Asian Journal of Innovative Research. (2023): 7 (2) 01-07

ISSN 2455 7285

Research Article Food Technology

EVALUATION OF NUTRITIONAL COMPOSITION IN HEALTH MIX DEVELOPED FROM ALMOND AND KUTHIRAIVALI

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Received on 18th June 2023; Revised on 30th June. 2023 Online 25th July. 2023

ABSTRACT

Composite flours are considered firstly as blends of many flours for the production of leavened breads, unleavened baked products, porridges, snack foods, etc.. Currently, there is a big global trend for using natural colors in food manufacture, pharmaceutical, and cosmetics industries. The aim of this work was to evaluate the proximate compositions and functional properties of health mix prepared from Almond and Kuthiraivali. The phytochemical characters of the health mix investigated and summarized table 1. The phytochemical screening health mix showed that the presence of saponins, terpenoids, alkaloids, antroquinones, polyphenol, glycosides and anthocyanins while tannin, flavonoids and steroids were absent in aqueous extract. The moisture, Total ash, fiber, protein, fat, carbohydrate and energy content of health mix was 6%, 1.25%, 6.50%, 51.96%, 1.95%, 38.33% and 378.75 Kcal/100 g. The functional properties of health mix flour such as water absorption index; solubility and swelling power of health mix was studied. The higher total antioxidant capacity of the health mix was observed that the extract possesses significant total antioxidant capacity of health mix was equivalent to 267.40µg/g of ascorbic acid per gram of dry weight. The result of the present study concluded that the health mix (Almond and Kuthiraivali) has significant nutritional and antioxidant property which help the disease prevention and treatment.

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

INTRODUCTION

Composite flours are considered firstly as blends of many flours for the production of leavened breads, unleavened baked products, porridges, snack foods, etc. (Chandra *et al.*, 2015). 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. Functional properties are those quantities that determine the applications and end uses of food materials for many food products; their application in food production and in the industries, depend on various functional properties (Oluwole *et al.*, 2016). 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). Health mix food 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 foods 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. Therefore, the aim of this work was to evaluate the proximate compositions and functional properties of health mix prepared from Almond and Kuthiraivali.

.MATERIALS AND METHODS

Collection of samples

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

Preparation of extracts

Aqueous extract of Almond and Kuthiraivali (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 Almond and Kuthiraivali (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

Compounds belonging to the respective groups have been reported to impart various medicinal characteristics to the plants. The presence of saponins in plant is very important because of their anticancer, antifungal, antioxidant, antibacterial activity (Lira *et al.,* 2017). Terpenoids were well known for antibacterial, anti-inflammatory and anticancer properties (Chung *et al.,* 1998). Alkaloids were known to be possessing analgesic as well as antibacterial properties (Nassar *et al.,* 2010). Phenolic compounds and phytosterol present in plants are responsible for antimicrobial, antiallergic, antidiabetic, antioxidant, anti-inflammatory, antimutagenic and anticarcinogenic properties (Khan *et al.,* 2015). Glycosides play role in the anticoagulant activity and antitumor activity (Xiao, 2017). Anthocyanin possess anticancer and neuroprotective properties (Chien *et al.,* 2015). Anthraquinones present in plants are responsible for the regulation of immunity and play therapeutic role in autoimmune diabetes (Rastogi *et al.,* 2015). 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, terpenoids, alkaloids, antroquinones, polyphenol, glycosides and anthocyanins while tannin, flavonoids and steroids were absent in aqueous extract.

Table 1: Phytochemicals qualitative analysis in health mix

S. No	Phytochemicals	Health mixed
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 6%, 1.25%, 6.50%, 51.96%, 1.95%, 38.33 and 378.75.

Table 2: Proximate composition analysis in health mix

S. No	Analysis	Health mixed
1	Moisture content (%)	6.00
2	Total Ash (%)	1.25
3	Fiber (%)	6.50
4	Protein (%)	51.96
5	Fat (%)	1.95
6	Carbohydrates (%)	38.33
7	Energy (Kcal/100 g)	378.75

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).

