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Applications of composite flour in development of bakery products

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■ **Abstract :** In India, bakery industry is considered as one of the major part of food processing industry. Generally baked products such as bread, biscuit, cookies, muffin, ruskare more popular because of their ready to eat, easily available and preferable good shelf life. Baked products are third most important components of staple diet. The main aim of incorporation of oat and soya flour with wheat flour is to satisfy the increasing demand of a healthy diet. Wheat flour is major ingredient in baked goods, it is also rich protein content. Soya flour have a dominant position due to presence of high quality proteins and balanced amino acid Soya rich in calcium, vitamins A, D, B, and C. Oat also a rich source of dietary fibre helps in digestion, phytochemicals, lipids.oat also good source of vitamin E and pantothenic acid. Use of oat flour during preparation helps to improve the structure, taste, aroma and nutritive value of bakery products. The incorporation of such soya and oat flour with wheat flour at desired quantity susceptible of baking provides a healthy and nutritionally rich diet in breakfast. Multigrain addition of such flour can contribute health benefits such as healthy digestive system, potentially lower fat and highly nutritional.

■ **Key words :** Baked product, Staple diet oat flour, Soy flour, Protein, Lipids, Vitamins, Dietary fibre

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Composite flour as a mixture of flours, starches and other ingredients intended to replace wheat flour totally or partially in bakery and pastry products (Milligan *et al.,* 1981).The use of composite flours had a few benefits for developing countries: i) the saving of hard currency, ii) promotion of high-yielding, native plant species, iii) a better supply of protein for human nutrition and iv) better overall use of domestic agriculture production (Berghofer, 2000 and Bugusu *et al.,* 2001). Composite flour is considered advantageous in developing countries as it reduces the importation of wheat flour and encourages the use of locally grown crops as flour (Hugo *et al.,* 2000 and Hasmadi *et al.,* 2014). Thus, several developing countries have to take the initiation of programmes to evaluate the feasibility of alternative locally available flours as a substitute for wheat flour (Abdelghafor *et al.,* 2011).The Food and Health Organization (FAO) in 1964 was initated composite technologytargeted reducing the cost of support for temperate countries by encouraging the use of indigenous crops such as cassava, yam, maize and others in partial substitution of wheat flour (Satin, 1988).

The application of composite flour in various food products would be economically beneficially if the imports of wheat could be reduced or eliminated, and that demand for pastry and bread products could be met by the use of domestically grown products instead of wheat (Jisha *et al.,* 2008). The bakery products produced by using composite flour were of good quality, with some characteristics similar to wheat-flour bread, though the

texture and the properties of the composite flour bakery products were different from those made from wheat flour, with an increased nutritional value and the appearance. Apart from being a good source of calories and other nutrients, wheat is considered nutritionally poor, as cereal proteins are deficient in essential amino acids such as lysine and threonine (Dhingra and Jood, 2001).

Therefore, supplementation of wheat flour with inexpensive staples, such as cereals and pulses, helps improve the nutritional quality of wheat products (Sharma *et al.,* 1999). For example, the protein quality of both the cassava-soya and the cassava-groundnut breads is higher than that of common wheat bread (Nilufer *et al.,* 2008). Bakery products are differed by the addition of value-added ingredients. Thus, the increasing number of use of composite flour in numerous bakery and pastry products has spurred a growing number of studies on the effects of different types of materials used to produce flour on their physico-chemical and functional properties (Sudha *et al.,* 2007).

According to Mepba *et al.* (2007) use of composite flours has clearly demonstrated that, for reasons of both consumer acceptance and product quality, wheat is an essential ingredient in many composite flours.Therefore, when bakery and pastry products are produced using composite flour, their quality must be as similar as possible to those of products made from wheat flour. The applications of composite flour in baked goods such as bread, biscuit, cookies etc.

India is a developing country with a large segment of population depending upon wheat, rice and maize as staple food which provide calories and proteins (Malik *et al.,* 2015). Traditionally only wheat has been used as a whole wheat meal (*Atta*) in production of chapattis, paratha and poori where as refined flour (*Maida)* finds great application in manufacture of bakery foods like bread and cookies (Nigham *et al.,* 2013). 75 per cent wheat is produced as whole wheat flour and only 25 per cent is used in preparation of bakery goods (Indrani *et al.,* 2010). The main aim for the development of composite flour baked food was to meet the increasing demand of healthy diet (Malik *et al.,* 2015). The composite flour products feature a combination of grains such as wheat, oat, barley, maize, rice, flax, soybean etc. and provide opportunity for snack manufacturers to develop products within an imaginative appearance, featuring new texture and colour with a beneficial nutritional profile (Indrani *et al.,* 2010).

