

Nutritional Virtues of Groundnut

Nature has designed only a few foodstuffs that are so rich in important nutrients as the kernels of groundnut. The groundnut kernels contain more protein than meat, and two and half times that in eggs, and far more than any other vegetable food except soybean. Thus groundnut is one of the cheapest sources of quality protein.

The nutrient composition of groundnut vis-à-vis major cereals (wheat and rice) is indicated here.

Nutritive value of groundnut and cereals

Constituents	G'nut	Wheat	Rice
Moisture (%)	3.0	12.2	13.7
Protein (%)	25.3	12.1	6.8
Fat (%)	40.1	1.7	0.5
Minerals (%)	2.4	2.7	0.6
Fibre (%)	3.1	1.9	0.2
Carbohydrate (%)	26.1	69.4	78.4
Energy (Kcal)	567	341	345
Ca (mg)	90	48	10
P (mg)	350	355	160
Fe (mg)	2.5	4.9	0.7
Carotene (µg)	37	29	0
Thiamine (mg)	0.90	0.49	0.06
Riboflavin	0.13	0.17	0.06
Niacin	19.9	4.3	1.9

With about 26% protein, 48% oil, and 3% fiber and high in calcium, thiamine and niacin contents, it has all the potential to be used as highly economical food-supplement to fight malnutrition that occurs due to deficiencies of these nutrients in the cereal grains like wheat and rice. Thus groundnut is a nature's gift to man in general and to children, pregnant and nursing women and the poor in particular. The nutritive virtues of groundnuts have attracted the attention of National Aeronautics and Space Administration of the USA. They have

* Principal Scientist (Biochemistry)

identified groundnut as a possible food for advance life support system for extended space missions.

In-shell roasted groundnuts, sold by hawkers around public places, cinema halls, theatres, fairs, exhibitions, shopping plazas etc., are one of the most popular snack foods in India. Since groundnut is highly satiating, it checks the appetite and hence popular among figure conscious people.

Groundnut is unique among oilseeds as it can be consumed directly as well as after blending with a variety of foodstuffs. A handful of groundnut soaked overnight and then pressure cooked with other ingredients of *samber* enriches it with flavour and protein. The traditional Indian cookery uses groundnut to prepare a variety of delicious and nutritious dishes. Some of these are being described here.

In India more than 80 percent of total groundnut production is crushed for oil extraction. The residue (cake and meal) is used as livestock feed concentrate. Groundnut oil is considered an excellent cooking medium in Indian cookery.

Groundnut protein isolates are used in a number of food preparations for protein enrichment. Composite flour can be prepared by using groundnut flour (10-25 percent and any other cereal flour (wheat, bajra, tapioca, rice, maize etc.). nutritious '*Paushtik Aatta*' - a highly nutritious flour can be prepared by mixing 75 percent whole wheat flour, 1 percent tapioca flour and 8 percent peanut flour.

This compilation is aimed at enhancing awareness about the nutritive virtues of groundnut among people and at the same time helping them bringing together at one place the various traditional Indian preparations that can be made from groundnut.

All the portions of groundnut plant are valuable. The roots of groundnut fix atmospheric nitrogen by symbiotic association with the bacterium *Rhizobium* and thereby reducing the requirement of the external application of nitrogen fertilizers of the following crop. The husk that is left behind after shelling can be utilized in many ways. One of the popular products is 'white coal' which is used as an industrial fuel.

1. Peanut Butter



Ingredients:

roasted groundnuts	1½ cup
salt	½ tsp
sugar	¾ tsp
refined groundnut oil	1 tbs

Procedure:

- Split each kernel into halves and remove the heart (germ).
- Discard the hearts by sieving and the spoilt and discoloured kernels by handpicking.
- Heat the de-skinned halves in a pan; allow a little cooling and while still warm, grind in blender with salt and sugar at low speed for about 10 seconds.
- Mix the contents in the blender with a spatula and run the mixer at a low speed adding oil gradually and then grind at high speed for a minute. Remove the contents to a glass jar and allow maturing for about two hours before use.