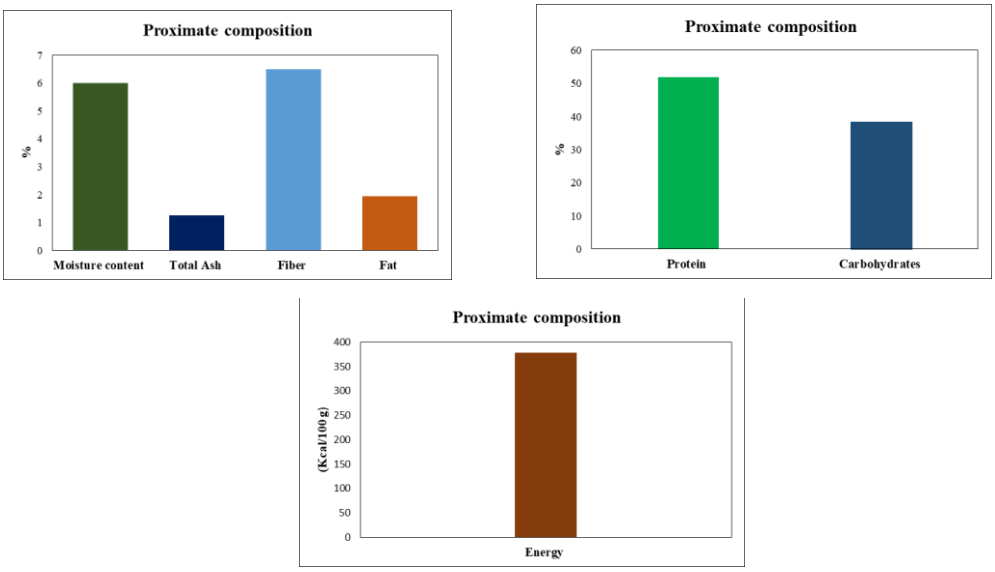

Figure 1: Proximate composition analysis in health mix

Functional Properties of health mix Flour

Table 3: Functional properties analysis in health mix

S. No	Analysis	Health mix
1	Bulk density (g/ml)	0.624
2	Water solubility (%)	12.00
3	Water adsorption (g/g)	0.29
4	Swelling capacity (g/ml)	1.20

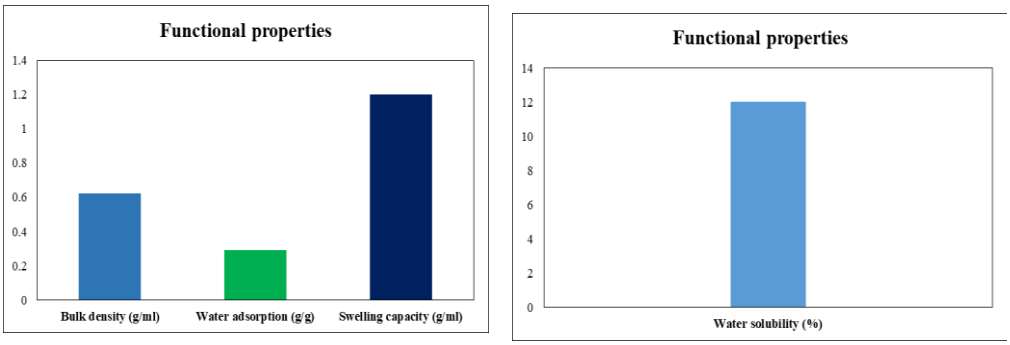

Figure 2: Functional properties analysis in health mix

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 0.29%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 12%. 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 1.20%.. 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).

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 267.40µg/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	267.40

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 (Almond and Kuthiraivali) has significant nutritional and antioxidant property which may help the disease prevention and treatment.

REFERENCES

Adebayo, O. R., Olayiwola, O. A., & Shittu, S. A. (2013). Functional properties and anti-nutritional factors of some selected Nigerian cereals. *Comp. Res. J Agric. Sci*, *1*(1), 1-5.

Adeyeye, E. I., & Aye, P. A. (1998). The effects of sample preparation on the proximate composition and the functional properties of the African yam bean (Sphenostylis stenocarpa Hochst ex A. Rich) flours. Note 1. *Rivista Italiana delle Sostanze Grasse*, *75*(5), 253-261.

