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Trends of Area, Production and Productivity of Onion in Tamil Nadu

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Abstract

The research work on "Influence of blanching and drying methods on the retention of quality of dried Moringa (Moringa oleifera Lam.) leaves" was conducted at Horticultural College and Research Institute for Women, Tiruchirappalli, Tamil Nadu. Moringa leaves need to be used on the same day of harvesting due to shorter shelf life and leaf yellowing and suitable processing technique is essential to extend the shelf life. Water blanching of leaves was done at 50o, 60o, 70o and 80oC for 1, 2 and 3 minutes. Among twelve blanching methods, water blanching at 50oC for 3 minutes was found to be the best in retention of total carotenoids, vitamin C, iron and calcium and less non-enzymatic browning in dehydrated moringa leaves. Sensory quality was recorded highest in water-blanched, dehydrated moringa leaves stored in HDPE and LDPE bags. After water blanching at 50oC for 3 minutes, the moringa leaves were dried in sun drying, shade drying and cabinet drying. Among drying methods, the drying ratio was found to be highest in cabinet-dried moringa leaves in water blanching as pre-treatment. Cabinet-dried moringa leaves after water blanching at 50oC for 3 minutes retained the highest total carotenoids (124.65 mg/100g), vitamin C (467.25 mg/100g), iron (21.50 mg/100g) and calcium (1413.10 mg/100g) content. Cabinet drying of moringa leaves after water blanching recorded the least non-enzymatic browning (1.03 O.D.). The sensory quality was found to be highest in cabinet-dried moringa leaves (8.8).

Keywords: *Moringa, Moringa oleifera Lam., blanching, cabinet drying, moisture content, total carotenoids, calcium, iron, non-enzymatic browning*

Introduction

The Onion (Allium cepa L.) is the most important member of the Alliaceae family and one of the most important vegetables in the world. Onions are widely used in the preparation of many dishes. Therefore, the domestic market is large. Onions are preferred for their flavor and pungency. This is due to the presence of the volatile oil "allyl propyl disulfide" Onion bulb is a rich source of carbohydrates, protein, vitamin C, phosphorus, and calcium and also possesses good medicinal properties [1] It can be eaten raw, in salads, fried, stewed, roasted, and used to flavor soups, jams, and other savory dishes. It is used almost daily in every household [2]. Ripe onions contain some starch and significant amounts of sugar, protein, and vitamins A, B, and C. The National Onion Association reports that the nutritional composition of onions is listed as follows: water (89%), sugar (4%), protein (1%), fiber (2%), fat (1%) [3].

In 2019-2020, Maharashtra ranked first in the country's onion production of 10,683,000 tons with an area of 618,000 hectares and a productivity of 17.29 MT/ha. There is a great demand for Indian onions all over the world.

Onions occupy an important place in the diets of

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all income groups, and their predominance as an ingredient in many Indian recipes has had far-reaching effects due to price changes. It is equally important to people of all classes. Changes in onion acreage and production lead to price changes that cause concern among farmers and consumers. Fluctuations in onion production negatively affect the distribution of employment and income at the farm level. Onions are one of the most market-sensitive raw materials. High onion price volatility affects both producers and consumers, with ripple effects in other sectors, leading to high inflation in the economy. It is therefore of great concern to politicians, policymakers, and experts. Therefore, this study was conducted to analyze the growth performance of the onion area, yield, and productivity in Tamil Nadu.

Material And Methods

The present study is based on secondary data. The time-series data on the area, production, and productivity of onion in Tamil Nadu were collected for the period of 50 years from 1971-72 to 2020-2021 from Seasonal Crop Report Tamil Nadu. For analytical purposes, this entire period was divided subjectively into two sub-periods, viz. Pre-liberalization (1971-72 to 1990-91) , Post-liberalization (1991-92 to 2020-2021). The compound Growth Rate of onion was estimated for two periods' viz., Pre-liberalization Period (1971-72 to 1990-91) and Post-liberalization (1991-92 to 2020-2021) periods. This grouping was done mainly to find out the effect of liberalization and to compare the growth performance of the onion.