2. Groundnut *Burfi*-1



Ingredients:

groundnut kernels	200 g
sugar	200 g
water	½ cup
groundnut oil	1 tsp
sesamum seeds (<i>til</i>)	1 tsp
grated dry coconut	1 tsp
chopped dry fruits (optional)	a little
cardamom powder	1 tsp
nutmeg (<i>jaiphal</i>) Powder	1 tsp

Procedure:

- Roast kernels in a *karahi* (deep pan) for about 10-15 minutes. Cool and remove skins and then grind to obtain a coarse powder.
- Prepare sugar syrup by heating sugar and water in another *karahi*. Continue heating till the syrup is about one thread consistency.
- Add groundnut powder, *illaichi* and nutmeg powder and stir. Add oil and cook (stir continuously) on a low flame till the mixture leaves the sides of the *karahi*.
- Immediately spread it on a greased plate and garnish it with *til* seeds, grated coconut and other chopped dry fruits.
- Allow it to cool and then cut it into rectangular pieces. It stays for 8-10 days without refrigeration.

3. Groundnut *Burfi*-2



Ingredients:

groundnut kernels (hps)	250 g
sugar	200 g
ghee	10 g
water	100 ml

Procedure:

- Roast groundnut and then remove the skin. Grind to fine powder. Take sugar in a frying pan and add water. Boil the mixture till it attains *chikki* like thick consistency.
- Add groundnut powder and mix thoroughly.
- Pour in a greased *thali*. Allow hardening. Cut into rectangular or square pieces.

4. Groundnut *Chutney* Relish



Ingredients:

groundnut seeds	50 g
fresh coconut pieces	100 g
green chillies	4 to 5
ginger piece	1.5 inch
fresh curd	2 cups
salt to taste	

For the seasoning

mustard (<i>rai</i>) seeds	1/3 tsp
curry leaves	8 to 10
groundnut oil	2 tsp

Procedure:

- Place groundnuts in a *karahi* and roast on slow flame for 10 minutes stirring frequently. Allow cooling and remove the skin.
- Mix de-skinned kernels with coconut pieces, chopped green chillies and ginger, and also curd and salt.
- Grind the mixture in a blender to a smooth paste.
- Remove the chutney in a serving bowl.
- Heat oil in a pan and add mustard seeds. When it splutters, add curry leaves and transfer
- Add this seasoning to the chutney.

5. Crunchy-Nutty-Chocolaty Groundnuts



Ingredients:

groundnut seeds	200 g
gum (<i>gond-katira</i>)	30 g
sugar	175 g
water	½ cup
groundnut oil	1 tsp
instant drinking chocolate	10-15 tsp
cold milk	15-20 ml
caster sugar	5-6 tsp
<i>illaichi</i> powder	1 tsp
nutmeg (<i>jaiphal</i>) powder	1 tsp
dry fruits (<i>kismish, kaju and badam</i>)	15-20 g
silver coated sugar balls	2-3 tsp
groundnut oil for frying	

Procedure:

Roast groundnut seeds in a *karahi* with continuous stirring for about 10-15 minutes. Cool and remove their skin. Grind the de-skinned seeds into a coarse powder. Fry gum granules in a pan and mix them with the groundnut powder, add *illaichi* and nutmeg powders and mix well. Prepare sugar syrup by heating sugar and water in another *karahi*. Continue heating till the syrup is of about one thread consistency. Add the groundnut-gum-*illaichi*-nutmeg

mixture into sugar syrup and stir well. Then add oil and cook with continuous stirring on low flame till the mixture leaves the sides of the *karahi*. Immediately spread it on a greased tray/plate to make a one-inch thick layer. Cool for 3-4 hours.

Fry the dry fruits a little and chop them when cool. Take milk in a bowl and mix the chocolate powder and caster sugar so as to form a thick paste of chocolate. Add some chopped dry fruits in it and spread this chocolate paste on base prepared above. Garnish with the rest of the chopped dry fruits. Refrigerate it for 4-5 hours. Remove and garnish with silver-coated sugar balls. Cut into square pieces and serve.

6. Nut Chocolate



Ingredients:

fresh butter	125 g
cocoa powder	50 g
drinking chocolate powder	10 g
milk powder	200 g
groundnut powder (fine)	75 g
sugar	125 g

Procedure:

- Sieve milk powder without any lumps. Mix with little water to make a batter.

- Keep a heavy bottom *karahi* with the diluted mixture and keep stirring till it becomes thick.
- Add sugar and cook till it becomes semi solid consistency.
- Remove from fire. Mix butter, sieved cocoa, drinking chocolate powder and stir well.
- Put it back on fire and stir till it becomes like a ball. Pour a little mixture in water and remove from fire if it floats like a ball.
- Add groundnut powder and mix well. Put it back on fire, pour in greased square plate and level the top.

