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Flour: Past, present, and future

Flour is a staple of most households throughout the world. It's transcended time well beyond the biblical days when bread was a 'free' and 'acclaimed' feast amongst people of the land. In tradition most households are burdened with providing the basic necessities to it's inhabitants as well as guest. The simple necessity of bread is steeped in a dying superstition which suggest even a poor home can offer 'bread' in feast to all who are welcome. As you may have encountered, along a country side road drive, fields of golden plenty as 'amber waves' blown by soft winds we know that once harvested, bread is a direct derivative of flour which is a product of those fields of wheat.

Manufacturing

Whole kernels of wheat are milled or mechanically ground down after being plucked from the fields in which the stalks are grown. Each kernel consist of bran, germ & endosperm components which are separated and recombined to make a different type of powder product, flour. These wheat kernels, also termed 'berries', are a resource of dietary fiber, B vitamins, calcium, iron, magnesium, phosphorus, potassium, and zinc. However, manufacturing enables the milled product of flour to be enriched, fortified, bleached, or unbleached in accordance to the standards toward optimal health and nutrition established per country.

History has taught us about the plausible 'Black Death' which spread from diseased rodents seeking out wheat on ships sailing the seven seas to distant lands for sale and distribution. Today as a raw agricultural product of wheat stalks, flour risks becoming contaminated from soil housing animal feces, insects, diseased plants, and other agents used during it's production, harvest, or storage. Such exposure of impurities results in 'bad' bacteria development and harboring as some strains can survive for an extended period of time. In such instances, flour can be treated chemically [chlorine] or irradiated with gamma rays to reduce the potential microbial load.

It is cleaned further through a screening process which removes fine, coarse materials and separates the ground seeds by grain size, shape and weight. After going through conditioning bins, it is blended for a mixed flour product.

Outside of health risks, wheat offers it's farmers the potential of two by-products:

a. bran 'shorts' : inward layer of wheat seed coat starchy, floury, components

b. 'middlings' : combination of bran & shorts are used for animal feed production

Each provide supplemental income and resource for much needed production revenue.

There are several types of flour available in market places as time has lent well to technological development and manufacturing additives which have generated such expanse.

Table One: Types of Flours

Wheat Flour	Refined wheat flour are by law enriched with thiamin, niacin, riboflavin, iron, and fortified with folic acid. Naturally contains vitamin B & iron in addition to selenium, potassium, and magnesium fiber resource
Whole Wheat Flour	Cannot be enriched with folic acid but utilized for bread making 'hard' wheat flour has increased protein [gluten] which makes dough sticky, elastic and able to hold bubbles formed by added leavening agent [yeast].
All Purpose Flour	Refined blend of 'hard' and 'soft' gluten wheat milled with endosperm not bran or germ used for baking, thickening and breading. Has some calcium, vitamin A & D fortification.
100% Whole Wheat	Hulled white spring wheat [wheat berries] high in fiber and other nutrients. Makes heavier bread and when mixed with all purpose flour for lighter texture and better rising. This flour has a shorter shelf life span than all-purpose flour as it is also mild in taste white color.
Self-rising	All purpose flour with added salt and baking soda. Leavening action of baking soda diminishes if stored to long. *not for yeast breads
Cake or Pastry Flour	Fine texture refined flour made from soft wheat high in starch. [used tender cakes & pastry]
Bread Flour	Refined from hard wheat and small amount of barley flour.

Gluten Flour	Refined from hard wheat with most starch removed high protein [gluten] then all purpose strength and rising power of dough.
Semolina Flour	Coarsely-milled, refined hard durum wheat flour used for pasta, couscous, gnocchi and puddings. High in gluten, wheat varieties or grains are semolina also. Corn Semolina [grits] Rice Semolina [rice]
Non-wheat Flours	Gluten free bread mixes are often blends of flours from other grains or plant sources: garbonza bean flour tapioca flour potato starch fava bean flour white sorghum flour variety of uses: whole grain-oil from germ nut flour-turn rancid overtime [storage important: refrigerate or freeze]
Almond Meal Flour	Blanched almonds, high protein, low carbohydrates, unsaturated fat, fiber, calcium, vitamin E moisture and nutty taste to pastry, baked goods dessert filling. [short shelf life]
Amaranth Flour	Ground from 'ancient seeds' high protein [complete] used in baked goods high 25% of flour used as thickener for gravies and soups. Has a slightly sweet nutty flavor.
Barley Flour	From pearl or whole grain barley. Adds fiber to foods; gluten-nourishing thickener
Buckwheat Flour	From 'buckwheat' cousin of 'rhubarb'. It combines with other flours to add hearty, grassy flavor and color to bread. Good for pasta and pancakes. Stronger flavor and more nutrients [whole buckwheat] milder and fewer nutrients [white buckwheat].
Corn Flour	Milled from whole corn kernel. Cornstarch is made from 'endosperm' breading or blended with other flours for batters or doughs.

