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ASSESSMENT OF PROXIMATE COMPOSITIONS AND FUNCTIONAL PROPERTIES OF HEALTH MIX PREPARED FROM PISTA AND THINAI

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ABSTRACT

Nowadays, the manufacturing of foods without using any additives is unthinkable both from the practical and theoretical viewpoint. Colors are one of the most important additives in the foods industry and very important sensory attribute. Colors are used for adding or restoring the color of the food to boost its visual appeal and matching consumer expectations. The aim of this work was to evaluate the proximate compositions and functional properties of health mix prepared from Pista and Thinai. The phytochemical screening health mix showed that the presence of saponins, flavonoids, terpenoids, antroquinones, polyphenol and glycosides while tannin, steroids, alkaloids and anthocyanins were absent in aqueous extract. The moisture, Total Ash, Fiber, Protein, Fat, carbohydrate and energy content of health mix was 3%, 1.05%, 5.50%, 57.16%, 1.25%, 35.03 and 380.21. The functional properties of health mix flour such as water absorption index; solubility and swelling power of health mix was studied. The higher TAC of the health mix. It was, however, observed that the extract possesses significant total antioxidant capacity of health mix was equivalent to 596.00µg/g of ascorbic acid per gram of dry weight. The result of the present study concluded that the health mix (Pista and Thinai) has significant nutritional and antioxidant property which may help the health preservation and disease prevention.

Keywords: Health mix, Proximate composition, phytochemicals, functional properties, total antioxidant capacity

INTRODUCTION

Nowadays, the manufacturing of foods without using any additives is unthinkable both from the practical and theoretical viewpoint. The additives are used to raise the sensory attractiveness and product quality, also to confirm the correct track of the processing technology and storage. Colors are one of the most important additives in the foods industry and very important sensory attribute. Colors are used for adding or restoring the color of the food to boost its visual appeal and matching consumer expectations (Abdeldaiem, 2014). Currently, there is a big global trend for using natural colors in food manufacture, pharmaceutical, and cosmetics industries. The consumer's awareness is increased towards natural products which from natural sources. Consumers prefer herbal medicines, natural foods and even in organic farming which do not use any pesticides or chemical fertilizers.

People became afraid of food additives which are chemical synthesis; this is may be due to the profuse of using synthetic colors, chemicals, and derived products. Synthetic food pigments presently cause

public anxiety concerning safety and the adverse impacts on human health; especially, the behavioral effects and neurological functions in children. So, the food industries were forced to replace them with natural colorants, which come from renewable and natural sources (Friedrich and Kuchlewska, 2013). Health mix contains high protein, calorie, and low fat and high fiber. High calories and protein diet are helpful in increasing of technology to better performance work and as well as these mix should be rich in other nutrients especially protein because it is urgently required to present free radical damage to the body along with combating other protein deficiency problem (Kamal and Kumari, 2018). Therefore, the aim of this work was to evaluate the proximate compositions and functional properties of health mix prepared from Pista and Thinai.

.MATERIALS AND METHODS

Collection of samples

The Pista and Thinai were purchased in June 2023 from Traditional Medicine Shops in Thanjavur, Thanjavur district, Tamil Nadu, India. The health Pista and Thinai were make a fine powder and used for analysis.

Preparation of extracts

Aqueous extract of Pista and Thinai (1:1) was prepared according to the procedure of Ibrahim and Abdel-hakim (2015). The extracted juice of Beetroot was prepared as described by Chen *et al.,* (2018).

Preparation of colored extracts

Fortified Pista and Thinai (1:1) with 10% red Beetroot juice. The sample were filled in 100ml container and incubated at 43°C until full coagulation and the containers were transferred to the refrigerator overnight. The samples then stirred and stored in the refrigerator at 7° ± 1°C. Phytochemical, proximate analysis, functional properties and antioxidant activity evaluations were carried out after 1 and 14 days of cold storage (7° ± 1°C).

Qualitative Preliminary phytochemical analysis

Preliminary phytochemical screening was carried out by using standard procedure followed by Sofowara (1993), Trease and Evans (1989) and Harborne (1973, 1984).

Proximate analysis

Determination of moisture content (Loss on drying). Crude fiber content was determined by following the method of Sadasivam and Manikam (1992). Dry Ashing estimated by the method of Ranganna (1986). Protein estimated by the method of Sadasivam and Manikam (1997). Total fat content of sample determines by the method of Ranganna (1986). Calculation of the total crude carbohydrate content of the sample was done using the formula (Janardhanan and Lakshmanan, 1985). The energy value of the samples was determined by multiplying the protein content by 4, carbohydrate content by 4 and fat content by 9 (AOAC, 1990).

Functional properties analysis

The bulk density (BD) was determined according to method of Momoh *et al.,* (2012), The water absorption index determine by the method of Suraiya Jamal *et al.,* (2016). The water solubility index of starches was carried out as described by Anderson and Sefa-dedeh (2001). The method of Okaka and Potter (1977) with some modifications were used for determining the swelling capacity.

