

A Perfect Curry

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Abstract

Using several plausible assumptions, equations are derived to define a well balanced curry that looks aesthetically pleasing on the plate.

1 Introduction

We consider our meal as a little hill of curry sitting on top of a uniform circular bed of rice. From that we can calculate some formulas for the volumes of rice and curry.

$$V_r = (\pi d_r^2 h_r)/4 \quad (1)$$

which gives the volume of the rice in terms of the height of the rice, h_r , and the diameter of the bed of rice, d_r , which will be a bit smaller than the plate size. The volume of a hill of curry is a bit more complicated. we approximate it as a spherical cap or dome:

$$V_c = \frac{\pi h_c}{6}(3r_c^2 + h_c^2) \quad (2)$$

which depends on the height, h_c , and radius, r_c , of the curry.

That is a lot of variables because there are a lot of ways to lay it out giving different visual effects, various ratios of curry to rice, and different total meal sizes. Physicists work with approximations and the key to good physics is to make the right approximations. We make the problem simple enough to solve, but detailed enough to give meaningful results: even though we know they cannot be exactly right.

2 Assumptions

Let's add further assumptions:

Assumption 1 *We want a clear band of clean plate outside the rice, let's allow 2cm.*

Assumption 2 *The rice needs to be at least 4mm deep for the grains to cover the plate*

Assumption 3 *Plate size 27cm, that is a good sized dinner plate. 23cm is common for a smaller dinner plate.*

Assumption 4 *Balance: I like equal amounts of curry and rice on my fork. The "fork test"*

Assumption 5 *Appearance: If the rice is 61% wider than the curry which sits in the middle, giving a good ring of rice. That is the famous golden ratio, which is said to be most aesthetically pleasing and has been claimed to be a precise and accurate rule for most appealing composition. It is very close to the rule of thirds used for photographic composition. However the strongest claims about the golden ration are to say the least exaggerated.*

Assumption 6 *Recommended rice portion size 60g which expands to 100g when cooked*

Assumption 7 *Rice, curry, and most foods are about the same density as water 1gcm^3*

Assumption 8 *Fluffiness factor f . Rice is served with separate grains, as much air as rice when it is laid onto the plate. It is the fluffiness that contributes to the look of the rice and how it feels in the mouth. It changes the effective density of the rice and results in equal volumes of rice and curry having quite different weights.*

Assumption 9 *Curry sauce coats all the meat to give a curry that is balanced with equal amounts of meat and sauce.*

3 The Equations

Everything then falls into place:

$$W_c = \frac{\pi h_c}{6}(3r_c^2 + h_c^2) = fW_r = f\frac{\pi}{4}d_r^2 h_r \quad (3)$$

The size of the meal is determined straight away from the portion size of rice and the *fork test* . We have 100g of rice, which fluffs up and needs 200g of curry to balance it visually. That gives a meal of 300g in total, containing 100g of meat. An average sized meal by most standards, and perfectly proportioned too.

4 On the plate

How does it look on the plate? The assumptions and a few calculations gives a 23cm diameter bed of rice 5mm thick, supporting a low dome of curry, 14cm diameter and 2.4 cm high (about an inch).

If the standard meal is not right for you, then try a more delicate 30g portion of rice and a smaller plate. We need an even smaller circle of rice to avoid the rice being spread too thinly [assumption 2]. The curry is just as high and more dome like. The total meal is a modest 150g.

For a starving student go for 100g of rice, a small mountain of curry (well 4cm), and a total meal of 480g: enough to satisfy just about anyone.

At the other extreme: how about a nouvelle cuisine curry: 20g of rice makes a ring just 15cm (6 inches) across and a spread of curry 9cm wide and 2cm high.

The four alternatives are shown in the table below.

	std	small	large	NC	units
Rice portion	60	30	100	20	<i>g</i>
volume of rice	192	96	320	64	<i>cm³</i>
diameter of plate	27	23	27	27	<i>cm</i>
empty band	2	4	2	6	<i>cm</i>
diameter of rice	23	15	23	15	<i>cm</i>
thickness of rice/mm	5	5	8	4	<i>mm</i>
diameter of curry	14	9	14	9	<i>cm</i>
height of curry	2.4	2.6	3.7	1.8	<i>cm</i>
weight of meal	294	145	480	96	<i>g</i>

Table 1: The perfect curry: various meal sizes. (NC is nouveau cuisine)