	[cornmeal can be grounded into flour]
Flaxseed Flour or Meal	Milled whole flax seeds for baked goods it's a fat or egg substitute. This seed makes Omega-3's available.
Oat Flour	Grounded 'oat groats' replaces flour in recipes, rich nutty flavor and denser mixture. For baked good that need to rise it must be mixed.
Peanut Flour	Fully or partially de-fatted, crushed peanuts used to thicken and add flavor to soups and sauces.
Potato Flour	Ground fro whole dried potatoes thickener used as a baking starch to dough. Holds water so breads are moist and extends freshness.
Rice Flour, Brown	Unpolished brown rice, grittier texture in baked goods cornbread and pound cake [nutty].
Rice Flour, White	White rice, pie crust and cookies. Sweet or glutinous rice has high starch. Short grain rices thickener for Asian dishes
Rye Flour	Heavy dark flour made from rye. Less gluten, produces heavy dense bread high protein flour blends with rye flour for better rising.
Soy Flour	Milled soybeans, high protein, low carbohydrate that all purpose flour good Ca, Fe, and magnesium resource. A thickener and wheat flour substitute in quick breads and cookies. Low fat absorption in frying batter or dough.
Spelt Flour	Made from spelt an 'ancient' grain and cousins to wheat high in protein than wheat flour substitutes. **May cause reactions in wheat allergic people.*

Wheat & Flour Quality Measurements

Within the United States borders, wheat production is limited primarily to five states. Those being Kansas, Washington, Oklahoma, North Dakota, and Montana having had suggested fields of dominant wheat types, Turkey Red and Red Fife. Some are using varied varieties as technology and improvements in farming methods offered. It has transformed 'wheat' into a 'mega-crop'.These farmers and Manufacturers use a variety of measurements to evaluate the quality of and form of care their 'spring or winter' wheat varieties require. The six discretionary tools are primarily determinants of 'wheat' quality.

1. Test Weight: grain quality indicator in volume
2. Grain Protein: concentration of proteins in grain as higher protein levels suggest higher water absorption and stronger more extensive dough properties
3. Falling Number: measure of enzymatic activity of grain used to convert starches and sugars for the activity of yeast
4. DON [Deoxynivalenol]: level of DON toxin present in grain
5. Moisture Content: measure of moisture content in flour increase moisture contents are conducive to growth of mold, bacteria, and insects
6. Ash Content: measure of mineral [ash] content in the flour or wheat indicator of yield that can be expected during mill ash primarily concentrated in bran

Trade/ Expense

Wheat is considered a easy to grow healthy, hearty crop, which serves as a predictor of the condition of the U.S. dollar. It's farming properties could make wheat a favorable grain in developing economies. And, if biofuel trends continue, higher prices with commensurate with a/the shortfall in wheat production.

Since global pricing is based upon U.S. denominations which currently have a weak rating intentionally to bolster cost of exporting, importing, and borrowing as well as spending. This policy is suggested to impact inflation and hence wheat pricing in addition to the volume of use rising throughout global 'quarantine' due to the Coronavirus. A prime commodity, wheat cost have spiked up to a 31% increase.

Global Varieties and Innovations

Wheat is significant to many cultures diets, however, at times it has been used as a powerful weapon amidst social conflicts. Dominant persons or governments have utilized forced labor for it's farming and thence manufacturing needs in efforts to capture wealth. Others have imposed limitations of access to impair nations during times of friction having their militaries to block farming or burn farms and stores to starve people of the conflict land. In turn, other governments have given wheat to strengthen their alliances.

Somewhere amongst the burdens of war, intensity of education, and competitiveness of science and nutritive requirements, other forms of 'flour' have derived. Influence has also penetrated our country's as health trends evolve, culinary interest change, and ethnic cuisines spread globally. This goes right along the paths of immigration and social projections expanding over the years. In addition, a diversity in baking products has caused a change in supermarket shelving as options in flour purchases have changed.

These innovations of flours are constructive outcomes from making greater use of food items such as grains and legumes which are edible seeds. Finely ground, sifted meal or grains, nuts, seeds, legumes or certain vegetables are all alternative forms of marketed flour products. Each flour has a different nutritive profile, value, and cooking or baking qualities.

Table 2: International Ethnic Flours

Cassava	Manioc flour used typically in Brazilian stews as thickener. gari- Nigerian cooking
Chickpea	garbonza flour, gran flour, cici flour, chana flour used in India cooking
Chapati	wheat & malted barley flours Indian chapatis
Dalflour	legume flour, besan flour Indian cooking
Fufu	dried plantain used in Nigerian recipes
Kamut	Ancient Egyptian grain Kamut bread and pastas.

	Blend with other flours.
Millet	baking and pancakes India and Pakistan called 'bajri' flour or Kurakkan
Teff *Ethiopia, Eritrea at war 2021. **How will this impact 'injera' and Teff access?**	Teff grain has 2x's Fe and 3x's Ca of other grains. used for 'injera' Ethiopian flat bread and baked goods

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