Total antioxidant capacity

The antioxidant capacity of sample was evaluated by the phosphomolybdenum method according to the procedure of Prieto *et al.,* (1999).

RESULTS AND DISCUSSION

Phytochemicals qualitative analysis in health mix

In the present study was carried out on the health mix revealed the presence of medicinally active constituents. The phytochemical characters of the health mix investigated and summarized table 1. The phytochemical screening health mix showed that the presence of saponins, flavonoids, terpenoids, antroquinones, polyphenol and glycosides while tannin, steroids, alkaloids and anthocyanins were absent in aqueous extract.

Due to the presence of flavonoids plants possess antioxidant properties as well as anticancer activities (Yadav and Agarwala, 2011). While terpenoids were well known for antibacterial, anti-inflammatory and anticancer properties (Chung *et al.,* 1998). Triterpenoids have the ability to enhance the release of insulin by modifying the metabolism of glucose and thus act as antidiabetic potential (Sabbah *et al.,* 2017). Phenolic compounds and phytosterol present in plants are responsible for antimicrobial, antiallergic, antidiabetic, antioxidant, anti-inflammatory, antimutagenic and anticarcinogenic properties (Khan *et al.,* 2015). The presence of saponins in plant is very important because of their anticancer, antifungal, antioxidant, antibacterial activity (Lira *et al.,* 2017).

Glycosides play role in the anticoagulant activity and antitumor activity (Xiao, 2017).

Table 1: Phytochemicals qualitative analysis in health mix

S. No	Phytochemicals	Health mix
1	Tannin	-
2	Saponin	+
3	Flavonoids	+
4	Steroids	-
5	Terpenoids	+
6	Alkaloids	-
7	Anthroquinone	+
8	Polyphenol	+
9	Glycoside	+
10	Anthocyanins	-

(-) Absent and (+) Present

Proximate Analysis of health mix

Proximate composition of the Instant health mix was analysed according to the AOAC (1980) method. The present study was analysed the proximate composition and represent in table 2 and Figure 1. The moisture, Total Ash, Fiber, Protein, Fat, carbohydrate and energy content of health mix was 3%, 1.05%, 5.50%, 57.16%, 1.25%, 35.03 and 380.21. This indicates the rich source of nutrient present inhealth mix. The results were not different from that obtained from literatures (Weiss, 2000; Potter and Hotchkiss, 2006). The chemical composition of the composite flours has been shown to affect both physico-chemical properties and nutritional quality of their products (Dhingra and Jood, 2001; Akhtar *et al.*, 2008; Mashayekh *et al.*, 2008).

Table 2: Proximate composition analysis in health mix

S. No	Analysis	Health mix
1	Moisture content (%)	3.00
2	Total Ash (%)	1.05
3	Fiber (%)	5.50
4	Protein (%)	57.16
5	Fat (%)	1.25
6	Carbohydrates (%)	35.03
7	Energy (Kcal/100 g)	380.21

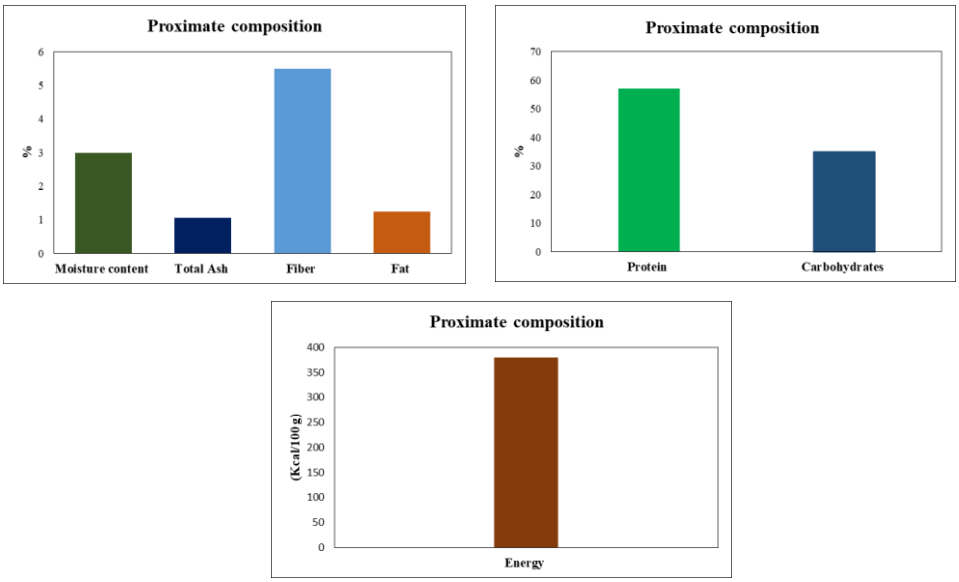

Figure 1: Proximate composition analysis in health mix

Functional Properties of health mix Flour

The functional properties of flour have great importance in the manufacturing of products and it is the basic property that reveals the relations between the structure, composition and molecular arrangement of food components with the nature of environment where it is measured and associated. Functional properties provide useful information for industrial purpose determined by their chemical, physical and organoleptic properties (Heo *et al.*, 2013). The functional properties of health mix flour such as water absorption index; solubility and swelling power of health mix is studied and are presented in Table 3.