Akhtar, S., Anjum, F., Rehman, S., Sheikh, M., & Farzena, K. (2008). Effect of fortification on the physico-chemical and microbiological stability of whole wheat flour. *Food Chem.,* 112,156-163.

Anderson, E. O., & Sefa-Dedeh, S. (2001). Chemical composition and quality changes occurring in Dioscorrea dumentorum pax tubers after harvest. *Food Chem*, *75*, 85-91.

AOAC. (1990). Official Methods of Analysis of the Association of Official Analytical Chemists, Vol. II, 15th ed. Sec.985.29. The Association: Arlington, VA.

Chaiwanichsiri, S., Thumrongchote, D., Suzuki, T., & Laohasongkram, K. (2012). Properties of non-glutinous Thai rice flour: effect of rice variety. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, *3*(1), 150-164.

Chandra, S., Singh, S., & Kumari, D. (2015). Evaluation of functional properties of composite flours and sensorial attributes of composite flour biscuits. *Journal of food science and technology*, *52*, 3681-3688.

Chen, Y., Wang, Z., Zhang, H., Liu, Y., Zhang, S., Meng, Q., & Liu, W. (2018). Isolation of high purity anthocyanin monomers from red cabbage with recycling preparative liquid chromatography and their photostability. *Molecules*, *23*(5), 991.

Chung, K. T., Wong, T. Y., Wei, C. I., Huang, Y. W., & Lin, Y. (1998). Tannins and human health: a review. Critical reviews in food science and nutrition, 38(6), 421-464.

Dhingra, S., & Jood, S. (2001). Organoleptic and nutritional evaluation of wheat breads supplemented with soybean and barley flour. Food Chem., 77, 479-488.

Fari, M. J. M., Rajapaksa, D., & Ranaweera, K. K. D. S. (2011). Quality characteristics of noodles made from selected varieties of Sri Lankan rice with different physicochemical characteristics. *Journal of the National Science Foundation of Sri Lanka*, *39*(1).

Harborne J.B. (1973). Phytochemical Methods; A guide to modern techniques of plant Analysis.2nd Edition, London New York.

Harborne J.B. (1984). Phytochemical Methods; A guide to modern techniques of plant Analysis.2nd Edition, London New York.

Heo, S., Lee, S. M., Shim, J. H., Yoo, S. H., & Lee, S. (2013). Effect of dry-and wet-milled rice flours on the quality attributes of gluten-free dough and noodles. *Journal of Food Engineering*, *116*(1), 213-217.

Ibrahim, J., & Abdel hakim, E. H. (2015). Quality improvement of Damietta cheese using some spices extract. *Assiut Vet Med J*, 61, 24-32.

Jamal, S., Qazi, I. M., & Ahmed, I. (2016). Comparative studies on flour proximate compositions and functional properties of selected Pakistani rice varieties: Comparative studies on flour proximate compositions and functional properties. *Proceedings of the Pakistan Academy of Sciences: B. Life and Environmental Sciences*, *53*(1), 47-56.

Janardhanan, K., & Lakshmanan, K. K. (1985). Studies on the pulse *Mucuna utilis*: chemical composition and antinutritional factors. *J. Food Sci. Technol.* 22: 369 – 371.

Kamal, S. K., & Kumari, A. (2018). Chemical evaluation of health mix foods developed from quality protein maize. *Journal of Pharmacognosy and Phytochemistry*, *7*(5), 1181-1183.

Khan, M. K., Karnpanit, W., Nasar- Abbas, S. M., Huma, Z. E., & Jayasena, V. (2015). Phytochemical composition and bioactivities of lupin: a review. International journal of food science & technology, 50(9), 2004-2012.

Likitwattanasade, T. (2009). *Effect of accelerated aging on functional properties of rice grain and flour* (Doctoral dissertation, Kasetsart University).

Lira, S. M., Canabrava, N. V., Benjamin, S. R., Silva, J. Y. G., Viana, D. A., Lima, C. L. S., & Guedes, M. I. F. (2017). Evaluation of the toxicity and hypoglycemic effect of the aqueous extracts of *Cnidoscolus quercifolius* Pohl. *Brazilian Journal of Medical and Biological Research*, 50(10).

