

Research Paper :

## Impact of safflower petal decoction supplementation on anthropometric measurements of selected subjects

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### ABSTRACT

Safflower (*Carthamus tinctorius* L.) florets contain two pigments Carthamin which is red and insoluble in water, and safflower yellow Carthamidin, which is soluble in water. Safflower pigments are safe for food and has curative effects on diseases. India is the largest producer of safflower (2.0 lakh tones). But it is cultivated as an oil seed crop and the valuable safflower petals are being wasted. Safflower petals decoction was prepared with 1.5 and 2.0 per cent concentration. A total number of 54 subjects, consisting of 18 hypertensive, 18 diabetic and 18 multiple health problems, were selected. Further these 18 subjects were divided into 3 groups and administered the different concentration of safflower petals decoction for 60 days. The anthropometric measurements were recorded at 0, 30 and 60 days. Administration of decoction of higher concentration for longer time had significant impact on reducing anthropometric measurements like body weight, body mass index, mid arm circumference and triceps skin fold.

**Key words :** Safflower petal decoction, Anthropometric measurements

Safflower (*Carthamus tinctorius* L.) is one of the world's oldest crop. Flower colour varies from whitish yellow to red orange, the most common being deep yellow. Safflower florets contain two pigments Carthamin which is red and insoluble in water, and safflower yellow Carthamidin, which is soluble in water. The yellow (20%) and red (2%) pigments extracted from safflower are widely used as stain, additive in food, beverages, cosmetics, printing and dyeing (Wang and Fan, 1989). Safflower pigments are safe for food and has curative effects on diseases such as lack of oxygen, coronary heart diseases, myocardial infarction, cerebral thrombosis, renal thrombosis etc. (Shouchun *et al.*, 1993). Some of medicinal uses of flower are the extract of florets, which contain pigments that are used in treatments of many illnesses such as menstrual problem, cardiovascular diseases, pain and swelling associated with trauma.

On the other hand India is the largest producer of safflower (2.0 lakh tones), in the world with highest acreage (4.3 lakh hectares). But it is cultivated as an oil seed crop and the valuable safflower petals are being wasted although they are known to have certain medicinal value. Therefore, it is considered worthwhile to put efforts to establish the scientific data on the evaluation of therapeutic value of safflower petals thus, the present study was undertaken to find out the impact of safflower petal decoction supplementation on anthropometric measurements of hypertensive, diabetic and multiple health problem subjects.

### METHODOLOGY

The safflower petal decoction was prepared by standardized procedure (Deodhar, 2001). Safflower petals decoction freshly prepared with different concentrations viz., 1.0, 1.5 and 2.0 per cent was given to all the selected subjects daily in the morning hours in an amount of 100 ml for a period of 60 days and the observations were recorded before giving treatment ( $T_0$  = initial), and 30<sup>th</sup> and 60<sup>th</sup> days of study period. A total number of 54 subjects consisting 18 hypertensive, 18 diabetic and 18 multiple health problems were purposively selected for the study. The selected 18 hypertensive subjects were divided into three groups; each group consisting of 6 subjects. Among three group first group (1.0), second group (1.5) and third group (2.0) per cent concentration of safflower petal decoction was supplemented for 60 days. The same experimental technique was followed for diabetic subjects and multiple health problems subjects.

The body measurements of the selected subjects recorded during the experimental period were weight (kg), height (cm), mid arm circumference (cm) and triceps skin fold thickness (mm) by following the standard procedures described by Jelliffe, (1966) and body mass index (BMI) was calculated by using the standard formula. The statistical analysis was carried out to know the overall effect of the treatment the mean of all the treatments was compared with the control (initial) by using 'F' test. (Snedecor and Cochran, 1967).

## FINDINGS AND DISCUSSION

The mean values of percentage of anthropometric measurements of the selected hypertensive subject administered with decoction of different concentration of safflower petals (1.0, 1.5 and 2.0%) for a period of 0, 30 and 60 days are presented in Table 1.

