

## COMPUTATIONAL GASTRONOMY

### ASSIGNMENT - 1

Q4.

	boiled rice & dal	boiled egg
Total fat	5.8g (7%)	5.3g (7%)
Cholesterol	12 mg (4%)	187g (62%)
Sodium	486 mg (21%)	62mg (3%)
Total carbohydrates	48g (7%)	0.6 g (0%)
Protein	13g	6.3g
Vitamin D	0mcg (0%)	1.1 mcg (6%)
Calcium	48 mg (4%)	25mg (2%)
Iron	6.4mg (36%)	0.6 mg (3%)
Potassium	493.7mg (11%)	63mg (1%)

Serving size of boiled boiled rice & dal : 1 cup (207g)

Serving size of boiled egg : 1 large (50g)

- boiled egg has high cholesterol than boiled rice & dal
- boiled rice & dal is more sodium rich than boiled egg
- There is no Vitamin D in boiled rice & dal but there is a minute amount in boiled egg
- Total carbohydrate in boiled rice & dal is 48g (Dietary Fiber 9.5g & Sugars 2.1g) whereas in boiled egg it is 0.6g (Dietary fiber 0g & sugars 0.6g)

Q5

5 most uncommon food ingredients are as follows:

a. Gond (common name)

English name: Edible Gum

Seasonal use: Panjiri which is usually eaten in winters.

Nutritional value: Calories - 70 calories

(per 100g)

Total Fat - 86g

Carbohydrates - 35g

Fiber - 30g

Protein - 9.51g

Sodium - 9g

b.

Khas Khas (common name)

English name: Poppy seeds

Seasonal use: used in the gravy of fish curry.

Nutritional value: Calories - 525 calories

(per 100g)

Total fat - 42g

cholesterol - 0 mg

Sodium - 26 mg

Total carbohydrate - 28g

Protein - 18g

c.

Kalonji (common name)

English name: Nigella Seeds.

Seasonal use: used in gujiya which is made on Holi

Nutritional value: Calories - 50-55 calories

(per 10g)

Protein - 2.2g

Fat - 2.5g

Carbohydrates - 4.8g

Fiber - 2.3g

Sugar - 0g

d. Khand (common name)

English name - Muscovado sugar

Seasonal use - used as preservatives for pickles, jams

Nutritional value - Energy : 753 KJ (180 kcal)

(per 500g)

Fat : 2.5g

Saturated fat - 0.5g

Carbohydrates - 36g

e. Bhoot Jolokia (common name)

English name - ghost chili

seasonal use - Traditional medicine, used in pickles/curries

Nutritional

Nutritional value - Calories - 1 calorie = 1 calorie

(2g)

Some micro nutrients in very small quantity

a6

(a)

(b)

Q6

- (a) Microwaving heats food quickly & uses less water compared to other cooking methods like boiling. As the cooking time is reduced & water is minimally used, microwave cooking can actually help retain more ~~nut~~ nutrients. The nutritional content of food is more affected by factors like temperature, time and the specific food being cooked, rather than the cooking method itself. Therefore, microwaving food does not inherently destroy its nutritional value any more than other cooking methods.

Conclusion: Myth (Harvard Health)

- (b) Refrigeration is a method used to slow down the process of food spoilage by inhibiting the growth of bacteria & other microorganisms. It helps in preserving the nutritional value of food by slowing down the degradation of nutrients. While there may be some minimal loss of certain nutrients, particularly vitamin C, over extended periods of refrigeration, the impact is generally minor. Refrigeration actually helps in retaining the nutritional value of food by preventing spoilage & degradation that would otherwise occur more rapidly at room temperature.

Conclusion: Myth (Columbia University)

(c) genetic modification is a tool used in biotechnology to introduce specific traits into organisms, such as disease resistance, drought tolerance in crops, or enhanced nutritional profiles.

The 'good' or 'bad' nature of GM organisms (GMOs) depends on the specific application & context. For example, GM crops like Bt corn are engineered to resist pests, reducing the need for chemical pesticides, which can be beneficial for both the environment & human health. Similarly, genetically modified animals like the AquAdvantage salmon grow faster, helping to meet food demand more efficiently.

However concerns about GMOs often center on ethical considerations, potential environmental impacts & long-term health effects. While most scientific studies have shown that GMOs are safe to consume & can offer significant benefits, it is important to continue evaluating each GM organism on a case by case basis.

Conclusion - Depends on the situation, could be either. (nature.com)

A7. The primary method for measuring caloric content in food is bomb calorimetry. This technique involves burning a sample of food in a sealed container (the 'bomb') submerged in water. The increase in water temperature is measured to calculate the energy released. This value is then converted to calories. For commercial purposes, an indirect method called the Atwater system is often used. It estimates calories based on the macronutrient content (carbohydrates, proteins & fats) of the food, using standardized conversion factors. While less precise than bomb calorimetry, this method is quicker & more cost-effective for large scale food labeling.

Q.8.

- (I) Smart chef robot : A robot which has complete knowledge of all the cuisines of the world . With a simple command you can order it to make a south Indian dosa or an italian pizza or mexican tacos .
- (II) Weight loss / gain strategy : using ML techniques , food can be added or removed from the diet according to the personal appetite of the individual which can offer guaranteed weight loss/gain within a certain number of days .
- (III) Invent new recipes : The culinary data can be used to create all new recipes
- (IV) Well structured culinary data can help to combine flavors that imitate foods the are culturally or economically not feasible . For example , the impossible burger can be made more economically viable if we have information of what all easy to find ingredients can be used to make it
- (V) Information about the molecular structure of food can help to make food that are devoid of allergens . For example , people suffering from lactose intolerance can be helped by the provision of food products that are lactose ~~for~~ free but still taste the same and have similar nutritional value . Alternatives that are already available such as soy milk do not taste the same .
- (VI) Genetically modified food can be made more nutrient dense if we know what all underlying nutrients need to ~~to~~ be modified & what are the ways that can be done .

- (vii) Plants with resistance to insecticides & pesticides can be grown so that there is least chemical toxicity transmitted to the plants.
- (viii) More effective & economic medicinal drugs can be made available if we have all the possible knowledge there is to know about the particular disease & its treatment. Understanding all the underlying chemical processes can help make these drugs more potent.
- (ix) Food Pill: As discussed in class, if culinary data can be used to create a pill that can make a person full in an instant & still completes his/her nutritional requirements. This can both help us save time & money that we use on making & consuming food. Since the pill will contain nutrients in the simplest form, they can be absorbed straight away & can give us energy instantly.