

Calorific value of Sunflower (*Helianthus annuus* L)

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Abstract- Sunflower (*Helianthus annuus* L.) is an important cereal as well as economically helpful for especially Indian farmer concern. A sunflower hybrid KBSH-I and APSH-II has been cultivated because those two variety is quite popular among the farmer. It is grown as a mixed crop with ground nut, Ragi and Black gram. The oil expeller's used for groundnut oil extraction and being used to extract sunflower oil. Calorific value varies among species, tissues, season and experimental settings.

Keywords: Sunflower, Calorific, KBSH-I, APSH-II, Oil.

I.INTRODUCTION

A Sunflower is a most valuable cash crop in temperate region of the world. It is raised as spring crop from April to May and also September to October. Sunflower is a rich source of oil as well as rich nutrients. The oil content ranges between 30-45 % and above. The oil edible and of high quality and has non chlorestol and anti chlorestol properties.

A sunflower variety KBSH-I & APSH-II has seen released for as cereal and commercial purpose The crops was become popular specially in Gaya jee (Bihar). These two varieties of sunflower is highly adoptable and to tolerable against temperature ranges of 20⁰C-30⁰C without any significant yield reduction.

In Gayajee district Bihar (India) Sunflower is successfully cultivated throughout the country and have economic growth and high yield production.

A number of workers have studied the calorific equivalents of biological material from time to time. Calorific value vary from among species, tissues, season and environmental seeding. Calorific concentration and energy structure of these cultivars

of sunflower i.e. KBSH-I & APSH-II is agro climatic condition of district Gaya jee, Bihar (India).

II.MATERIAL AND METHODS

The calorific value of different components of KBSH-I & APSH-II were estimated from samples collected at the interval of 15 days of the germination.

- (a) Sampling of plant material: -Sampling of cultivars of sunflower i.e. KBSH-I & APSH-II was sorted in Root, Stem, Leaf & Capitulum. The sampling was made at the intervals of 15 days from November 2021 to February 2022.
- (b) Drying:- The samples were dried up 48 hrs at 80⁰C until the weight of samples were constant.
- (c) Powdering & Plating:- The dried material were powdering and stored in plastic bags closed and labelled with sample number then prepared by compress it in a pellets.
- (d) Estimation of calorific value:- Calorific value of plant samples were estimated by parr oxygen bombs calorimeter. Pellets were placed in the agitation cup of the bomb with the help of nickel chromium fuse wire. The whole device filled with oxygen a 13-15 atmospheric pressure was immersed is a bucket filled with water. The volume of water taken inside the water bucket was kept constant at 1300 ml in all the combustion. The temperature of water was carefully recorded and the different between two initial / final reading was used for calculation of the calorific values.
- (e) Fuse wire correction:- Fuse wire is act important role in combustion the correction factor used for fuse wire in 2.3 cal/g – 10 cal/g of fuse was used is all estimation and hence a correction of 2.3 calories was made.

Mean calorific value (cal/g) dry weight of different two varieties KBSH-I / APSH-II of sunflower (*Helianthus annuus L.*)

DAYS	KBSH-I			APSH-II		
	Stem	Leaf	Capitulum	Stem	Leaf	Capitulum
15	3483	4279	-	3368	4126	-
30	3528	4437	-	3472	4258	-
45	3905	4538	-	3607	4412	-
60	4291	4991	4677	4042	4717	3912

III.RESULT

Trend and Mean and current rate of energy accumulation were found similar in two cultivars KBSH-I & APSH-II. The mean increment rate of energy was found to be increasing between 15 to 60 days. The mean rate of energy increment at 60 days is high. It has increased from 3483 cal/g to 4291 cal/g is all stem, leaf and capitulum of different intervals. In KBSH-I stem varies 3483 cal/g – 4291 cal/g, leaf varies 4279 cal/g to 4991 Kcal/g and capitulum 4677 Kcal/g where as in APSH-II Stem varies 3368 cal/g to 4042 cal/g, leaf 4126 cal/g to 4717 cal/g and capitulum varies 3912 cal/g.

IV.DISCUSSION

The calorific value of the plant material depends upon the quality and quantity of food reserve in its. The energy content of the plants governed by its genetic constituent's stage in the life history and nutrients value or status specially the fat content seasonal variation. Environmental factor as well as variation in the fat would cause a remarkable change in calorific value.

It had seen observed that the energy concentration in vegetative parts has increased with days till flowering. Later on it has decreased is all the vegetative plants till final harvest. The energy concentration in capitulum was found to be increase right from its inhabitation to its maturity. The trend of variation of energy concentration in different plant part is attributed to change in ratio of fat, carbohydrate and protein and the dry matter. Fat is richest source energy contents and its distribution in plant is Governed by genetic ability developmental stage of plant and environmental complex.

V.CONCLUSION

Calorific value were found to be ranging between 3483 cal/g to 4677 cal/g in variety KBSH-I were as in APSH-II varies 3368 cal/g to 3912 cal/g. The maximum storage of energy 4677 cal/g increased in capitulum KBSH-I at 60 days and 3912 cal/g in Capitulum of APSH-II at 60 days. The maximum energy storage in Stem was 4291 cal/g in KBSH-I was as 4717 cal/g in APSH-II stem.

The above studied conclude that the KBSH-I variety of sunflower is ecologically suitable for cultivation in vicinity of the agro climatic condition of Gaya jee district (Bihar).

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