

**ESTIMATION OF OLEORESIN CONTENT AT DIFFERENT
MATURITY STAGES OF PAPRIKA (CAPSICUM
ANNUUM L.)**

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ABSTRACT

Fifty three genotypes of paprika including the released varieties Arka Abir and Kt-Pl 19 were evaluated in the Department of Olericulture, College of Agriculture, Thiruvananthapuram, Kerala to study the influence of three different harvest stages viz., turning stage, red ripe stage and withering stage on oleoresin content of paprika. The study revealed that oleoresin content of paprika fruits increased from turning stage to withering stage. The study observed significant influence of both genotypes and harvest maturity on biochemical parameters of paprika. CA 5 had the highest oleoresin content (21.13 per cent) when harvested at withering stage.

Keywords: Paprika, chilli, oleoresin, maturity, variability

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Introduction

Chillies are an indispensable adjunct and a popular condiment in the world of food. Chilli enjoys a unique position in the nutritional world. Besides adding flavour it also enhances the nutraceutical value to the diet. Value addition of spices holds a great potential for India with the global food industry increasing towards oleoresins and oils with a natural flavour. Paprika is defined in the world market as non-pungent brilliant red ground capsicum powder, derived from the dried red pods, with most of the seeds and veins removed. Paprika is the high coloured low pungent chilli. The Hungarian word for plants in the genus *Capsicum* is 'paprika'. The Hungarian paprika may be pungent or non-pungent, depending upon the cultivar. Paprika is gaining more importance in the global market because of its value added products like oleoresin, capsaicin, chilli powder etc. In India the export of these products are increasing tremendously every year and thus contribute a major share in Indian economy.

Oleoresin represents the total flavour of ground spice and consists of fixed oil, capsaicin, pigments, sugars and resin. Oleoresin of paprika is used to impart bright red color to meat, sausage products, sauces and to other processed foods thus making the product more acceptable and pleasing to the eye. The pungency of chilli is due to crystalline acrid volatile alkaloid capsaicin, present in the placenta of fruits. Paprika is a rich source of vitamin C. Vitamins A and E, small quantity of proteins, fat, carbohydrates and traces of minerals are also present in paprika fruits. Oleoresin consists of fixed oil, capsaicin, pigments, sugars and resin. Oleoresin is extracted from milled paprika using organic solvents. Oleoresin has great advantages as it is free from pathogens and microbial infections, it is a sterile extract, it is a clean product, free of physical contaminants, concentrate can be easily distributed in media such as water, it has longer shelf life and is free from deterioration caused by pests or moulds.

Materials and methods

Fifty three accessions of paprika (*Capsicum annum* L.) were evaluated in a field study at Department of Olericulture, College of Agriculture, Vellayani, Kerala. The experiment formed a factorial RBD with 53 accessions, three maturity stages and three replications.

The three maturity stages were:

M₁ (Turning stage) : Stage when mature fruit just starts changing its colour to intermediate stage.

M₂ (Red ripe stage) : Stage when fruit becomes fully ripe, but firm and succulent in nature.

M₃ (Withering stage) : Stage when the fully ripe fruit has become shriveled in appearance.

Fruits were harvested at three different stages of maturity from each accession and studied the variation in oleoresin yield with maturity stages. Oleoresin in chilli was extracted in a Soxhlet's apparatus using solvent acetone (Sadasivam and Manickam, 1992). Chilli fruits harvested at red ripe stage were dried in a hot air oven at 50°C and powdered finely in a mixer grinder. Weighed two grams of chilli powder and packed in filter paper and placed in Soxhlet's apparatus. 200 ml of acetone was taken in the round bottom flask of the apparatus and heated in a water bath. The temperature was maintained at the boiling point of the solvent (around 60°C). After complete extraction (4 – 5 hours) the solvent was evaporated to dryness. Yield of oleoresin was calculated on dry weight basis.

Results and discussion

The present study unraveled considerable variation among the genotypes of paprika for oleoresin content. Varietal performance based on different maturity stages with respect to quality characters are presented in the table.

At turning stage CA 25 (15.67 per cent) had maximum oleoresin and CA 8 had the minimum oleoresin content (7.34 per cent). The fruits of CA 7 (18.09 per cent) had maximum oleoresin content which was on par with CA 28 (18.00 per cent) when harvested at full ripe stage, whereas CA 8 (8.45 per cent) recorded minimum oleoresin content at this stage. When fruits were harvested at withering stage CA 5 had highest oleoresin content 21.13 per cent which was on par with CA 6 (20.83 per cent) followed by CA 7 (19.40 per cent), CA 29 (19.10 per cent). CA 23 had the lowest content (9.83 per cent).