The results indicated that administration of 1.0 per cent concentration of safflower petals decoction for 30 and 60 days did not help in significant weight reduction of the hypertensive subjects over initial value. The per cent values of the weight obtained by administering 1.5 and 2.0 per cent concentration of safflower petals decoction for a period of 30 and 60 days were found to be at par with the initial value. Hence it can be concluded from the above findings that administration of various concentration of safflower petals decoction for 30 and 60 days had no significant effect on the weight of the hypertensive subjects over initial value, however declining trend in weight was observed consistently for 60 days. The results of statistical analysis revealed non significant difference in the weight of subject between the treatments.

The values of body mass index over the initial value indicated that there was a slight reduction in the body mass index values of the hypertensive subjects after the administration of safflower petals decoction with various concentration for a period of 30 and 60 days. However, the results of analysis of variance showed non-significant difference ( $P > 0.05$ ).

The results of the statistical analysis revealed significant differences between the initial value and

treatments implying thereby effectiveness of safflower petals in declining mid arm circumference over the initial value. However, the individual treatment differences were observed to be non significant at 5 per cent level of significance.

It was noticed that there was reduction in the tricep skin fold measurements of the studied subjects due to consumption of safflower petals decoction. The results indicated that for each concentration of safflower petals decoction, as the period of treatment increased there was a decrease in the tricep skin fold of the subjects.

The results of statistical analysis showed significant differences for initial value verses treatments as well as among the different treatments. The tricep skin fold of the subjects was significantly declined over initial value when the safflower petals decoction with 1.5 and 2.0 per cent concentration was continued for a period of 60 days. However, no significant differences were observed in case of 1.0 per cent concentration of safflower petals decoction.

On the whole it can be said that the administration of safflower petals decoction to the hypertensive subjects with various concentration did not help in reducing the body weight, body mass index and mid arm circumference of the subjects. Similar findings were reported by Deodhar (2001) that a slight reduction in weight, mid arm circumference and tricep skin fold of the selected hypertensive subjects were recorded after intake of decoction of 0.5 and 1.0 per cent concentration of safflower petals for 30 and 60 days. But the changes in

**Table 1 : The mean values of percentage of anthropometric measurements of the selected hypertensive subjects administered with decoction of different concentration of safflower petals (1.0, 1.5 and 2.0%) for a period of 0,30, and 60 days**

Treatments	Weight	Body mass index	Mid arm circumference	Tricep skin fold
T <sub>0</sub> -Initial	100	100	100	100
T <sub>1</sub> . 1.0 per cent concentration for 30 days	98.5	98.4	98.4	99.0
T <sub>2</sub> - 1.0 per cent concentration for 60 days	97.8	97.7	98.2	97.4
T <sub>3</sub> - 1.5 per cent concentration for 30 days	99.5	99.5	98.0	97.2
T <sub>4</sub> - 1.5 per cent concentration for 60 days	98.8	98.8	96.2	95.4
T <sub>5</sub> - 2.0 per cent concentration for 30 days	98.2	98.1	99.1	97.8
T <sub>6</sub> - 2.0 per cent concentration for 60 days	97.2	97.2	98.1	96.3
'F' value (T)	1.35	1.34	2.24	2.35
'F' value (T <sub>0</sub> Vs T)	0.64	0.85	4.10	7.38
S. E. (T)	1.0	2.4	0.9	1.3
C.D. (T)	NS	NS	NS	3.6*
S. E. (T <sub>0</sub> Vs T)	1.2	1.2	3.2	1.5
C.D. (T <sub>0</sub> Vs T)	NS	NS	6.4*	2.9

T = Overall treatment mean

NS - Non significant

\* indicates significance of value at P=0.05

(Note : Values converted into percentage over initial value)

anthropometric measurements were not significant.

However, in the present study it was proved to be beneficial in reducing the triceps skin fold, which is an indicator of the reduction in the subcutaneous fat of the body.

Table 2 reveals the anthropometric measurements of the diabetic subjects who were given the various concentration of safflower petals decoction for 0,30 and 60 days. The results revealed that the body weight of the subjects was significantly declined over the initial value after the administration of various concentration of safflower petals decoction. The weight of diabetic subjects was found to be significantly reduced when 1.0 per cent concentration of safflower petals decoction was given for 30 days and 60 days the decline was by 1.4 per cent and 3.0 per cent, respectively over initial value. A significant decline in weight of diabetic subjects was recorded when 1.5 per cent concentration of safflower petals decoction was given for 60 days as compared to 30 days. Similarly there was a significant decline in weight of diabetic subjects for 30 and 60 days when 2.0 per cent safflower petals decoction was given.