The compound annual growth rate was calculated by fitting the following equation in the time series data in area, production, and yield.

$$\ln Y = a + bt \quad \ldots(1)$$

where, Y defines the time series data of production, area, and yield of Onion, 't' is the trend term, and 'a' is the constant coefficient.

b' is the slope coefficient, which measures the relative change in Y for a given absolute change in the value of explanatory variable 't'.

Compound growth rate is calculated using the following equation:

$$CGR = [\text{antilog } b - 1] * 100 \quad \ldots\ldots\ldots(2)$$

Equation (1) has been estimated by applying the Ordinary Least Square (OLS) method. The t-test was applied to test the significance of 'b'. This equation presumes that a change in agriculture output in a given year would depend upon the output in the preceding year [4] & [5].

If y_t denotes the observation (e.g. agricultural production, productivity, or area) at time t and r is the compound growth rate, the model employed for estimating r is based on Eq. (1):

$$y_t = y_0 (1 + r) t \quad \ldots\ldots\ldots\ldots(3)$$

The usual practice is to assume a multiplicative error-term exp (e) in Eq. 3) so that the model may be linearized employing logarithmic transformation, giving Eq. (4):

$$\ln (y_t) = A + Bt + e \quad \ldots\ldots(4)$$

where, $A = \ln (y_0)$, and $B = \ln (1 + r)$.
Eq. (4) is then fitted to data using the "method of least squares" and goodness of fit is assessed by the coefficient of determination R^2 .

Finally, the compound growth rate is estimated by Eq. (5)

$$r\hat{} = \exp (B\hat{}) - 1 \quad \ldots\ldots(5)$$

Results And Discussion

Growth Analysis of Area, Production, and Productivity of onion in Tamil Nadu

The Compound Growth Rates (CGRs) of onion in Tamil Nadu for the periods 1970-71 to 1990-91 (Pre- liberalization Period), 1991-92 to 2020-2021 (Pre liberalization Period), and 1970-71 to 2020-2021(Overall Period) were estimated and are furnished in Table 1.

The growth rates of onions in terms of area, production, and productivity showed variations. During Pre liberalization Period, the compound growth rate for the area (1.71 percent) was positive and non-significant. The growth rate in the post-liberalization period was positive and significant. It was concluded that the onion area increased during the post-liberalization period. Onion production showed a positive growth rate of 0.63% in the pre-liberalization period and almost the same growth rate

Table 1: Compound Growth Rates of Area, Production, and Yield of Onion in Tamil Nadu (Percent per Annum)

Year	Area	Production	Productivity
1970-71 to 1990-91 (Pre- liberalization Period)	1.71^{NS}	0.63^{NS}	-1.07*
1991-92 to 2020-2021 (Post - liberalization Period)	1.02**	0.64^{NS}	-0.31^{NS}
1970-71 to 2020-2021 (Overall Period)	1.43**	0.77**	-0.62**

**- significance at 1 percent level, *- significance at 5 percent level, NS- Non Significance

(0.64%) in the post-liberalization period. After post-liberalization, the area increased from about 26,630 ha to 51,027 ha, but the growth rate of production was low. This is primarily due to productivity.

Regarding onion productivity, the pre-liberalization period had a negative growth rate (-1.07%) but was significant. During the post-liberalization period, onion productivity is negative (-0.31). This was reflected in the growth rate of production. From the above results, it was concluded that the growth rate per area of onions was high in the pre-liberalization period. Since onion productivity affects its production, there is a need to develop techniques to increase onion productivity. The post-liberalization period averaged 8813 kg/ha.

Conclusion

The study found variability in the annual growth rate of onion crop area, yield, and productivity in Tamil Nadu. During the period before and after liberalization, the average annual growth rate of onion is positive for area and production and negative for productivity. Although onion acreage and onion production increased, productivity fell between 2012 and 2013. There is an urgent need to improve the area and production of onion crops in Tamil Nadu through comprehensive farmer expertise, HYV seed development, and new technologies. Increasing planted area and production as well as increasing onion productivity due to population growth in the state and increased demand for onions in Tamil Nadu

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