INTRODUCTION:-

- Cooking food brings about desirable changes in the foods being consumed.

SOURCE OF COOKING:-

- Burning of wood or charcoal
- Kerosine oil or gas
- Electric oven
- microwave

Causes of cooking food

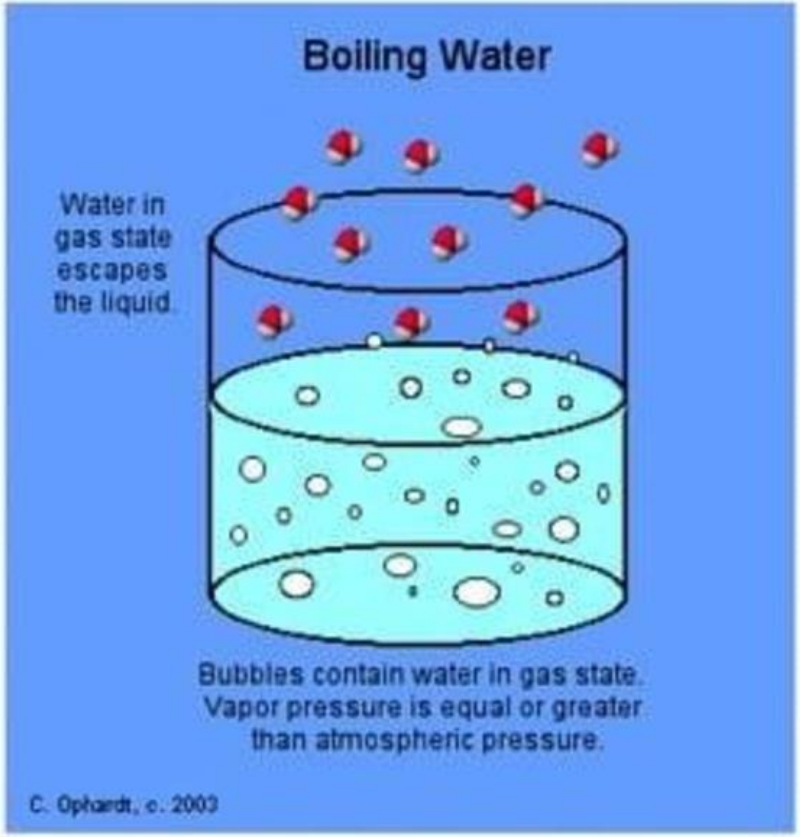
1) Cooking improves the appearance of the food.
2) It develops the flavour of the food.
3) It changes the taste of the food.
4) Cooking improves the digestibility of food.
5) It sterilizes the food by destroying the harmful microorganisms.
6) Food becomes nutritious on cooking.

METHODS OF COOKING

- There is 9 methods of cooking food as follows:-

❖ **Boiling:-**

- temperature-100·c (212·f)
- Rice, pulses, roots, vegetables are cooked.
- Using excess of water Result loss of vitamins and minerals.

