

THE PHARMA INNOVATION - JOURNAL

Impact of high tension power lines (132 Kv) on oil percentage of *Brassica Juncea* L. grown in Sri Ganganagar (Rajasthan) India

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Electromagnetic Field (EMF), affect human beings not only through environment, but also through its indirect impact through the environment, prevailing in agriculture. However it is still unknown as how EMF affects humans indirectly via food. *Brassica juncea* L. the most popular and are used for food and oil badly affected under EMF having significantly low oil percentage.

Keyword: High tension, power lines, oil percentage, electromagnetic field, electric field

1. Introduction

Electricity has become an important part of our lives; several theories try to explain how overhead power lines, domestic wiring and even cellular phones produced biological effect. Cellular tower, radio station and some electronic equipment produce radiofrequency fields. Electricity also produced Electromagnetic Field (EMF). One of the physical harmful factor of the environment is EMF (Zamanian Z. *et al.* 2010) [6]. For more than 25 years scientist have been studying the effects of EMF on food crops and livestock which is caused by electric and magnetic fields. It is not only humans that are affected, scientist researched response also in other organism (Smith *et al.* 1993; Muraji *et al.* 1998) [5, 3].

Brassica juncea L. the most popular and are used for food and oil. It is grown as an oilseed crop in India (brown or Indian mustard), known as 'Rai' (Pua E.C. and Douglas C.J. 2004) [4]. Seeds are a rich source of oil and protein. The seed has oil as high as 46-48% whole seed meal has 43.6% protein (Khan S. *et al.* 2008) [2]. Mustard is not

only on considered an oil crop, but present a very significant opportunity to create new products based on its unique profile. Industrially mustard may have a use in a number of industrial products including biodiesel (Jham *et al.* 2009) [1]. Present study is an attempt to investigate the impact of EMF produce by 132 KV High tension power lines across the agriculture field, over an important oil crop *Brassica juncea* L.

2. Material and Method

2.1 Experiment design

To carry out in-vivo study of the EMF impact on *Brassica juncea* L. a model was created in the field (*Fig.; 1*). This model was created in an agriculture form which was raising *Brassica* crop regularly.

Through this form an active 132 KV high tension power line was running. The center point of the three high tension wires become the center point on either side of this 10 feet and 10 feet area was considered as danger zone on either side of this, 20 feet strip was marked and considered as sub

danger zone, next to this 20 feet strip was considered as safe zone.

In each strip five replicas were marked each having an area of 4 meter, from each area that is replica, two plants were selected, taken and used as an experimental material.

2.2 Oil percentage

For the estimation of oil percentage, Soxhlet's apparatus was used. The 2.5 gm oven dried sample was taken in thimble of Whatman's filter paper. This thimble was taken in soxhlet's extraction which was connected above with condenser and below with pre weighed oil flask. Oil percentage or ether extract was obtained by following formula.

$$\text{Oil percentage} = \frac{W2 - W1}{W} \times 100$$

W1= Weight of oil flask before extraction

W2= Weight of oil flask after extraction

W = Weight of sample used in thimble.

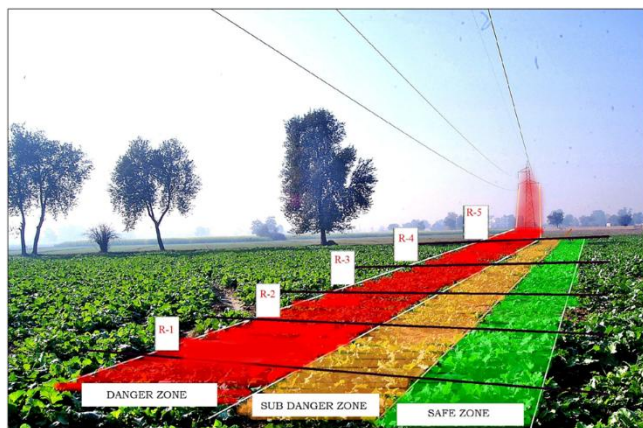


Fig 1: Experimental design

Result and Discussion

Study of two years (2008-09 and 2010-11) for crude oil percentage showed in Table: 1, the mean value with standard error, in safe zone is 42.34 ± 0.3 , sub danger zone 40.73 ± 0.2 and danger zone mean value is 39.68 ± 0.5 . Data analyzed statistically (Fig.; 2) showed that three different zones for oil percentage were highly significantly different (F value 12.40) at 0.01 level of significance.

Year 2010-11 for oil percentage showed the mean value with standard error, in safe zone is 41.82 ± 0.2 , sub danger zone 40.61 ± 0.3 and danger zone mean value is 39.26 ± 0.5 . Data analyzed statistically (Fig.; 3) showed that three different zones for oil percentage were highly significantly different (F value 10.23) at 0.01 level of significance.

Table 1: EMF impact of High tension power lines on oil percentage of *Brassica juncea* L. (Value in mean \pm SE)

Year	Safe zone	Sub Danger zone	Danger zone	F Value (0.01)
2008-09	42.34 ± 0.3	40.73 ± 0.2	39.68 ± 0.5	12.40**
2010-11	41.82 ± 0.2	40.61 ± 0.3	39.26 ± 0.5	10.23**

**= Highly significant at 0.01(F critical=5.49)

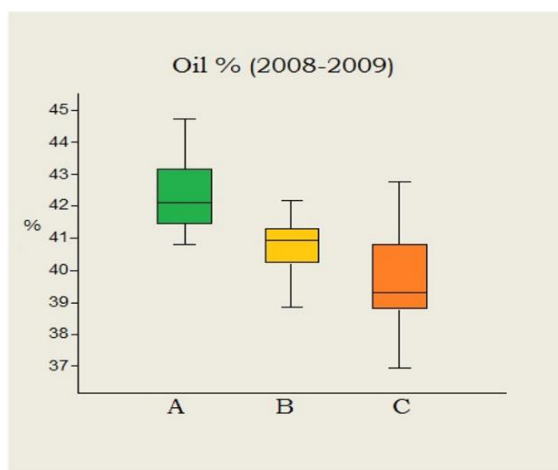


Fig 2: Oil percentage in different zones (Year 2008-09) A=Safe zone; B= Sub danger zone; C= Danger zone

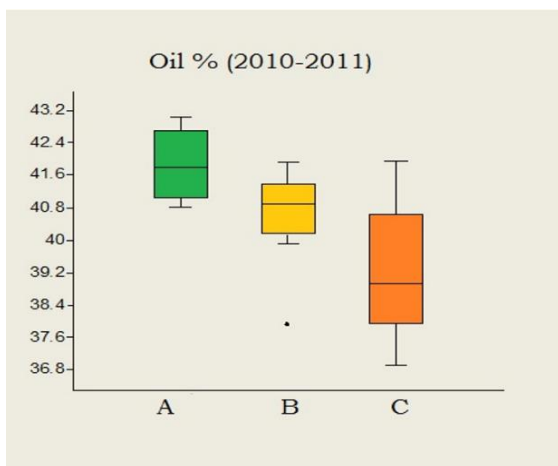


Fig 3: Oil percentage in different zones (Year 2010-11) A=Safe zone; B= Sub danger zone; C= Danger zone

3. Conclusion

Brassica juncea L. is important oil producing crop, the oil quality as well as quantity naturally has a point of attention. In the present study the plant in EMF of High tension power lines seem to be metabolically badly affected because the seed produced by these plants were having significantly low oil percentage as compare to the plant which was in the safe zone.

4. Reference

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