Composite flour products must be of course whole grain to offer maximum nutritional benefits. The use multigrains are well established in other food sectors particularly bakery and breakfast cereals. They make a positive contribution to the taste and texture of products and consumer readily accept the health benefits. Multigrain products can contribute to a healthy digestive system, help in weight control, reduce the risk of diabetes reduce the risk of cardiac failures. There was a need to quantify the different levels of various grains for development of baked products (Mandge *et al.,* 2014). The main aim of this review make baked product by using soy and oat flour based composite flour.

Applications of composite flour and it's nutritional benefit :

Wheat is an important part of manufacture of bakery goods because it has the inherited property to form dough and retain gases. However, the protein content of wheat varies from as low as 8 to 15% (Dayanand *et al.,* 2012). Flour is fine powder made from cereals or other starch based produce. Wheat flour with different cereal flour used in production of bakery goods such as cookies, bread and cake. Incorporation of composite flour into wheat flour for bakery goods production is expected to produce effect in the functional properties of the blended samples.

Soybean (*Glycine max*), a species of legume, a miracle bean, is an excellent health food and it contains good quality protein (Gopalan *et al.,* 1999). Moreover, most of the oilseeds contain 40–50% oil, where as soybean contains about 18% of oil (American Soybean Association, 2004). Amino acid profile of soy protein is excellent amongst plant proteins. Soy protein directly lowers serum cholesterol levels (Mirrahimi *et al.,* 2010). Soybeans also contain biologically active or metabolic proteins such as enzymes, trypsin inhibitors, hemagglutinins, and cysteine proteases very similar to papain (American Soybean Association, 2004). Soluble fibre in soy foods control blood sugar. Soy foods are quite important to us as they reduce the risk of heart disease. It is also rich in calcium, phosphorous and Vitamins it has been referred to as "the protein hope of the future" (Islam *et al.,* 2007).

Oat belongs to the family *Poaceae* and genus *Avena. Avena sativa* L. Oats have numerous uses in food most commonly they are rolled or crushed into

oatmeal or into fine oat flour (McMullen, 2000). Oats are an excellent food for lowering cholesterol and reducing risk of heart disease because of the high soluble fibre content. Oats are a good choice for diabetics and people conscious about their weight (Salwa *et al.,* 2014). Oats are rich source of dietary fibre. Oats are unique for their high protein as well as lipid contents. Oat is a perfect source of soluble dietary fibre ß-glucans. The most important beneficial effects of ß-glucans are their contribution to a lowering of serum blood cholesterol as well as moderating blood glucose in diabetics (Sangwan *et al.,* 2014). Use of composite flour develops baked foods like bred, cookies, biscuit, rusk, muffin, pastry etc.

Bread :

Bread consumption has increased continuously in many developing countries due to changing eating habits, a steadily growing population and because a large proportion of the overall increased incomes can now be spent on foods (Seibel, 2011).

Much effort has been made to use of composite flours, in which a portion of wheat flour is replaced by locally grown crops, in bread, thereby lower the cost associated with with imported wheat (Olaoye *et al.*, 2006), which in turn decreases the demand for imported wheat while producing protein-enriched bread (Giami *et al.*, 2004). Flours from corn, barley, cassava and chickpea are the most predominant studied for the production of composite flour breads (Defloor *et al.*, 1993 and Ali *et al.,* 2000). Legume proteins are successfully used in baked products to get a protein-enriched product with improved amino acid balance (Bojnanská *et al.*, 2012; Mohammed *et al.*, 2012).

Biscuits :

Biscuits are ready-to-eat snacks possess several attractive features, including a wider consumption , relatively long shelf life, greater convenience and good eating quality (Hooda and Jood, 2005). The growing interest in these types of bakery products is due to their better nutritional properties and the possibility of their use in feeding programmes and catastrophic situations such as starvation or earthquakes (Pratima and Yadava, 2000). In many countries, cookies are prepared with fortified or composite flour to increase their nutritive value (Gonzalez-Galan *et al.*, 1991) – for example, the high-protein cookies made using composite flours that include blends of soy bean (Shrestha and Noomhorm, 2002) with field pea and defatted peanut replacing the wheat flour by upto 30 g/100 g (McWatters, 1978) and with chickpea and lupin by upto 20 g/100 g (Faheid and Hegazi, 1991). Legumes are higher in nutrients, especially in protein (18–24%), than cereal grain (Noor Aziah *et al.*, 2012). Cowpea and peanut flour have been reported to successfully replace upto 20% wheat flour in cookies (McWatters, 1978).

Conclusion :

Through this review there have been lots of interesting findings and insights. Composite flour addition into bakery product formulation had considerable effects on physico-chemical and sensory properties of bakery products. Composite flour shows good potential for use as a functional agent in bakery products. It may be concluded from that different flour can be successfully incorporated in wheat flour bakery product upto different proportion to yield bakery product of enhanced nutritional quality with acceptable sensory attributes. Hence, development and utilization of bakery product will not only improve the nutritional status of the population but also helps those suffering from degenerative diseases. It's applications of such value added food ingredients.

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