

Job Creation and Income Generation in Three in One (3 IN 1) Balanced Tomato, Sweet Pepper and Sardine Fish Powder

Abdulazeez, A.¹ Abdullahi, S.² Adamu, M.I.³ Abdulazeez, A.O.⁴,
Lukman, M.A.⁵ Danlami, Y.⁶

¹Department of Agricultural Education, Federal College of Education (Technical) Bichi, Kano State, Nigeria.

²Department of Agricultural Education, Federal College of Education (Technical) Bichi, Kano State, Nigeria.

³Department of Agricultural Education, Federal College of Education (Technical) Bichi, Kano State, Nigeria.

⁴Department of Home Economics Education, Federal College of Education (Technical) Bichi, Kano State, Nigeria

⁵Department of Agricultural Education, Federal College of Education (Technical) Bichi, Kano State, Nigeria.

⁶Department of Agricultural Education, Federal College of Education (Technical) Bichi, Kano State, Nigeria.

Abstract: Fresh tomatoes are readily available in abundance during the harvest seasons, but due to short postharvest life (post harvest loss), they are only available for a short period of time, except they are quickly and properly preserved. 3 in 1 Balanced Tomato Powder is the sundry of combined grinded fresh tomatoes (3.4kg), sweet pepper (1.8kg) and sardine fish (500g) that have been dehydrated by being placed in the sun for four days in green house. When they are dried, the 3 in 1 balanced tomato powder shrinks up (618g) losing over 90% of its water weight. The study was carried in green house of Department of Agricultural Education, Federal College of Education Technical Bichi from 11th to 27th November, 2021. Fresh tomatoes, sweet pepper and sardine fish were purchased from Bichi town market, washed, sorted, graded and grinded into paste, the paste was drained using nylon sieve and sun dried into 3 in 1 balanced tomato cake, and then the cake was grinded into 3 in 1 balanced tomato powder (BTP) and packed in 10g per sachet.

Key words: Tomato, Pepper, Fish, Powder, Sundry, Income generation.

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I. Introduction

For Nigeria education system to really prepare Nigeria students/youths for the world of work and self reliance after leaving school, it must include skill-building courses in areas of negotiation, dialogue, leadership, development of new products and services, creative thinking and exposure to technological innovations.

Tomato (*Lycopersicon esculentum*) is one of the most widely cultivated and consumed horticultural crop globally. According to the Executive Director of the National Horticultural Research Institute (NIHORT) Dr, Olaniyan (2019) "Nigeria currently produces 2.3 million metric tonnes of tomatoes annually, while the national demand is 3.0 million metric tonnes annually". He further said that, Nigeria is the 14th largest producer of tomatoes in the world and second in Africa. Kano is the largest producer of tomatoes in Nigeria, and other states in Nigeria engaged in commercial production are Gombe, Kaduna, Bauchi, Katsina, Benue, Jigawa and Plateau (Olaniyan, 2019). According to Alam and Goyal (2007), tomato is botanically a fruit but classified as vegetable in trade, this is due to the way it is consumed. It is believed that tomato is originated from parts of tropical Americas, Ecuador and the wild in Peru, and it was introduced into West Africa by Portuguese traders and freed slaves from West Indies. The most common colour of tomato is red but they can be pink, yellow, orange, green, brown or black in colour (Okwori and Chindo 2010). The numerous uses of tomato can be a contributing factor to its extensive production. It provides an ample and reasonable source of energy, body-building nutrients and large deposits of vitamins and minerals. Lycopene in tomatoes is an antioxidant found to neutralize free radicals and thus prevent proliferation of cancer cell types, tomatoes regulate blood pressure, improve skin and hair health, good for pregnant and nursing mothers, reduce cholesterol and improve heart health, enhance digestive system, help in managing diabetes, reduce inflammation and promote liver health. Due to the wide variety of nutrients and the many health related benefits fresh tomatoes and tomatoes based food products provide to the body, they are eaten raw or most times included as ingredients in a lot of dishes such as salads and sandwiches, and the processed ones are consumed dried or as pastes, sauces, soups, juices and drinks (Geeta 2021). Tomato is rich in vitamins and minerals, sodium, iron, phosphorous, beta-carotene, potassium, magnesium, calcium, zinc, vitamins – A, B1, B2, B6, C, E and K, dietary fiber, carbohydrate and fatty acid

derivatives. Presently, tomatoes are utilized at a higher rate in developed countries than in developing countries and hence it may be referred to as a luxury crop (Victor and Ronald 2008). One of the ancient ways of preserving tomatoes is drying. The basic procedure involves removal of moisture from the fruit to a point where decay is not likely. This can be achieved by using an oven, a dehydrator or the warm heat of the sun. Once finished, the produce should be stored in a dry place in air tight containers (Adegbola and Bodunde 2012). The process of drying, freezing or treating tomatoes with substances to prevent the upsurge in the number of microorganisms such as bacteria and fungi in order to stop decomposition is known as preservation. Irokanulo and Owa (2015) concluded that, to ensure continuous supply of tomatoes throughout the year, there is need for sundry and preservation of tomatoes in powder form or by prolong the shelf life of the produce.