Water Absorption Capacity (WAI)

Water absorption capacity of health mix flour of showed in Table 3. The present findings revealed that Absorption Capacity of flour was 1.38%Water absorption is the ability of flour to associate with water under specific conditions where water is limited (Adebayo *et al.*, 2013; Jamal *et al.*, 2016). The composition of flour such as carbohydrate, fiber, protein and amylose content are the major factors influencing water absorption index. Particle size of flour is another important factor which effect water absorption capacity. Flour with smaller particle size has higher surface area for flour hydration (Chaiwanichsiri *et al.*, 2012). The WAI is also dependent upon pore size, capillary and protein charges. This is due to strong correlation of extent of protein hydration with polar constituents along with the interaction of hydrophilic components by hydrogen bonding. The higher protein content lead to strong hydrogen bond, which subsequently increase the water absorption capacity of rice flour. The difference in variety and starch granule structure significantly influence the hydration capacity of the flour (Adeyeye and Aye, 1998).

Water Solubility Index (WSI)

Water solubility index of health mix flour represent in Table 3. The present findings revealed that solubility of health mix flour was 10%. The WSI of flour depends on the temperature and amylose content of rice flour. However, relationship of solubility with temperature was directly related, while amylose content has inverse relation to solubility of rice flour (Wadchararat *et al.*, 2006). Other factors which affected water solubility are the presence of protein and starch lipids complex, which reduces solubility (Chaiwanichsiri *et al.*, 2012). One of the major factors effecting water solubility is the methods of milling and damaged starch content (Heo *et al.*, 2013). The degradation of starch granules led to higher water solubility.

Swelling capacity (SC)

The present findings revealed that Swelling Power of health mix flour was 2%.. The SC of health mix flour might be affected by amylose and protein content, which inhibit the granular swelling due to disulphide and intermolecular bonding in protein that result in extensive and strong network (Fari *et al.*, 2014; Likitwattanasade, 2009) Protein is one of the most important macronutrient, which has the ability to bind starch and form starch granules, which affect the pasting properties of rice flour. The protein and starch content in rice flour are embedded tightly in the lipid matrix and form an amylose lipid complex that influences the pasting properties (Rosniyana and Hazila, 2013). Similarly, the ratio of amylopectin and amylose as well as their structural confirmation in a starch granule substantially effect flour swelling power (Tester and Debon, 2000).

Table 3: Functional properties analysis in health mix

S. No	Analysis	Health mix
1	Bulk density (g/ml)	0.669
2	Water solubility (%)	10.00
3	Water adsorption (g/g)	1.38
4	Swelling capacity (g/ml)	2.00

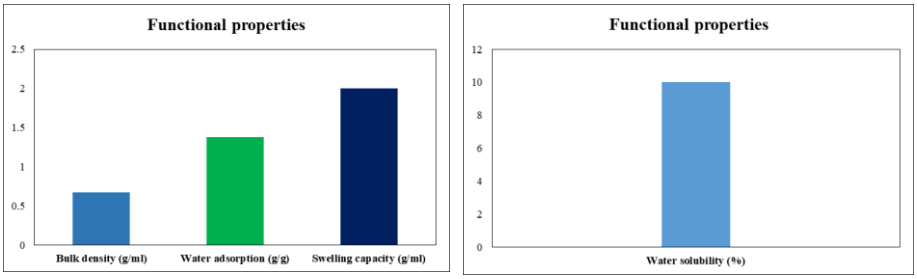

Figure 2: Functional properties analysis in health mix

Total antioxidant capacity (TAC) of health mix

The results indicate higher TAC of the health mix. It was, however, observed that the extract possesses significant total antioxidant capacity of health mix was equivalent to 596.00µg/g of ascorbic acid per gram of dry weight.

Table 4: The total antioxidant capacity (TAC) of health mix

Sample	TAC (µg ascorbic acid equivalents /g. dw)
Health mix	596.00

These antioxidants provide protection against damage caused by free radi-cals played important roles in the devolopment of many chronic disease including car-diovasculer diseases, aging, heart disease, anaemie, cancer, inflammation (Velavan, 2007).

Conclusion

The result of the present study concluded that the health mix (Pista and Thinai) has significant nutritional and antioxidant property which may help the health preservation and disease prevention.

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