On the whole the body weight of diabetic subjects was decline considerably over the initial value after the administration of various concentration of safflower petals decoction

The body mass index of the diabetic subjects after the administration of various concentration of safflower petals decoction declined considerably from 100 to 94.1, 98.6 and 97.1 per cent for treatment T<sub>2</sub>, T<sub>4</sub> and T<sub>6</sub> respectively. Hence, it can be concluded from the result

that there was a reduction in body mass index of the diabetic subjects when treatment was given for longer period of time.

The difference between the mean values of percentage of mid arm circumference of diabetic subjects before and after the administration of various concentration of safflower petals decoction was found to be statistically significant. In case of 1.5 and 2.0 per cent concentration of safflower petals decoction given to the diabetic subjects for 30 and 60 days indicated that the mid arm circumference values declined significantly over initial value. On the whole the results of analysis revealed the declining trend in mid arm circumference of the subject with increase in concentration of safflower petals decoction given for longer duration and relatively higher reduction was noticed in treatment T<sub>4</sub>.

Treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>4</sub>, T<sub>5</sub> and T<sub>6</sub> given to the diabetic subjects reduced the triceps skin fold significantly over initial value. It was also noticed that triceps skin fold value in diabetic subjects given treatment T<sub>6</sub> was found to be significantly higher over the initial value and was at par with all other treatments.

In conclusion, it was observed that administration of higher concentration of safflower petals decoction for longer duration had significant impact on body weight, body mass index, mid arm circumference and tricep skin fold of the selected diabetic subjects.

The mean values of percentage of anthropometric measurements of multiple health problems subjects administered with decoction of different concentration of safflower petals for a period of 0,30 and 60 days are

**Table 2 : The mean values of percentage of anthropometric measurements of the selected diabetic subjects administered with decoction of different concentration of safflower petals (1.0, 1.5 and 2.0%) for a period of 0, 30 and 60 days**

Treatments	Weight	Body mass index	Mid arm circumference	Tricep skin fold
T <sub>0</sub> -Initial	100	100	100	100
T <sub>1</sub> - 1.0 per cent concentration for 30 days	98.6	95.6	98.7	96.1
T <sub>2</sub> - 1.0 per cent concentration for 60 days	97.0	94.1	97.8	93.8
T <sub>3</sub> - 1.5 per cent concentration for 30 days	98.9	100.4	96.1	95.4
T <sub>4</sub> - 1.5 per cent concentration for 60 days	98.6	98.6	93.7	95.4
T <sub>5</sub> - 2.0 per cent concentration for 30 days	98.2	98.0	96.3	97.0
T <sub>6</sub> - 2.0 per cent concentration for 60 days	97.2	97.1	94.3	92.9
'F' value (T)	3.90	2.34	9.34	3.39
'F' Value (T <sub>0</sub> Vs T)	2.92	2.53	28.62	30.53
S. E. (T)	0.4	1.7	0.9	1.7
CD (T)	1.2**	4.8*	2.6**	4.7**
S. E. (T <sub>0</sub> Vs T)	0.8	1.9	1.0	1.9
C.D. (T <sub>0</sub> Vs T)	1.1*	3.84*	2.1*	3.9**

T = Overall treatment mean

NS - Non significant \* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

(Note : Values converted into percentage over initial value)

given in Table 3.

The percentage of body weight of multiple problems subjects varied from 101.7 to 99.1. The minimum value of body weight was recorded for the subjects who were given 1.0 per cent concentration of safflower petals decoction for 60 days followed by 2.0 per cent for 30 and 60 days.

On statistical analysis significant decline in the values of bodyweight of multiple problems subjects was observed for  $T_2$ ,  $T_5$  and  $T_6$  over initial value.