Sweet pepper (*Capsicum annuum*). Sweet pepper is a perishable farm produce, it is high in antioxidants (piperine) which helps to prevent or delay the damaging effect of free radicals linked to major health problems like inflammation, premature aging, heart disease and cancers. It improves cholesterol levels, blood sugar control, brain and gut health, it has bold flavor and make soup tasty and thicken (Makaya, 2019).

Fish: Fish is a perishable farm produce, it is among the healthiest foods on the planet. It's loaded with important nutrients, such as protein and vitamin D. Fish is also a great source of omega-3 fatty acids, which are incredibly important for human body and brain. Fish is packed with many nutrients that most people are lacking. This includes high-quality protein, iodine, and various vitamins and minerals. Fatty fish also boast omega-3 fatty acids, which are crucial for optimal body and brain function and strongly linked to a reduced risk of many diseases, reduced risk of heart attacks and strokes. Fish is recommended for pregnant and breastfeeding women, it reduced mental decline in older adults. Fish has been linked to a reduced risk of type 1 diabetes and several other autoimmune conditions. Studies show that children who eat more fish have a lower risk of asthma. People who eat more fish have a much lower risk of Adult Muscle Degeneration (AMD), a leading cause of vision impairment and blindness (Fish 2019). From the above findings, it can be summarized that tomatoes, sweet pepper and fish have short postharvest life, demand for tomatoes and fish is high globally and no information on three in one (3 in 1) balanced tomatoes powder. For these reasons, the main aim of this study was to sundry tomatoes, sweet pepper and sardine fish and preserve the mixture as three in one (3 in 1) Balanced Tomato Powder (BTP). The objectives of the study are:

1. To encourage job creation and income generation in tomatoes, sweet pepper and fish farming in Nigeria and by extension in Africa.
2. To encourage design and production of affordable and efficient machines for processing and production of 3 in 1 balanced tomatoes powder.
3. To stop postharvest loss in tomatoes, pepper and fish production.
4. To make three in one (3 in 1) balanced tomato powder available throughout the year.

1.2 Significance of the study

Tomato production in Nigeria contributes greatly to nutrition intake, food security and income generation of both peasant farmers and governments of Nigeria. Nigeria rural farmers contribute the highest farm resources in tomato production, but earn the least profit, compared to retailers, middle men/women, wholesalers and tomato processing companies. Thus, the need to educate the rural farmers and youths on simple skills in sundry and preservation of excess tomatoes for highest profit. The study is also significant in the sense that it will assist individuals, Food and Agricultural Organization (FAO) and World Health Organization (WHO) in particular on ways to improving nutritional status of global citizens.

1.3 Statement of the Problem

Tomato farmers in Nigeria are faced with postharvest losses, because tomatoes are generally harvested with very high water content of over 90%, which makes them perishable. A significant portion of tomatoes is lost because of poor handling, poor transportation, poor marketing and poor preservation.

II. Materials And Methods

2.1 Research Area

The study was carried out in November 2021, in green house of Department of Agricultural Education, Federal College of Education (Technical) Bichi (12° 14' N and 8° 14' E), 2775m above sea level, average temperature per annum 25° and average rainfall per annum 80cm, Sudan Savanna zone of Nigeria.

2.2 Materials

Materials employed for the study are: fresh tomatoes, sweet pepper, sardine fish, green house, sun heat, nylon sieve, grinding machine, water, plastic bucket, mortar and pestle, packing leather and trays.

2.3 Methods and procedures

Tomatoes, sweet pepper and sardine fish were purchased from Bichi market, washed, sorted and graded. Tomatoes and sweet pepper were thoroughly mixed and grinded into semi-solid or paste, while sardine fish was

boiled slightly and sundried. The combined grinded tomatoes and sweet pepper paste was drained into semi-solid paste, using nylon sieve, the fresh drained paste was dried by exposing it to sun heat for four days to form hard paste in green house. Using pestle and mortar, the hard paste and dried fish were grinded and sieved into 3 in 1 Balanced Tomato Powder in proportion of tomatoes (5g), sweet pepper (3g) and fish (2g) of 10g per pack/sachet (figs 1-9).



g. 1. Fresh tomatoes and Sweet pepper washed, sorted and graded



Fig. 2. Crushing and grinding fresh tomatoes and sweet pepper into raw paste



Fig. 3. Sun drying of grinded fresh tomatoes and sweet pepper paste in green house