7. Crispy *Masala* Groundnuts



Ingredients:

roasted groundnut seeds	200 g
bengal gram flour (<i>besan</i>)	100 g
red chilly powder	½ tsp
cumin seed coarse powder	1 tsp
turmeric powder	¼ tsp
coriander (<i>dhania</i>) powder	1 tsp
<i>amchoor</i> (dry mango) powder	½ tsp
baking soda	a pinch
salt	½ tsp
groundnut oil	2 tsp
water	1-2 cups
<i>chat masala</i> for garnishing	3 to 4 tsp

groundnut oil for frying

Procedure:

Heat oil in a *karahi*. Mix all the ingredients except *chat masala* in a plate. Divide the groundnuts and the *masala* mixture into 4 or more equal parts such that each part can be fried at one time. Sprinkle a little water on one portion of groundnuts and also on one *masala* part. Mix these gently so that the *masala* layer gets coated on the groundnuts. Fry these *masala*-coated groundnuts in hot oil and at a low flame stirring frequently. Break the lumps formed, if any, and remove from *karahi* when brown. Sprinkle *chat masala* immediately on them. Allow to cool and serve. Store in airtight container. They keep well for 10-15 days.

8. Groundnut *shakarpare*



Ingredients:

groundnut seeds	100 g
sugar	100 g
water	100 ml

Procedure:

Roast groundnut seeds in a *karahi* on low flame with continuous stirring for about 10-15 minutes. Cool for a few

minutes. Prepare sugar syrup by heating sugar and water in a pan. Continue heating till the syrup is of two-thread consistency. Add roasted groundnuts with skins to it. Stir continuously. Continue cooking on low flame till the syrup starts to dry. Remove the pan from fire and continue stirring till the entire syrup gets dried up and each sugarcoated groundnut seed gets separated. Allow it to cool for 10-15 minutes and serve. Store in a clean dry container. It stays for about 15 days without refrigeration.

9. Groundnut Milk



Ingredients:

Groundnut	250 g
Sugar	15 g
Water	1.5 L

Procedure:

- Roast groundnut kernels slightly. Cool and remove skin.
- Split each kernel into halves and remove the heart (germ).
- Discard the hearts by sieving and the spoilt and discoloured kernels by handpicking.
- Place groundnut halves in mixer and grind at a low speed to form a groundnut paste

- Add water and sugar to the paste and grind first at low speed and then at high speed for about two minutes.
- Remove the contents and extract the milk through a cloth or strainer. Save the residue aside for preparing groundnut *halwa* and other preparations described later.
- Boil the milk and use. Add green cardamom powder before boiling for flavour, if required.

10. Groundnut Curd



Ingredients:

- groundnut milk
- starter (dairy milk curd)

Procedure:

- Add the starter to lukewarm milk and mix well.
- Cover with a lid and leave undisturbed for about 6 hours.

11. Groundnut *Halwa*



Ingredients:

Residue after extracting milk
Milk powder: amount equal to residue
Sugar: amount equal to residue
Ghee as much as required for frying

Procedure:

- Mix the above three ingredients in a pan, add *ghee* in small quantities, and heat with stirring continuously.
- Continue heating till the entire mass leaves the sides of the pan. Transfer to a greased plate. Cool a little and serve.

12. Groundnut *Vada* (from milk residue) and *chutney*



Ingredients:

milk residue
sago powder
leaves of coriander and sweet *neem*
green chilly
ginger,
salt and sugar
lime juice
asafetida
groundnut oil for deep frying

Procedure:

- Prepare paste of coriander leaves, sweet neem leaves, green chilly and ginger and add salt and sugar and lime juice as per taste.
- Take groundnut milk residue and sago powder in a vessel and mix paste and asafetida. Prepare thick dough and keep it for 1 hr. Prepare round *vada* and deep fry.

Chutney

Ingredients:

Groundnut curd, mint leaves, coriander leaves, sweet *neem* leaves, green chilly, ginger, salt and sugar.

Procedure:

- Grind mint leaves, coriander leaves, sweet *neem* leaves, green chilly, salt and sugar to a paste in a blender.
- Mix the paste with groundnut curd.

13. Salted Groundnut

**Ingredient:**

groundnut kernels	300 g
common salt	12 g
water	300 ml

Procedure:

- Soak groundnut kernels in salt-water (4%) for about 12 hours.
- Remove and allow drying. Roast the kernels in hot sand/oven till slight brown.
- Peel off the skin.
- Pack in polythene bags or glass bottle with airtight lid.

