

9: WHEAT PRODUCTS

9.1: Industrial use of Wheat product and by-product,

9.1.1: Wheat Products:

The main consumable products out of wheat are Wheat Bran (Chokar), whole Wheat Flour (Atta), Fine Wheat Flour (Maida), Semolina-Coarse & Fine (Suji & Rawa) Macaroni product etc.

9.1.2: Bye-Products :

We may consider using wheat bye products, mainly stalks, for the products viz, (1) Geotextiles, (2) Filters, (3) Sorbents, (4) Structural composites, (5) Non-structural composites, (6) Molded products, (7) Packaging, and (8) Combinations with other materials. Wheat straw is also used as cattle feed.

9.1.3. Use of Wheat in manufacturing other products:

- **Straw Particle Board (wood):** Primary uses of strawboard include ready to assemble furniture, flooring a, foundation for lamination and kitchen cabinets.
- **Wheat starch in Paper making:** Wheat starch makes paper stronger.
- **Adhesives:** Many types of Starch is used as an adhesive on postage stamps and is used to hold the bottom of paper grocery sacks together. Polymers, Packing peanuts, Plastic Bags, Plastic film, eating utensils and molded items (biodegradable) Packaging, foams and insulation (biodegradable, starch-based), Reinforcing agents in rubber products , Charcoal, Cups, Fine paper products (carbonless copy paper), Fuels, Golf Tees, Insulation Medical swabs, Roofing and other building materials, Textile finishing agents, Wood substitute in composite building materials.
- **Cosmetics and Pharmaceutical products:** Wheat starch could be substituted in significant volumes for current materials if probed commercially viable. Hair conditioners, Moisturizers, Liquid laundry detergents and Water-soluble inks.
- **Starch replacing fat in desserts:** Researchers have found when wheat starch replaces fat in frozen desserts, the desserts not only are lower in fat, but also are creamier and tastier than the same product without wheat starch.
- **Milk replacers:** Egg white substitutes, non-dairy products including whipped toppings, creamers Co-binder in food and non-food packaging, A carrier of the controlled release of pesticides or flavors.

9.2: Products derived from main product and by-product and their uses

9.2.1: Wheat Food products

Table-9.1: Generic Type of Wheat food products

Type of Wheat	Products
Hard Wheat derived	White pan breads, White specialty breads, Wheat breads
Wheat-other mixtures	Rye and pumpernickel breads, Mixed grain breads
Soft Wheat	Crackers, Cookies, Cakes, Pie crusts, Puff pastries, Doughnuts, Refrigerates dough
Durum Wheat	Pasta products
Wheat breakfast cereals	Traditional hot cereals, Instant traditional hot cereals, Ready to eat cereals, Miscellaneous cereals

Table-9.2 : Traditional products made from different species of Wheat

Type of Wheat	Products
Bread	Chapati/ Roti/ Phulka, Tandoori Roti, Rumali Roti, Naan, Kulcha, Bhatura, Pizza, Kachori, Samosa, Matthi, Namakpara, Papad, Prantha, Paysam, Balusai, Jalebi, Ghewar, Phirni, Sawainan, Chikki, Vattayappam, Palappam, Shahitoast, Noodles, Laddu
Durum	Chapati, Paramtha, Dhebra, Bhakri, Porridge, (salted&sweet), RawaIdli, Rawa Puttu, Khichdi etc.
Diococum	Culadi ki Laddu, Godi Huggi, Sweet pan cake, Madal etc.

