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Tinsukia College, Tinsukia, Assam

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rds : Gibberellic acid (GA_3), (2-Chloroethyl) trimethyl ammonium chloride (CCC), Prot
Groundnut.

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Effect of GA_3 and CCC and Their Interactions on Protein and Sugar Contents of Groundnut

Susmita Chakraborty
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Groundnut seeds (CV. JL 24) were treated with GA_3 at the concentrations of 0,100, 250, 500 and 1000 µg/ml. The percentage of germination gradually increased up to 500 ug/ml of GA_3 and then declined. CCC (O, 100, 250, 500 and 1000 µg/ml) sprayed on leaves after the emergence of the seedlings caused an increase in the protein and sugar contents of the seeds. The maximum protein content was estimated as 30.5 per cent at GA_3 500 plus CCC 500µg/ml against 24.5 per cent at control. The maximum contents of reducing, non-reducing and total sugars were estimated as 0.9, 0.63 and 1.53 per cent at GA_3 500 µg/ml plus CCC 250 µg/ml against 0.6, 0.4 and 1 per cent at control.

Keywords : Gibberellic acid (GA_3), (2-Chloroethyl) trimethyl ammonium chloride (CCC), Protein, Sugar, Groundnut.

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is a member of Papilionaceae known for highly nutritious value for high oil and protein content. This vegetable oil is extensively used for cooking purposes and also for the manufacture of hydrogenated vanaspati, soap and toilet requistes. The groundnut protein is used in the manufacture of a synthetic fibre called 'ardil'. In India, the crop is grown mainly in Gujarat, Maharashtra, Andhra Pradesh, Madhya Pradesh, Tamilnadu and Karnataka.

Plant growth regulators have now-a-days been widely used to modify vegetative and reproductive parameters of crops. Gibberellic acid (GA_3) the most active form of gibberellins has long been known for its stimulatory effect on seed germination (Kahn 1960, Wareing and Saundars 1971, Sengupta *et al.* 1977). GA_3 also stimulated the germination and seedling growth of *Raphanus sativus* (Sarma 1987). GA_3 increased plant height and number of leaves and maximum yields (Abo-El-Saod *et al.* 1975, Yamaguchi *et al.* 1983), GA_3 also causes an increase in the number of chloroplasts (Borzenkova and Mokronosor 1976) resulting in increased rate of photosynthesis and yield (Zhukova, 1965).

CCC prevents the synthesis of gibberellin on the whole plant (Ryugo and Sachs 1969). Bechyne (1982) reported that application of CCC to spring varieties of oil seed rape (*Brassica alba, B. juneea, B. campestris*) at different concentrations decreased plant height, reduced inernodal length but increased thickness of stem and pod and seed weight. So, it was decided to give a boost to vegetative growth initially and then restrict it by growth retardant CCC so that height is decreased with resultant increase in leaves. This is expected to increase the metabolic activities with subsequent accumulation of more metabolites. Under these circumstances it was decided to examine the effect of GA_3 and CCC at their various concentrations specially on protein and sugar contents of the nuts.

MATERIAL AND METHODS

Freshly harvested certified seeds of groundnut (CV. JL 24) were procured from National Seed Corporation, Guwahati Branch. Pods were shelled and the kernels were treated with 1 per cent Ceresan (Ethyl Mercuric Chlonde) and dried. The seeds were soaked at different concentrations of GA_3 (0.100, 250, 500 and 1000 µg/ml) for 12 hr before sowing and at 4-5 leaf stage CCC was sprayed. Experiments were carried out in Randomised Block Design (RBD).

Light sandy soil was selected for sowing the seeds. As the pods develop underground, the soil was prepared making a lilth up to 12-15 cm. FYM at the rate of 100 kg/ha was mixed before ploughing. Heptachlor at the rate of 25 kg/ ha was used to clear the field of white-grubs. Muriate of Potash were evenly mixed before final preparation of the beds.

Protein content was estimated from dry nuts following Lowry's Method (1951) of estimation of protein. Reducing, non-reducing and total sugars of the nuts were estimated by Nelson's modification of Somogyi's Method (Nelson 1944).