Oleoresin content increased as the age of the fruit increased. This is in agreement with Sheela *et al.* (2001) who reported that oleoresin content was more in red ripe fruits than in mature green

fruits of *C. frutescens*. Mini and Vahab (2002) reported that oleoresin recovery was higher in fruits of *Capsicum spp* at withering stage than at red ripe and turning stage. Robi (2003) observed the same trend in a study consisting of ten accessions of *C. chinense*. Khyadagi (2009) also reported the similar results. Oleoresin consists of fixed oil, capsaicin, pigments, sugars and resin and as fruits mature these contents also increase.

Conclusion

The maximum oleoresin content was recorded when fruits were harvested at withering stage. The fruits left in the plant for withering had high oleoresin. The interaction of genotypes with maturity stage was also significant. Considering genotypes with maturity stages, CA 5 had highest oleoresin content (21.13 per cent) when harvested at withering stage. The present study revealed significant influence of both genotypes and harvest maturity on biochemical parameters of paprika. This indicates the importance of delayed harvest in paprika for oleoresin extraction on commercial scale.

Table 1. Particulars of paprika accessions used for the study and their oleoresin content

I. No.	Accession Number	IC No./Accession Name	Oleoresin (%)		
			M1	M2	M3
	CA1	EC-354890	8.83	10.83	11.67
	CA 2	EC-391082	10.00	10.67	13.14
	CA 3	EC-391083	10.00	16.63	20.76
	CA 4	EC-399574	8.64	9.67	10.17
	CA 5	EC-596920	11.83	15.38	21.13
	CA 6	EC-596940	13.20	16.33	20.83
	CA 7	EC-599960	12.06	18.09	19.40
	CA 8	EC-599969	7.34	8.45	11.17
	CA 9	EC-599992	10.62	11.63	14.13
0	CA 10	EC-628901	8.23	10.83	11.23
1	CA 11	IC-255896	8.59	12.76	15.46
2	CA 12	IC-436231	10.56	11.72	19.75

3	CA 13	IC-570369	8.24	10.03	12.31
4	CA1 4	IC-572481	11.39	13.17	14.67
5	CA 15	IC-572490	13.83	14.81	17.08
6	CA 16	Local	12.33	13.67	14.50
7	CA 17	Local	8.99	12.32	14.22
8	CA 18	Local	11.83	13.33	14.63
9	CA 19	Local	10.17	11.17	11.68
0	CA 20	Local	9.83	10.17	12.00
1	CA 21	Local	14.82	16.00	18.50
2	CA 22	Local	9.83	10.83	10.67
3	CA 23	Local	8.86	9.00	9.83
4	CA 24	Local	9.01	10.00	10.83
5	CA 25	Local	15.67	16.17	17.92
6	CA 26	Local	11.67	13.67	14.77
7	CA 27	Local	14.97	15.99	16.42
8	CA 28	Local	14.83	18.00	19.03
9	CA 29	Local	15.50	17.50	19.10
0	CA 30	Local	10.19	11.49	13.69
1	CA 31	Local	9.19	10.00	11.15
2	CA 32	Local	10.00	10.17	12.20

3	CA 33	Local	10.17	11.73	13.82
4	CA 34	Local	8.91	9.98	12.61
5	CA 35	Local	10.96	14.63	17.80
6	CA 36	Local	8.17	11.82	15.17
7	CA 37	Arka Abhir	12.83	17.00	18.92
8	CA 38	Byadagi Local	8.31	10.33	16.45
9	CA 39	Kt-PI-19	10.66	11.88	13.04
0	CA 40	Local	10.33	11.53	12.31
1	CA 41	Local	9.83	11.67	12.15
2	CA 42	Local	11.20	12.25	14.02
3	CA 43	Local	10.33	12.18	12.34
4	CA 44	Local	10.37	13.83	15.16
5	CA 45	Local	11.33	12.71	14.16
6	CA 46	Local	10.17	12.28	13.32
7	CA 47	Local	13.83	14.82	16.17
8	CA 48	Local	9.73	10.67	11.00
9	CA 49	Local	10.17	11.17	12.67
0	CA 50	Local	11.32	13.49	13.89
1	CA 51	Local	11.83	13.50	14.67
2	CA 52	Local	12.83	15.00	15.33

3	CA 53	Local	9.83	10.64	12.67
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References

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