In conclusion it can be said that administration of decoction of safflower petals for longer time had helped in reducing the body weight of multiple health problems subjects and treatment  $T_2$  had a marked influence on reduction of body weight of multiple health problems subjects. Therefore consumption of safflower petals decoction can be advocated to multiple health problems subjects for reducing the weight and there by helping in reducing the metabolic health problems of the subjects so that overall health can be improved.

The results of body mass index of selected multiple problems subjects showed significant difference between initial value and the values obtained after the treatments. Body mass index of the subjects followed treatment  $T_2$  was significantly less than that of treatment  $T_3$ . However it was at par with treatment  $T_5$  and  $T_6$ .

In conclusion, it can be said that treatment  $T_2$  had a significant impact on body mass index of the multiple health problems subjects.

The results showed that the administration of various concentration of safflower petals decoction had

significantly reduced the values of mid arm circumference of multiple problems subjects over the initial value. The minimum value of mid arm circumference was observed for the subjects who were given the treatment  $T_4$  followed by  $T_2$ . In conclusion, treatment  $T_4$  was found to be effective in reducing mid arm circumference of selected subjects as compared to other treatments.

In case of the values of triceps skin fold of the multiple problems subjects before administration of safflower petals decoction and after the administration of various concentration of safflower petals decoction differed significantly.

The minimum value (93.2%) of triceps skin fold was recorded for the subjects who were consuming 1.5 per cent concentration of safflower petals decoction for 60 days ( $T_4$ ) followed by treatment  $T_3$  (95.6%). The results indicated that treatments  $T_2$ ,  $T_3$ ,  $T_4$  and  $T_6$  had significantly reduced the values of triceps skin fold of selected subjects over the initial value. When the values of triceps skin fold were compared among the treatments it was found that  $T_4$  had significantly reduced triceps skin fold of the subjects over all other treatments except for  $T_3$ .

Hence, it can be concluded from the results that treatment  $T_4$  was effective in reducing the triceps skin fold of multiple health problems subjects as compared to other treatments.

### Conclusion:

In case of hypertensive subjects the tricep skin fold was significantly declined over initial value when the safflower petals decoction with 1.5 and 2.0 per cent

**Table 3 : The mean values of percentage of anthropometric measurements of the selected multiple health problems subjects administered with decoction of different concentration of safflower petals (1.0, 1.5 and 2.0%) for a period of 0, 30 and 60 days**

Treatments	Weight	Body mass index	Mid arm circumference	Tricep skin fold
$T_0$ -Initial	100	100	100	100
$T_1$ . 1.0 per cent concentration for 30 days	100.1	100.1	94.5	98.3
$T_2$ - 1.0 per cent concentration for 60 days	99.1	99.1	93.3	97.5
$T_3$ - 1.5 per cent concentration for 30 days	101.7	101.7	96.3	95.6
$T_4$ - 1.5 per cent concentration for 60 days	101.4	101.4	92.7	93.2
$T_5$ - 2.0 per cent concentration for 30 days	99.3	99.4	95.5	98.8
$T_6$ - 2.0 per cent concentration for 60 days	99.3	99.7	93.9	96.9
'F' value (T)	2.60	2.67	11.13	7.49
'F' Value ( $T_0$ Vs T)	4.89	7.58	56.58	17.09
S. E. (T)	0.6	0.6	1.0	0.9
C D (T)	1.7*	1.7*	2.9**	2.7**
S. E. ( $T_0$ Vs T)	0.8	0.7	1.2	1.1
C. D. ( $T_0$ Vs T)	1.4**	1.4**	2.3**	2.3**

T = Overall treatment mean \* and \*\* indicate significance of values at P=0.05 and 0.01, respectively  
(Note : Values converted into percentage over initial value)

concentration was continued for a period of 60 days which is an indicator of the reduction in the subcutaneous fat in the body. Further the administration of higher concentration of safflower petals decoction for longer duration had significant impact on body weight, body mass index, mid arm circumference and tricep skin fold of the selected diabetic subjects. Administration of decoction of safflower petals for longer time had helped in reducing the body weight of multiple health problems subjects. Therefore consumption of safflower petals decoction can be advocated for reducing the weight and there by helping in reducing the metabolic health problems of the subjects so that overall health can be improved.

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