Fig. 4. Sardine fish purchased from Bichi market, slightly boiled and sundried



Fig. 5. Dried tomato and sweet pepper cakes in green house



Fig. 6. Tomatoes and Sweet Pepper Powder



Fig. 7. Sardine Fish Powder

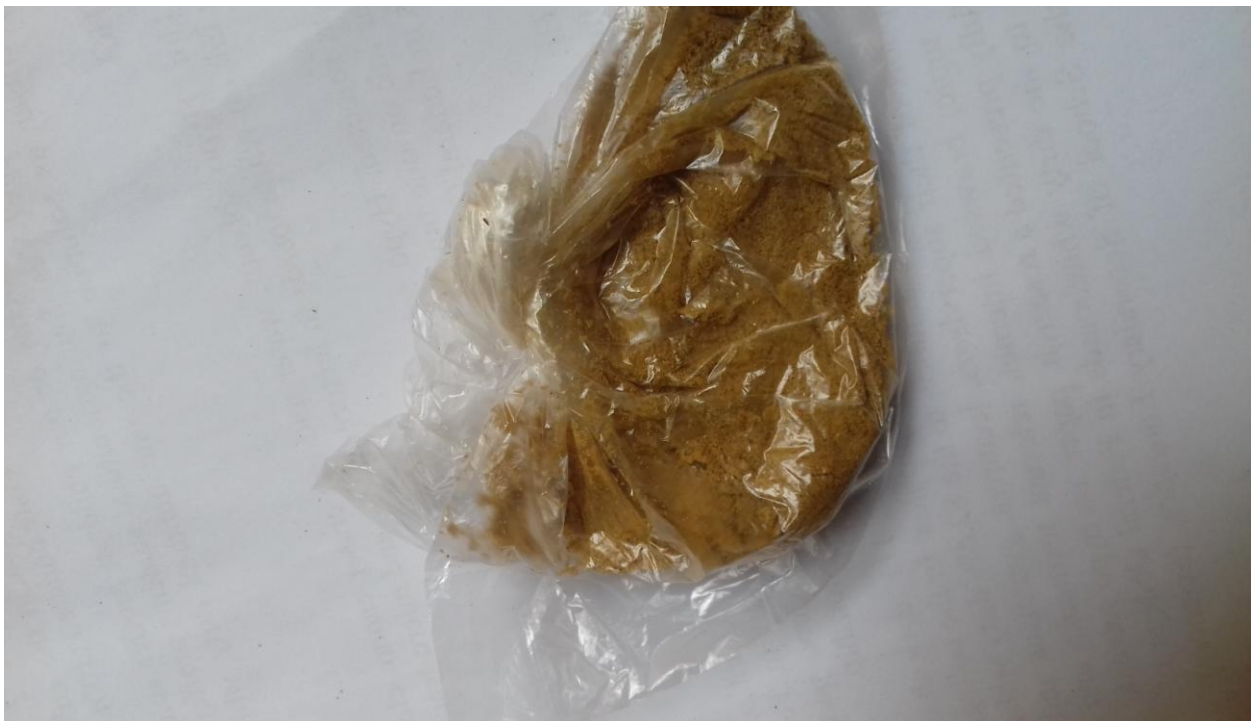


Fig. 8. Mixture of 3 in 1 Balanced Tomato Powder: tomatoes (5g), sweet pepper (3g) and fish (2g) of 10g per pack



Fig. 9. Packages of mixture of 3 in 1 Balanced Tomato Powder

2.4 Cooking preparation

Put 10g of 3 in 1 balanced tomato powder into cooking pot with 150ml ordinary water and allow the mixture to dissolve for two minutes. Then, place the cooking pot and its content on fire, stew and stir for five minutes. You may wish to add salt, oil and seasoning cubes. It is delicious, nice to taste and good to remember.

III. Summary

3.1 Tomatoes production contributes to food and nutrition security, and a lucrative business for many Nigerians. Therefore, the skill in sundry, preservation and production of 3 in 1 balanced tomato powder is highly needed by rural tomatoes farmers; in order to sustain food and nutrition security, farmers' income security and job opportunities for the teeming population of Nigeria youths.

3.2 Recommendations

Nigeria politicians and wealthy individuals should financially empower Nigeria youths in tomatoes, sweet pepper and fish farming as well as in commercial production of 3 in 1 balanced tomato powder. Developed Nations should partner with Nigeria governments, in design and production of affordable and efficient machines, for processing and commercial production of 3 in 1 balanced tomato powder for international market.

3.3 Conclusion

It is a fact that tomatoes farmers in Nigeria are faced with postharvest losses, for postharvest losses to be reduced, Nigeria tomatoes farmers should embrace 3 in 1 balanced tomato powder technology.

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