14. Groundnut *Chikki*



Ingredient:

groundnut kernels (hps)	250 g
jaggary	150 g
ghee	10 g
water	10 ml

Procedure:

- Roast groundnut and remove its skin. Split whole kernel in to halves.
- Take sugar in a frying pan, add water and boil the mixture. Boil till it attains proper consistency (put a drop of hot syrup in water and check, if it is hard).
- Add groundnut halves to the syrup, mix well, and then transfer the mixture to a greased flat plate and spread evenly.
- Cut into pieces and fill in the container.

15. Groundnut Flakes



Ingredient:

groundnut kernels	300 g
salt	10g

Procedure:

- Dissolve salt in an amount of water enough to submerge the groundnut kernels.
- Allow the soaking for overnight.
- Drain off the salty water and replace with plain water and heat the container and allow boiling for ten minutes.
- Drain off the excess water and spread kernels between the two layers of a brown paper. Crush each kernel by hammering with a wooden hammer or pestle to obtain flakes.
- Roast the flakes in a *karahi* or oven.

16. Groundnut Gujjhia



Ingredient:

Dough to form covering:

white flour (<i>maida</i>)	200 g
groundnut oil	100 ml
water	2 cups

Mixture for filling:

groundnut seeds	100 g
roasted semolina (<i>suji</i>)	50 g
<i>khoya</i> (<i>mawa</i>)	100 g
desiccated grated coconut	25 g
sesame (<i>til</i>) seeds	25 g
caster sugar	300 g
cardamom (<i>illaichi</i>) powder	1 tsp
nutmeg powder (<i>jaiphal</i>)	1 tsp
chopped dry fruits	50 g

Groundnut oil for frying

Procedure:

Preparation of the dough: Heat oil slightly and mix it well with flour. Slowly add sufficient water to knead it into tight dough.

Preparation of the filling: Roast the groundnuts, cool and remove the skins and grind them to coarse powder. Add to it coarsely

ground *til* powder and mix well. Add rest of the ingredients of the filling and mix well.

Preparation of gujjhia: Make 20 balls of equal size from the dough. Divide the filling mixture into equal number of parts. Roll out each ball into a circular *puri* of about 9-10 cms diameter. Place the filling on one side in each *puri*. Fold the other side and cover the filling and seal the edges by moistening the brim and pressing the edges with fingers.

Heat oil in a *karahi* and fry *gujjhias* on slow flame till brown. Serve cool. These *gujjhias* can stay without refrigeration for 8-10 days.

17. Khasta Groundnut Kachori



Ingredient:

Dough for covering:

<i>maida</i> (white flour)	100 g
groundnut oil, little warm	50-60 ml
water	1cup

Dough for the filling:

groundnut kernels	100 g
red-chilly powder	1 tsp
coriander powder	1 tsp
cumin (<i>jeera</i>) powder (coarse)	1 tsp
fennel (<i>saunf</i>) powder (coarse)	1 tsp

hing (asafetida) powder	1/3 tsp
amchoor powder	1 tsp
salt to taste	

Groundnut oil for frying

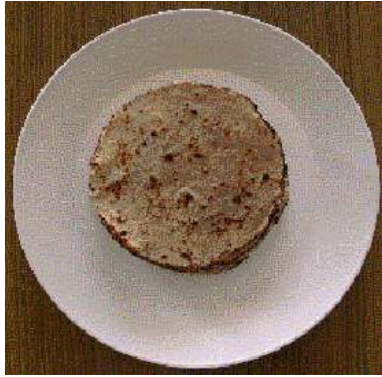
Procedure:

Preparation of dough: Add the warm oil to the flour and mix thoroughly. To this slowly add sufficient water to knead into a tight-dough and keep it covered with a wet cloth.

Preparation of the filling: Roast the groundnuts and when slightly cool, remove their skins. Grind to a coarse powder. To this add the rest of the ingredients of the filling and mix well.

Preparation of the kachori: Divide the dough prepared above into 14-15 equal parts and form balls. Divide the filling mixture also into equal number of parts. Roll out each ball into a circular puri of about 8-9 cm diameter. Place the filling in the centre of each *puri*. Fold the edges, and with wet fingers, seal them in the centre. Roll out with the palm of the hand into a small *puri* of about 6-7cm diameter. Heat the oil for frying in a *karahi*. Deep fry on slow flame till brown. Serve hot with groundnut or *khatti-mithi imli chutney*. Store in an airtight container. It stays for about 8-10 days without refrigeration.