RESULTS AND DISCUSSION

All the concentrations of GA_3 and CCC increased protein and sugar contents of the nuts. At the concentrations

of 100, 250, 500 (optimum) and 1000 µg/ml of GA_3 protein content was estimated 24.6, 24.9, 25.05 and 24.75 per cent as against 24.5 per cent at the control. The increase in growth and chemical composition of fruits by GA_3 treatment has been attributed to the prevention of destruction process of IAA-oxidase and thereby raising more of the native plant hormones necessary for improvement of quality (Pilet 1959, Pilet and Morgler 1958). At the concentration of 100, 250, 500 and 1000 µg/ml of CCC protein content was estimated as 25.3, 26.1, 26.8 and 25.9 against 24.5 per cent at the control. The seeds showed further increase in protein content when both the compounds were combined together. The maximum protein content was estimated at the optimal concentration of GA_3 500µg/ml plus CCC 500 µg/ml as 30.5 per cent against 25.05 and 26.8 per cent at GA_3 500µg/ml and CCC 500 µg/ml respectively (Table 1).

At the control, sugar content was 0.6, 0.4 and 1 per cent reducing, non-reducing and total sugars respectively. At all the concentrations of CCC sugar content was higher than the control and also than GA_3 alone. The combination of GA_3 with CCC caused still higher sugar content than CCC and GA_3 acting alone. Thus, the maximum reducing, non-reducing and total sugar content was estimated as 0.9,0.63 and 1.53 per cent respectively at GA_3 500 plus CCC 250 µg/ml (Table 2).

Application of plant growth regulators improved fruit quality was reported by Banker and Prasad (1990), Kale *et al.* (2000) and Babu (2000). The overall effect of both the compounds and their interaction is the manifestation of improved yield. Growth retardation besides preventing chloroplast breakdown (Knypl 1967) induces an increase in total chlorophyll content resulting in more photosynthetic activities (Pinkush 1974). Increase in photosynthesis as a result of accumulation of more chlorophyll enhances the yield. It may also be due to increased rate of translocation of metabolites from the top to the developing pegs.

Table 1 : Interactions between GA_3 and CCC on protein content

Cocn. of GA_3 and CCC (µg/ml)	Percent of protein content (± SE)
GA_3 0+CCC 0	24.5 ± 0.005
GA_3 0+CCC 100	25.3 ± 0.005
GA_3 0+CCC 250	26.1 ± 0.02
GA_3 0+CCC 500	26.8 ± 0.01
GA_3 0+CCC 1000	25.9 ± 0.02
GA_3 100+CCC 0	24.6 ± 0.005
GA_3 100+CCC 100	26.5 ± 0.005
GA_3 100+CCC 250	28.4 ± 0.005
GA_3 100+CCC 500	29.06 ± 0.005
GA_3 100+CCC 1000	27.5 ± 0.01
GA_3 250+CCC 0	24.9 ± 0.005
GA_3 250+CCC 100	27.92 ± 0.005
GA_3 250+CCC 250	28.9 ± 0.005
GA_3 250+CCC 500	30.0 ± 0.01
GA_3 250+CCC 1000	28.75 ± 0.01
GA_3 500+CCC 0	25.05 ± 0.005
GA_3 500+CCC 100	29.32 ± 0.005
GA_3 500+CCC 250	30.2 ± 0.005
GA_3 500+CCC 500	30.5 ± 0.055
GA_3 500+CCC 1000	29.63 ± 0.005
GA_3 1000+CCC 0	24.75 ± 0.005
GA_3 1000+CCC 100	27.04 ± 0.005
GA_3 1000+CCC 250	29.5 ± 0.005
GA_3 1000+CCC 500	29.7 ± 0.055
GA_3 1000+CCC 1000	28.04 ± 0.01

REFERENCES

Abo-El-Saod I, Momtaz, A. and Mansor, M. 1975. Effect of foliar application with $ZnSO_4$ and GA_3 on growth and yield of flax crop. Fibra : **20 (2) :** 42 - 50.

Babu, N. 2000. Effect of NAA, IAA and GA_3 sprays on growth, yield and quality of papaya (*Carica papaya* L.) fruits under foothills of Nagaland. New Agric. **11 (1,2) :** 71 - 75 .

Banker, J. and Prasad, R.H. 1990. Effect of GA and NAA on fruit set and quality of fruit in ber cv Gola Prog. Hort. 22 : 60 - 62.

Bechyne, M. 1982. The response of spring oil seed crops to CCC treatment. Crop Physiol Absts. (1983) **9 (1) :** 318.