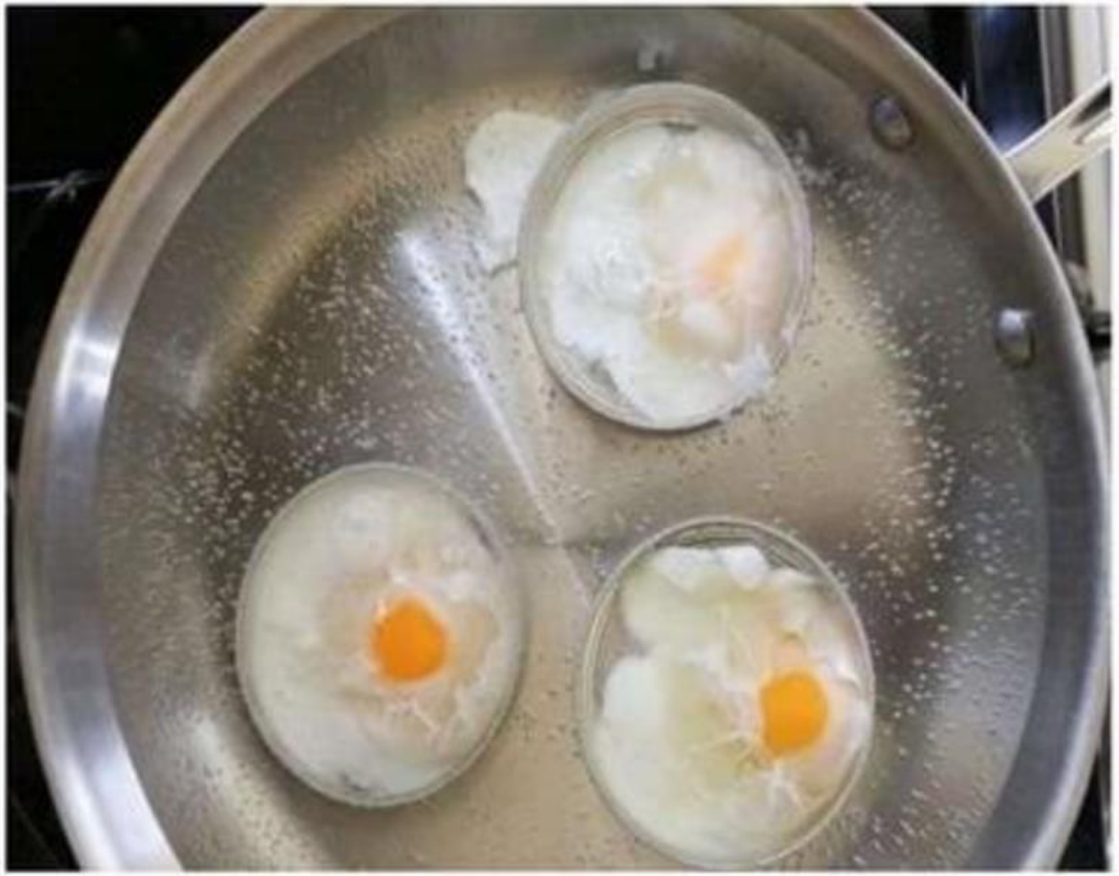


SIMMERING:-

- Temperature- 84·c
- Meat and fishes are best cooked by simmering , because at high temperature the fibres are hardened.

POACHING:-

- Temperature- less than 82·c
- Eg:- egg and fish



EFFECTS OF BOILING,POACHING AND SIMMERING:-

- **ON VITAMIN C:-** more decrease

↓

in boiling,

↓

then simmering and poaching,

↓

vitamin C is more water soluble
& heat sensitive

- **ON VITAMIN B:-** more decrease

in simmering,

then boiling and poaching,

vitamin B is heat sensitive

If water is consumed of this method 100% minerals and 70-90% vitamins is retained

STEAMING:-

- Temperature:- 100·c to 121·c
- Steam generated heat, this heat is used as a medium of cooking
- It takes longer time to cook as compared to boiling.
- Mainly water soluble nutrients are lost.

BAKING AND ROASTING:-

BAKING:-

ROASTING:-

BAKING AND ROASTING:-

- Temperature:-120 to 250·c
- Roasting and baking refers to cooking food in an oven with dry heat.
- Roasting is Used for meat while baking is used for bread, cakes, cookies.
- Due to long cooking time at high temperature, B vitamins in roasted meat may decline (40).

THE EFFECT OF COOKING ON DIFFERENT TYPES OF FOODS

- **FRUITS:-**

- Fruits consist mostly of water a little carbohydrate as cellulose and sugar.

- The Protein, fat and mineral content very low.

- Cooking makes the fruits more digestible by softening the cellulose but usually results in the loss of sugar by solubility is water.

- If the fruit is cooked by stewing and juice is taken with stew, the sugar , the sugar loss is very little , but even then there will loss of vit C.

VEGETABLES:-

- ***Green leafy vegetables:-***

- GLV provide a little caloric value but give most of vit and minerals of the normal diet.

- Usually cooked by boiling method.

- If much water is used in boiling , thiamine , vit C and some of the minerals are lost by solubility in water .

- Thiamine may also be destroyed if baking soda(sodium bicarbonate) is used in cooking .

- ***Roots and tubers:-***

- Root vegetables do not suffer much loss of nutrients by either dry or wet cooking method , because their skin prevented leaking of the nutrients.

- Tubers eg. Potatoes contain large amount of starch more then other vegetables they must be adequately cooked so that the starch grains may swell and burst the cell walls of cellulose.

- Socking for long time can cause loss of vitamins.

- Nutrients in tubers are retained by cooking them with their skin intact , but if they are old a strong flavour is also retained .

- New potatoes should be scrapped rather then peeled off to preserve the mineral layers.

- ***Other vegetables:-***

- Other vegetables vary in food contents, but like GLV they also contribute vit and minerals to the diet.

- The same precaution should be taken in the preparation and cooking of food to preserve their food value.

MILK:-

Following changes occur in the milk due to boiling and cooking

- VitC is destroyed.
- Partial loss of vitB complex occurs.
- Certain enzymes are destroyed organisms of producing lactic acid are killed.
- Caseinogen (principal protein of milk)becomes more digestible.