18. Groundnut *Chapati*



Ingredient:

wheat	450 g
groundnut kernels	50 g

Procedure:

- Grind the wheat and groundnut kernels in a blender to a fine powder.
- Knead the composite flour to prepare dough.
- Prepare small balls for rolling out *chapati*
- Cook *chapati* on a hot *tawa* in the same way as wheat-flour chapati is cooked

19. Groundnut *Elaichi-dana*



Ingredient:

groundnut kernels	1000g
sugar	6000g

Procedure:

This preparation is usually produced at cottage industry level, as this requires special machinery called *handi* (a spinning-vessel made of copper).

- Prepare sugar syrup of a thick consistency.
- Transfer kernels to hot *handi*.
- Add about one fourth portion of hot syrup in the spin-roasting container at a time and allow the syrup to set on the kernels. Add the remaining syrup in three lots with suitable intervals for binding of syrup on kernels.
- Remove the sugar-coated kernels and allow cooling before packing.



Hot Sugar Syrup



Spinning *Handi*

Nutritive value of groundnut preparations

Preparation		Content per 100 g					
		Energy (Kcal)	Carbohydrates (g)	Protein (g)	Fats (g)	Minerals (g)	Fibre (g)
1.	Peanut butter	578	29	24	40	4	3
2.	Groundnut <i>burfi</i> -1	491	13	12	22	1	2
3.	Groundnut <i>burfi</i> -2	512	15	14	25	1	2
4.	Groundnut <i>chutney</i> relish	217	8	6	18	1	1
5.	Crunchy nutty chocolaty g'nut	468	59	12	20	1	1
6.	Nut chocolate	452	35	11	30	3	0
7.	Crispy <i>masala</i> groundnuts	554	29	24	35	2	3
8.	Groundnut <i>shakarpare</i>	483	63	13	20	1	2
9.	Groundnut milk	98	5	4	7	0	1
10.	Groundnut curd	98	5	4	7	0	1
11.	Groundnut <i>halwa</i>	630	32	9	52	2	0.5
12.	Groundnut <i>vada</i>	419	43	14	21	1	2
13.	Salted groundnuts	567	26.1	25.3	40.1	2.8	3.1
14.	Groundnut <i>chikki</i>	596	19	18	32	2	2
15.	Groundnut flakes	567	26.1	25.3	40.1	2.8	3.1
16.	Groundnut <i>gujjhia</i>	533	61	9	22	1	1
17.	Khasta groundnut kachori	560	39	14	39	1	1
18.	Wheat-groundnut <i>chapati</i>	368	66.7	13.2	5.4	1.6	1.4
19.	Groundnut <i>elaichy-dana</i>	422	89	4	6	0.4	0.4

Value Addition in Groundnut Byproducts

The byproducts of groundnut oil industry, i.e. shell and groundnut cakes can be utilized as a raw material for value addition. Many of these products can be produced at cottage industry level in rural areas without making much investment while others may require a little investment as well as expertise.

Some value-added products are shown below.