Borzenkova, R.A. and Mokronosor, A.T. 1976. The role of phytohormones in biogenesis of chloroplasts. Pl. Gr. Reg. Abstr. **5 (52) :** 94

Kahn, A. 1960. Promotion of Lettuce seed germination by gibberellins. Plant. Physiol. **35 :** 333 - 339.

Kale, V.S., Dod, V.N., Adpawar, R.M. and Bharad, R.G. 2000. Effect of plant growth regulators on fruit characters and quality of ber (*Zizyphus mauritiana* L.) Crop. Res. **20 (2) :** 327 - 333.

Knypl, J.S. 1967. Retardation of chlorophyll degradation of *Zea mays* by Coumarin, Phosphon-D and CCC. Naturwissenchften. **54 :** 146.

Lowry, O.H., Rosebrough, N.J., Farr, A.L. and Randall, R.J. 1951. Protein measurement with the Folin-Phenol Reagent. Bio Chem. **193 :** 265 - 275.

Nelson, N. 1944. A photometric adaptation ofthe Somogyi's method for determination of glucose. J. Biol.Chem. **153 :** 375 - 380.

Pilet, P.E. 1959. Quoted by Phinney BO and Last CA (1960) (Doc City)

Pilet, P.E. and Morgler, W. 1958. Quoted by Phinney BO and Last CA (1960) Loc.

Pinkush, G.R. 1974. Effect of Chlorocholine chloride of formation of frost resistance in winter wheat. Fiziol Biokhm Kultz Rast. **6 (1) :** 54 - 60.

Ryugo, K. and Sachs, R.M. 1969. *In vitro* and *in vivo* studies of Alar (1, 1-dimethyl amino succinic acid, B-995) and related substances. J.Amer.Soc.Hort. Sci. **94 :** 529 - 533.

Sarma, B.D. 1987. Physiological studies on the effects of plant growth regulators on the germination and vegetative growth of radish. Ph.D. Thesis Gau. Univ.

Table 2 : Interactions between GA_3 and CCC on sugar content

Cocn. of GA_3 and CCC (µg/ml)	Percent of sugar content (± SE)		
GA_3 0+CCC 0	0.6 ± 0.055	0.4 ± 0.055	1.0 ± 0.055
GA_3 0+CCC 100	0.65 ± 0.005	0.44 ± 0.005	1.09 ± 0.055
GA_3 0+CCC 250	0.67 ± 0.005	0.49 ± 0.005	1.16 ± 0.005
GA_3 0+CCC 500	0.68 ± 0.005	0.5 ± 0.055	1.18 ± 0.005
GA_3 0+CCC 1000	0.66 ± 0.005	0.47 ± 0.005	1.13 ± 0.005
GA_3 100+CCC 0	0.61 ± 0.005	0.41 ± 0.005	1.02 ± 0.055
GA_3 100+CCC 100	0.69 ± 0.005	0.51 ± 0.005	1.2 ± 0.005
GA_3 100+CCC 250	0.71 ± 0.005	0.52 ± 0.005	1.23 ± 0.005
GA_3 100+CCC 500	0.72 ± 0.005	0.53 ± 0.005	1.25 ± 0.005
GA_3 100+CCC 1000	0.7 ± 0.005	0.51 ± 0.005	1.21 ± 0.01
GA_3 250+CCC 0	063 ± 0.005	0.43 ± 0.005	1.06 ± 0.005
GA_3 250+CCC 100	0.73 ± 0.005	0.53 ± 0.005	1.26 ± 0.005
GA_3 250+CCC 250	0.63 ± 0.005	0.56 ± 0.005	1.39 ± 0.005
GA_3 250+CCC 500	0.85 ± 0.005	0.59 ± 0.005	1.44 ± 0.005
GA_3 250+CCC 1000	0.76 ± 0.005	0.54 ± 0.005	1.3 ± 0.055
GA_3 500+CCC 0	0.64 ± 0.005	0.46 ± 0.005	1.1 ± 0.005
GA_3 500+CCC 100	0.87 ± 0.005	0.59 ± 0.005	1.46 ± 0.005
GA_3 500+CCC 250	0.9 ± 0.055	0.63 ± 0.005	1.53 ± 0.005
GA_3 500+CCC 500	0.88 ± 0.005	0.61 ± 0.005	1.49 ± 0.005
GA_3 500+CCC 1000	0.84 ± 0.005	0.57 ± 0.005	1.41 ± 0.005
GA_3 1000+CCC 0	0.62 ± 0.005	0.42 ± 0.005	1.04 ± 0.01
GA_3 1000+CCC 100	0.78 ± 0.005	0.54 ± 0.005	1.32 ± 0.005
GA_3 1000+CCC 250	0.8 ± 0.055	0.55 ± 0.005	1.35 ± 0.005
GA_3 1000+CCC 500	0.81 ± 0.005	0.56 ± 0.005	1.37 ± 0.005
GA_3 1000+CCC 1000	0.75 ± 0.005	0.53 ± 0.01	1.28 ± 0.02

