooking consistency across different sections. The pasta was intentionally undercooked to mitigate the risk of burning the drier pasta sections, particularly the 1x dilution. This undercooking could have influenced the overall taste evaluation.

The cheese quantities were not precisely controlled, as the slices of mozzarella were not weighed before application. Similarly, the garlic was added without precise measurement, potentially creating inconsistency in flavor profiles across the different dilutions.

The preparation of vegetables varied throughout the experiment. The authors acknowledge becoming less meticulous midway through the experiment, resulting in inconsistent cutting of onions and peppers. Some vegetables were finely diced while others were left in larger chunks. This inconsistency in vegetable preparation likely affected the biophysics of moisture release and flavor distribution.

Finally, a significant limitation of this study was the lack of multiple trials. While additional experimental runs were desired, resource constraints limited the investigation to a single trial, reducing the statistical reliability of the findings.

References

Reddit (2024). Store brought pasta sauce to pasta ratio. https://www.reddit.com/r/cookingforbeginners/comments/1fdntw6/store_brought_pasta_sauce_to_pasta_ratio/ Accessed March 2025.