9.2.2: Processed Wheat

9.3: Bakery Flours

Bakery Flours	Applications
Wheat Flour For Luxury Bread	Premium quality luxury bread making wheat flour with high strength and protein.
Wheat Flour For Bread	High quality bread making wheat flour with moderate strength and protein content. Suitable for French baguette and all bread types.
Wheat Flour For Bread	High quality bread and all purpose flour.
Wheat Flour For Bread	Darker coloured, bread making wheat flour. Suitable for Indian type and flat breads.
All Purpose Wheat Flour	A perfect balance of flour strength and cost effectiveness. Suitable for all applications.
Wheat Flour For Wet Noodle	High elastic character with low ash content. Specially designed wet noodle.
Wheat Flour For Instant Noodle	Lower strength and protein content. Mainly suitable for Cake, confectionary and instant noodle.
Wheat Flour For Industrial use	Industrial wheat flour for animal feed.
Wheat Bran	The by-product of wheat milling, used in the animal feed.

9.2.2.1: Special Applications

Bread Mix with Oats, Multi Grain Bread Mix, Bread Mix with Wheat Bran.

9.2.2.2: Feed Products

- Wheat Midds Animal feed, Wheat Midds Pellets Animal feed, Red Dog Animal feed Wheat Germ Animal vitamins. Second Clear Flour Pet food, animal feed, plywood industry, vital wheat gluten. Durum Second Clear Pet food

2.3: Wheat Milling Products

- White flour** is the finely ground endosperm of the wheat kernel.
- All-purpose flour** is white flour milled from hard wheats or a blend of hard and soft wheats.
- Bread flour** is white flour that is a blend of hard, high-protein wheats and has greater gluten strength and protein content than all-purpose flour.
- Cake flour** is fine-textured, silky flour milled from soft wheats with low protein content.
- Self-rising flour**, also referred to as phosphated flour, is a convenience product made by adding salt and leavening to all-purpose flour.

- **Pastry flour** has properties intermediate between those of all-purpose and cake flours. It is usually milled from soft wheat for pastry-making, but can be used for cookies, cakes, crackers and similar products.
- **Semolina** is the coarsely ground endosperm of durum, a hard spring wheat with a high-gluten content and golden color. It is hard, granular and resembles sugar. **Durum flour** is finely ground semolina. It is usually enriched and used to make noodles.
- **Whole wheat, stone-ground and graham flour** can be used interchangeably; nutrient values differ minimally. Either grinding the whole-wheat kernel or recombining the white flour, germ and bran that have been separated during milling produces them. Their only differences may be in coarseness and protein content. Insoluble fiber content is higher than in white flours.
- **Gluten flour** is usually milled from spring wheat and has a high protein (40-45 percent), low-starch content. It is used primarily for diabetic breads, or mixed with other non-wheat or low-protein wheat flours to produce a stronger dough structure. Gluten flour improves baking quality and produces high-protein gluten bread.

Table-9.4: Suitable Wheat Varieties for Different Wheat Products

Wheat Product	Wheat Varieties
Chapati	C 306, Raj 3765, HD 2285, PBW 226, PBW 175, PBW 373, K 8027, LOK 1,MACS 6145, K 9107, UP 262, NW 1014, HUW 234, HUW 533, HD 2833,Sujata, HI 1500, HW 2004, DL-788-2, GW 173, GW 273, GW 322, GW 496
Bread	HS 240, VL 738, PBW 396, HD 277, HD 2733, NW 2036, LOK 1, GW 173, GW190, GW496, HI977, HD 2189, HD 2501, DWR 162, DWR 195, PBW 533
Biscuit	Diococum varieties
Pasta	Durum varieties PDW 233, WH 896, PBW 34, HI 8498, HD 4672, MACS 2846, Raj 1555, A-9-30-1, DDK 1009, NP 200

The quality requirements for each end-product have been defined and grain hardness, protein content and gluten strength have been noted as key components in wheat quality. Molecular markers associated with gluten strength in durum wheat have been identified using recombinant inbred lines. Micro level tests useful in breeding for evaluating early segregating generations such as solvent retention capacities and sedimentation tests have been developed for improving wheat quality. Germplasm lines with desirable quality traits have been identified and being used in breeding programme. Nap Hal, the unique Indian land race of wheat has been well characterized at molecular and rheological level and registered at National Gene bank for use in biscuit making quality.