Sengupta, U.K., Sirohi, G.S., Kaim, M.S. and Pokhriyal 1977. Effect of growth regulators on seed germination in groundnut. Ind. J. Plant Physol. **20 :** 91 - 96.

Wareing, P.F. and Saundars, P.F. 1971. Hormones and dormancy. Ann. Rev. Plant Physiol. **22 :** 261-288.

Yamaguchi, T., Nakatani, M. and Sutcliffe, J.F. 1983. Promotion of growth in aged tobacco seeds by pretreatment with gibberellic acid. Ann. of Bot. **51 (1) :** 157 -159

Zhukova, P.S. 1965. Use of growth stimulators to increase productivity of vegetables. FIZIOL ACTIVE. Veshecherva Ikh. Primen Raztenievocl, Dokl. Nauch, Knof, Vilnyus 1960: 103-108 (Pub, 1965)(Russ.)

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A Comperative Study on the Effect of GA_3, CCC and Alar and their Interactions on Fat Content of Groundnut

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Ground nut seeds (CV.JL 24) were treated with GA_3 at the concentrations of 0, 100, 250, 500 and 1000 µg/ml. The percentage of germination gradually increased up to 500 µg/ml of GA_3 and then declined. CCC and Alar (0, 100, 250, 500 and 1000 µg/ml) srayed separately on leaves after the emergence of the seedlings caused an increase in the fat content of the seeds. The highest fat content was estimated as 52.4 per cent at GA_3 500 plus CCC 500 µg/ml and 50 per cent at GA_3 500 plus Alar 500 µg/ml against 42.8, 43.1, 44.8 and 44.5 per cent at control, GA_3 500 µg/ml, CCC 500 µg/ml and Alar 500 µg/ml respectively.

Keywords : Gibberellic acid (GA_3) (2-Chloroethyl) trimethyl ammonium chloride (CCC), Succinic acid 2, 2-dimethyl hydrazide (Alar).

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is a member of Papilionaceae is known for highly nutritious value for high oil and protein content. This vegetable oil is extensively used for cooking purposes and also for the manufacture of hydrogenated vanaspati, soap and toilet requisites. In India, the crop is grown mainly in Gujarat, Andhra Pradesh, Tamilnadu, Karnataka, Maharashtra and Madhya Pradesh.

Plant growth regulators have now-a-days been widely used to modify vegetative and reproductive parameters of crops. Gibberellic acid (GA_3) the most active form of gibberellins has long been known for its stimulatory effect on seed germination (Khan and Tolbert, 1965, Sengupta *et al.*, 1977), GA_3 also stimulated germination and seedling growth of *Raphanus sativus* (Sharma, 1987) and wheat (Chakraborty, 1993). GA_3 increased plant height and number of leaves and maximum yields (Abo-El-Saod *et al.*, 1975, Yamaguchi *et al.*, 1983). GA_3 also causes an increase in the number of chloroplasts (Borzenkova and Mokronosor, 1976) resulting in increased rate of photosynthesis (Zhukova 1965) and yield.

CCC prevents the synthesis of gibberellin on the whole plant (Ryugo and Sachs, 1969), Bechyne (1982) reported that, application of CCC to spring varieties of oil seed rape (*Brassica* spp) at different concentrations decreased plant height, reduced internodal length but increased thickness of stem and pod and seed weight. So, it was decided to give a boost to vegetative growth initially and them restrict it by growth retardant CCC so that height is decreased with resultant increase in leaves. This is expected to increase the metabolic activities with subsequent accumulation of more metabolites.

Alar (B-9) inhibits biosynthesis and GA activity (Maiko and Musat, 1977). Reddy and Patil(1981) reported that after 60 days of application of alar to groundnut significantly decreased plant height, but increased secondary branches per plant and leaf area index. Boonstra and Jansen (1977) reported that alar treatment can suppress vegetative growth, resulting in increased flowering and control of disease and pests. Enhancement of chlorophyll content was also noticed with B-9 (Humphries 1968). Yadava and Sreenath (1975) reported that alar on foliar application of cowpea reduced plant height significantly, but increased the number of leaves and subsequently increased seed yield.