- Lactalbuminand lactoglobulin(protein of the milk)are coagulated at the temp. of 160·f and 168·frespectively.
- Calcium , magnesium and phosphorus are precipited.
- After some a thin scum is formed on the top of the milk which consist of milk fat, lime fat, partly dried casein and coagulated lactalbumin

EGG:-

- On boiling, egg white and egg yolk are coagulated.
- Avidin a substance present in the egg is destroyed on boiling the egg, which prevents the body from obtaining biotin, one of the factors of vitB-complex present in the egg.
- Boiled egg is therefore nutritionally superior to raw egg.

CEREALS:-

- Cereals consist mainly of starch with a little protein enclose within a cell wall of cellulose.
- By cooking the food adequately, the cellulose walls of the cells are broken so that the digestive juices can reach the starch within the cells.
- Boiling of cereals cause the starch grains to swell and burst the cellulose wall.
- Rice absorbs water twice of its own weight during cooking and so the weight of cooked rice is three time of its dry weight.

- If much water is used in cooking cereals, the thiamine is los from the food by solubility in water .
- Thiamine will also be destroy if baking soda is added to the food during cooking.
- The protein of cereals is also coagulated on cooking food and it depends upon the breaking of the cellulose walls, for digestion.
- Well-cooked cereals are thus more easily digested than the cereals in the raw state.

PULSES:-

- Pulses contain less carbohydrate but more protein the cereals but the effect of cooking is much same.
- Pulses also contain some carbohydrate which is not digestible, and they also contain an anti-trypsin substance which prevents the action of trypsin enzyme.
- The undigested carbohydrate may be broken down by the bacteria present in the large intestine and cause flatulance.

- The anti-trypsin substance is destroyed by adequate boiling so that it is very important the pulses or dals should be properly cooked.

THE EFFECTS OF HEAT ON THE NUTRIENTS IN FOODS

CHANGES IN PROTEIN:-

- Destruction of micro-organisms of the food.
- Destruction of the toxic substance of food, as trypsin inhibitor present in the legumes, which affects the digestibility and availability of protein.
- Inactivation of certain enzymes present in the food.
- At the temp. of about 140·c or 60·c Proteins are coagulated on heating or cooking the food.

- Above this temp. protein of animal foods, with the exception of eggs, shrinks and becomes slightly less digestible.

- Vegetable protein also coagulate on cooking, but they are usually found along with the starch which swells up in moist heat and the cellulose covering is ruptured.

- Cooking thus makes the vegetable soft and protein more digestible,

- Some loss of protein from the vegetables occurs when these are boiled in water particularly when salt is used in cooking.

CHANGES IN FATS:-

- Fats are not affected by heat so much as proteins and carbohydrates.
- Fat which is solid at room temp. melts on heating.
- When fat is heated further i.e, at high temp. it starts smoking , known as smoking point, and begins to decompose.
- At this point it becomes brown and thickness with a change in taste and flavor. Fat becomes rancid due to oxidation, and watery due to hydrolysis by the enzymes.

CHANGES IN CARBOHYDRATES:-

- Starch of the carbohydrates is mostly affected by heat.
- Cellulose walls of the cells are not digested in man, which must be broken down for the cell contents to be digested.
- If water is used in cooking the cellulose walls are softened, but swell up and eventually the cellulose walls are ruptured causing the quicker digestion of starch by the enzymes, thereby increasing the digestibility of carbohydrates.

- When starch is subjected to dry heat, it is broken down into dextrin which is responsible for the brown colour and slightly sweet taste of the baked foods eg. Crust of bread.

CHANGES IN VITAMINS:-

- vitA or carotene is not affected when food stuffs are cooked in water. But in shallow frying or roasting there may be considerable loss of vitA.

- vitB complex of rice and dal is lost upto 50% by scrubbing and washing them repeatedly bwefore cooking, while vitC is lost upto 45%.

- vitC is the most heat-labile(destroyed by heat) vitamin which is readily lost or destroyed in food preparation or by cooking food.

- Thiamine, riboflavin and vitK aredetroyed in the presence of an alkali,

  eg. Sodium bicarbonate, and may be lost by solubility in water.

CHANGES IN MINERALS:-

- There is no loss of minerals during cooking of food but they may be lost by solubility in water if cooking water is thrown out.

CHANGES IN COLOUR:-

- There is various colours of food which make the food more attractive and acceptable.
- The plant pigments such as chlorophyll of green leaves, carotenoid of carrots, flavonoids of white potatoes and anthocyanins of beet root, onions and red cabbages and myoglobulins of meat, etc, affected by heat.
- The soluble pigments such as anthocyanins may leach in the cooking water.