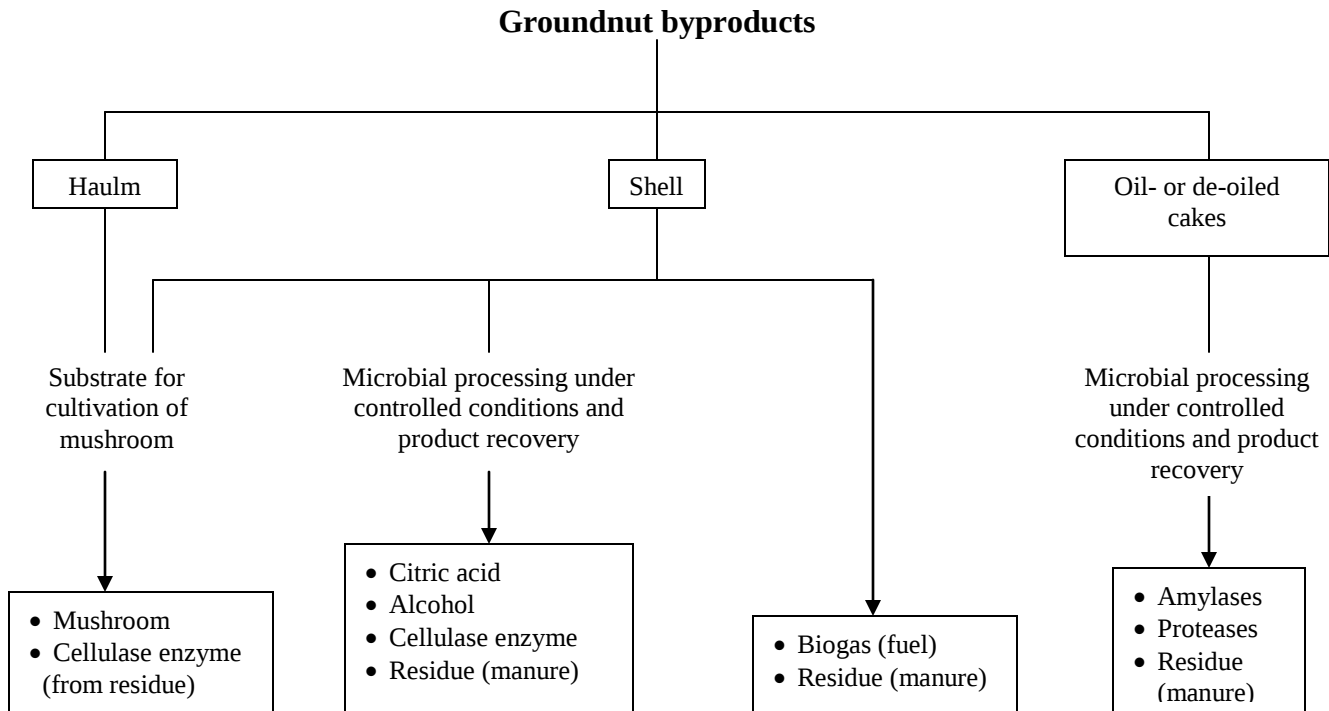
Oyster mushroom growing on groundnut shell ↑

White coal: an extrusion product of groundnut shell ↓

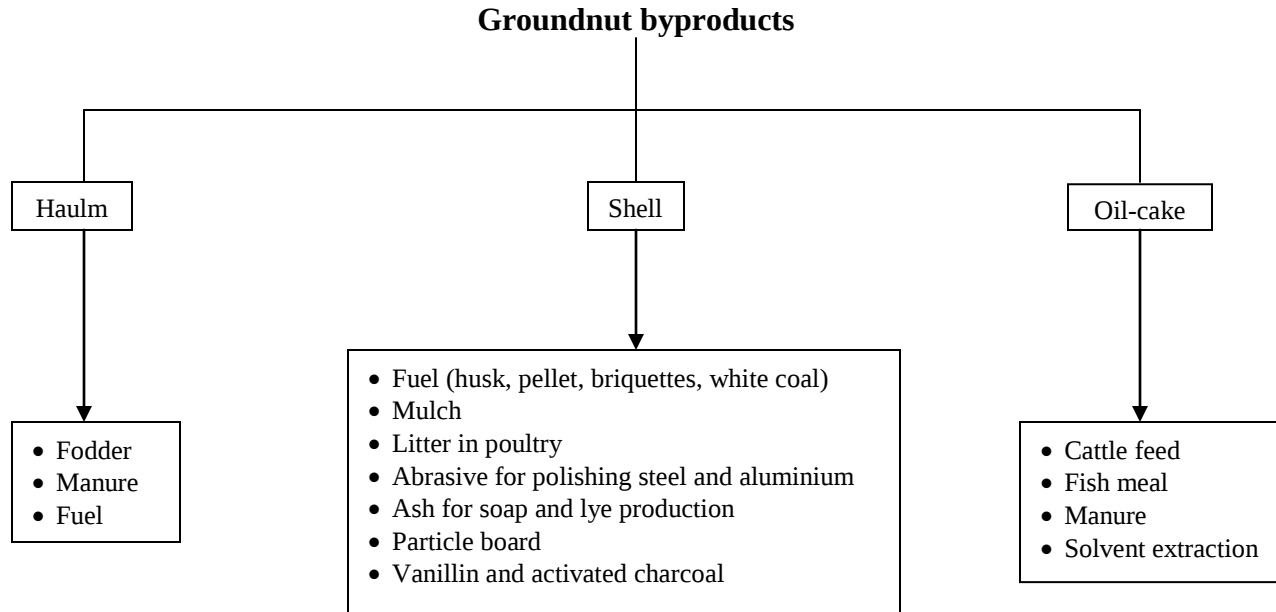


Various possible options open for entrepreneurs for value addition are shown in form of flow charts on pages 25 and 26.

For further details, readers may please write to the Director, National Research Centre for Groundnut, Junagadh-362001.



Utilization of groundnut byproducts by microbial processing



Direct utilization of groundnut byproducts