This paper reports on the effect of GA_3 and CCC and GA_3 and alar at their various concentrations on fat content of groundnut.

MATERIAL AND METHODS

Freshly harvested certified seeds of ground nut (cv. JL24) were procured from National Seed Corporation, Guwahati Branch. Pods were shelled and the kernels were treated with 0.1 per cent Ceresan (Ethyl Mercuric Chloride) and dried. The seeds were soaked at different concentrations of GA_3 (0, 100, 250, 500 and 1000 µg/ml) for 12 hr before sowing and at 4-5 leaf stage CCC and alar (0, 100, 250, 500 and 1000 µg/ml) were sprayed separately. Experiments were carried out in Randomized Block Design (RBD).

Table 1 : Interactions between GA_3 and CCC on fat content.

Conc. of GA_3 and CC (µg/ml)	Per cent of fat contents (± SE)
GA_3 0 + CCC 0	42.8 ± 0.005
GA_3 0 + CCC 100	43.5 ± 0.005
GA_3 0 + CCC 250	44.2 ± 0.055
GA_3 0 + CCC 500	44.8 ± 0.01
GA_3 0 + CCC 1000	43.9 ± 0.055
GA_3 100 + CCC 0	42.85 ± 0.01
GA_3 100 + CCC 100	45.05 ± 0.005
GA_3 100 + CCC 250	46.3 ± 0.055
GA_3 100 + CCC 500	49.6 ± 0.055
GA_3 100 + CCC 1000	46.3 ± 0.01
GA_3 250 + CCC 0	43.0 ± 0.055
GA_3 250 + CCC 100	46.9 ± 0.005
GA_3 250 + CCC 250	49.1 ± 0.005
GA_3 250 + CCC 500	51.8 ± 0.005
GA_3 250 + CCC 1000	48.9 ± 0.005
GA_3 500 + CCC 0	43.1 ± 0.005
GA_3 500 + CCC 100	50.2 ± 0.005
GA_3 500 + CCC 250	52.0 ± 0.055
GA_3 500 + CCC 500	52.4 ± 0.005
GA_3 500 + CCC 1000	51.1 ± 0.001
GA_3 1000 + CCC 0	42.9 ± 0.055
GA_3 1000 + CCC 100	45.55 ± 0.10
GA_3 1000 + CCC 250	50.7 ± 0.02
GA_3 1000 + CCC 500	51.5 ± 0.005
GA_3 1000 + CCC 1000	47.6 ± 0.02

Table 2 : Interactions between GA_3 and Alar on fat contens.

Conc. of GA_3 and Alar (µg/ml)	Per cent of fat contents (± SE)
GA_3 0 + Alar 0	42.8 ± 0.005
GA_3 0 + Alar 100	43.4 ± 0.005
GA_3 0 + Alar 250	44.0 ± 0.01
GA_3 0 + Alar 500	44.5 ± 0.005
GA_3 0 + Alar 1000	43.5 ± 0.005
GA_3 100 + Alar 0	42.85 ± 0.005
GA_3 100 + Alar 100	45.0 ± 0.005
GA_3 100 + Alar 250	47.3 ± 0.02
GA_3 100 + Alar 500	48.0 ± 0.01
GA_3 100 + Alar 1000	46.1 ± 0.005
GA_3 250 + Alar 0	43.0 ± 0.055
GA_3 250 + Alar 100	46.4 ± 0.01
GA_3 250 + Alar 250	47.6 ± 0.005
GA_3 250 + Alar 500	49.4 ± 0.005
GA_3 250 + Alar 1000	47.2 ± 0.055
GA_3 500 + Alar 0	43.1 ± 0.02
GA_3 500 + Alar 100	48.2 ± 0.005
GA_3 500 + Alar 250	49.8 ± 0.01
GA_3 500 + Alar 500	50.0 ± 0.055
GA_3 500 + Alar 1000	48.85 ± 0.005
GA_3 1000 + Alar 0	42.9 ± 0.02
GA_3 1000 + Alar 100	45.1 ± 0.01
GA_3 1000 + Alar 250	48.5 ± 0.005
GA_3 1000 + Alar 500	49.1 ± 0.055
GA_3 1000 + Alar 1000	47.0 ± 0.01

Light sandy loamy soil was selected for growing the seeds. As the pods develop underground, the soil was prepared making a tilth up to 12-15 cm. FYM at the rate of 100 kg/ha was mixed thoroughly before ploughing. Heptachlor at the rate of 25 kg/ha each of Urea, Super Phosphate and 20 kg/ha of Muriate of Potash were evenly mixed before final preparation of the beds.