Mashayekh, M., Mahmoodi, M. R., & Enterazzi, M. H. (2008). Effect of fortification of defatted soy flour on sensory and rheological properties of wheat bread. *Int. J. Food Sci. Technol*, 43, 1693-1698.

Momoh, A. T., Abubakar, M. Y., & Ipinjolu, J. K. (2012). Effect of ingredients substitution on binding, water stability and floatation of farm-made fish feed. *Int. J. Fish. Aquat. Stud*, *4*(3), 92-97.

Okaka, J. C., & POTTER, N. N. (1977). Functional and storage properties of cowpea powder-wheat flour blends in breadmaking. *Journal of Food Science*, *42*(3), 828-833.

Oluwole, O., Akinwale, T., Adesioye, T., Odediran, O., Anuoluwatelemi, J., Ibidapo, O., & Kosoko, S. (2016). Some functional properties of flours from commonly consumed selected Nigerian Food Crops. *International Research Journal of Agricultural and Food Sciences*, *1*(5), 92-98.

Potter, N., & Hotchkiss, J. (2006). Food Science. 5th ed. CBS Publishers and distributors. Daryangaji, New Delhi, India.

Prieto, P., Pineda, M., & Aguilar, M. (1999). Spectrophotometric quantitation of antioxidant capacity through the formation of a phosphomolybdenum complex: specific application to the determination of vitamin E. *Analytical biochemistry*, *269*(2), 337-341.

Ranganna, S. (1986). Handbook of Analysis and quality control for fruit and vegetable products. 2nd edn. Tata McGraw Hill Publication company, Ltd, *New Delhi*, 211 – 241.

Rosniyana, A., & Hazila, K. K. (2013). Nutritional properties and organoleptic acceptability of traditional cakes made from MR 220 rice flour. *J Trop Agric Food Sci*, *41*, 41-52.

Sabbah, A., Nasser, M., As-sadi, F., Hijazi, A., Rammal, H., & Nasser, G. (2017). Chemical composition and antioxidant activity of lebanese punica granatum peels. Int J Pharma Res Health Sci, 5(1), 1552-7.

Sadasivam, S., & Manickam, A. (1997). Biochemical methods. 2ndedn. New age international (p) Ltd. *Publisher, New Delhi*, 5 – 207.

Sadasivam, S., & Manikam, A. (1992). Biochemical method for agricultural sciences, W*illey, Eastern Ltd*. 105.

Sofowara, A. (1993). Medicinal plants and Traditional medicine in Africa. Spectrum Books Ltd, Ibadan, Nigeria. p. 289.

Suraiya Jamal., Qazi, I. M., & Ahmed, I. (2016). Comparative studies on flour proximate compositions and functional properties of selected Pakistani rice varieties: Comparative studies on flour proximate compositions and functional properties. *Proceedings of the Pakistan Academy of Sciences: B. Life and Environmental Sciences*, *53*(1), 47-56.

Tester, R. F., & Debon, S. J. (2000). Annealing of starch—a review. *International journal of biological macromolecules*, *27*(1), 1-12.

Trease, G. E., & Evans, W. C. (1989). Pharmacognsy.11th edn. Brailliar Tiridel Can. Macmillian publishers.

Velavan, S. (2011). Free radicals in health and diseases-A Mini Review. *Pharmacologyonline Newsletter*, *1*, 1062-1077.

Wadchararat, C., Thongngam, M., & Naivikul, O. (2006). Characterization of pregelatinized and heat moisture treated rice flours. *Agriculture and Natural Resources*, *40*(6 (Suppl.)), 144-153.

Weiss, E. A. (2000). Oilseed Crops. 2nd ed. Blackwell Science Ltd. Victoria, Australia, pp. 165-203.

Xiao, J. (2017). Dietary flavonoid aglycones and their glycosides: Which show better biological significance?. Critical reviews in food science and nutrition, 57(9), 1874-1905.

Nassar, Z. D., Aisha, A. A., & Majid, A. M. S. A. (2010). The pharmacological properties of terpenoids from Sandoricum koetjape.

Rastogi, S., Pandey, M. M., & Rawat, A. K. S. (2015). Medicinal plants of the genus Betula—Traditional uses and a phytochemical–pharmacological review. Journal of ethnopharmacology, 159, 62-83.