The method followed of extraction of fat from the kernels was of cold extraction (Kartha and Sethi, 1957) by using petroleum either (B.P. 70-90°C) as the solvent.

RESULTS AND DISCUSSION

All the concentrations of GA_3 and CCC increased fat content of the nuts. At the concentrations of 100, 250, 500 (optimum) and 1000µg/ml of GA_3 fat content was estimated as 42.85, 43, 43.1 and 42.9 per cent as against 42.8 per cent at the control. The increase in growth and chemical composition of fruits by GA_3 treatment has been attributed to the prevention of destruction process of IAA- oxidase and thereby raising more of the native plant hormones necessary for improvement of quality (Pilet 1959). At the concentration of 100, 250, 500, and 1000 µg/ml of CCC fat content was estimated as 43.5, 44.2, 44.8 and 43.9 against 42.8 per cent at the control.

On the other hand the fat content was estimated as 43.4, 44, 44.5 and 43.5 per cent at 100, 250, 500 and 1000 µg/ml of alar against 42.8 per cent at the control. The seeds showed farther increase in fat content together. The maximum fat content was estimated at the optimal concentration of GA_3 500 plus CCC 500 µg/ml as 52.4 per cent against 43.1 and 44.8 per cent at GA_3 500 µg/ml and CCC 500 µg/ml respectively (Table 1).

On the other hand the maximum fat content was estimated at the optimal concentration of GA_3 500 plus alar 500µg/ml as 50 per cent against 43.1 and 44.5 per cent at GA_3 500 µg/ml and alar 500 µg/ml respectively (Table 2).

The fat content was found more as 52.4 per cent as a result of interaction between GA_3 500 plus CCC 500 µg/ml in compare to the interaction of GA_3 500 plus alar 500 µg/ml which was found as 50 per cent.

The overall effect of both the compounds and their interaction is the manifestation of improved yield. Growth retardation besides preventing chloroplast breakdown (Knypl, 1967) induces an increase in total chlorophyll content resulting in more photosynthetic activities (Pin kush, 1974). Increase in photosynthates as a result of accumulation of more chlorophyll enhances the yield. It may also be due to increased rate of translocation of metabolites from the top to the developing pegs.

REFERENCES

Abo-El-Sood, I., Momtaz, A. and Mansor, M. 1975. Effect of foliar application with $ZnSO_4$ and GA_3 on growth and yield of flax crop. Fibra : **20 (2)** : 42 - 50.

Bechyne, M. 1982. The response of spring oil seed crops to CCC treatment. Crop Physiol. Absts. (1983) **9 (1)** : 318.

Borzenkova, R.A. and Mokronosor, A.T. 1976. The role of phytohormones in biogenesis of chloroplasts. Pl. Gr. Reg. Abstr. **5 (52)** : 94

Boonstra, J.J. and Jansen, H. 1977. [Kalanchoe cult reprogrammed successfully (2)] Kalanchoeteelt goed to programmeron (2). Vakblad. Voor. De Bloemisteri}. **32 (33)** : 16-17 (Cited from Plant Growth Reg.Abst). **4 (6)** : 122.

Chakraborty, S. 1993. A study on the effect of gibberellic acid on the germination and mobilization of substrates in grains of wheat. M.Phil. Dissertation, GU.

Humphries, E.C. 1968. The effect of growth regulators CCC and B-9 on protein and total nitrogen of bean leaves (*Phaseolus vulgaris*) during development. Ann.Bot., **32** : 497 - 507.

Kartha, A.R.S. and Sethi, A.S. 1957. A cold percolation method for rapid gravimetric estimation of oil in small quantities of oilseeds. Ind. J. Agri. Sci. **27** : 211.

Khan, A.A. and Tolbert, N.E. 1965. Inhibition of lettuce seed germination and root growth by Indole and Coumarin and reversal by Cycocel. Plant Physiol. **40 (Suppl.)** VII.

Knypl, J.S. 1967. Retardation of Chlorophyll degradation of *Zea mays* by Courmarin, Phosfon-D and CCC. Naturwissenchfton. **54** : 146.

Malko, T.K. and Musat, I.K. 1977. The effect of retardants CCC, B9 and ethrel on gibberellins activity in peaches. *Introduktsiya* ta Aklimatiz Roslin na Ukraini Resp. Mizhvid Zb, **10** : 90 - 92.

Pilet, P.E. 1959. Quoted by Phinney BO and last CA (1960) (toe Cite).

Pin kush, G.R. 1974. Effect of Chlorocholine Chloride of formation of frost resistance in winter wheat. *Fiziol Biokhna* Kultz. Rast. **6 (1)** : 54 - 60.

Reddy, S.C.S. and Patil, S.V. 1981. Effect of growth retardants on the vegetative and physiological characters of groundnut (*Arachis hypogaea* l). Mysore J. Agric. Sci., **15 (2)** : 242 - 244.

Ryugo, K. and Sachs, R.M. 1969. *In vitro* and *in vivo* studies of Alar (1, 1-dimethylaminosuccine acid, B-995) and related substances. J. Amer. Soc. Hort. Sci. **94** : 529 - 533.

Sengupta, U.K., Sirohi, G.S., Kaim, M.S. and Pokhriyal, T.C. 1977. Effect of growth regulators on seed germination in groundnut. Ind. J. Plant. Physiol. **20** : 91- 96.

Sharma, B.D. 1987. Physiological studies on the effects of plant growth regulators on the germination and vegetative growth of radish, Ph.D. thesis. G.U.

Yadava, R.B.R. and Sreenath, P.R. 1975. Influence of some growth regulator on growth, flowering and yield of cowpea. Ind.J.Pl. Physiol., **18** : 135 - 139.

Yamaguchi, T., Nakatani, M. and Sutchliffe, J.F. 1983. Promotion of growth in aged tobacco seeds by pretreatment with gibberellic acid. Ann Bot. **51 (1)** : 157 - 159.

Zhukova, P.S. 1965. Use of growth stimulators to increase productivity of vegerables. FIZIOl ACTIV. Veshecherva Ikh. Primen Rastenievod, Dokl, Nauch, Knot, Vilnyus 1963 : 103- 108 (pub. 1965) (Russ.)

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Perspectives

A collection of essays on
Language, Ethnicity & Identity

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Ethno Medicine Used by Sonowal Kacharis of Tinsukia District, Assam

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Introduction

Assam is known for its valuable heritage of herbal medicinal knowledge. The ethnic people of Assam living in the remote forest areas still depend on the indigenous systems of medicine to a great extent (Dutta and Dutta, 2005). The Sonowal Kacharis are the third largest tribe in the state of Assam. The total population of this tribe is about 3,50,000. They are mongoloid in origin (Bordoloi and Sharma, 1988). The Sonowal Kacharis are a branch of great Bodo Kacharis of Assam. The Sonowal Kacharis are descendents of the "Hammusa" family. They are mainly found in Tinsukia, Dibrugarh, Sivasagar, Lakhimpur and Dhemaji districts of Assam.

The ethno-medicinal lore of the Sonowal Kacharis is very rich. They have some native plants which are used in their daily life as medicine (Kalita and Deb, 2004). The Sonowal Kacharis are strong believers in traditional herbal medicine and do not advocate alternative forms of medicine such as allopathic, homeopathic and ayurvedic medicines acquired by the tribal people through experience is usually passed on orally as a guarded secret of certain families (Dutta and Dutta, 2005). The Sonowal Kacharis believe that the secret of medicinal herbs and plants boils down to the knowledge with held and passed down from their forefathers. As such, the secret of medicines are kept to retain the efficacy of these plants and herbs. Among the Sonowal Kacharis, there are a few herbal specialists or medicine-man, who are called Bez (Barua and Phukan, 1990). The Bez have a wide knowledge of available herbs and their various medicinal use and most of them are the elders of the community.

The Sonowal Kacharis use indigenous methods in the treatment and dialysis of various illnesses. The Sonowal Kacharis have a wide variety of plants for different types of ailments. The people have numerous herbal practices for healing purposes, each varying for the many sicknesses which afflict them. Flowers, fruits and vegetables are common properties of their process, even honey, sugar and twigs. These are usually ingested after preparation.

Study Area

The study areas are Okonimuria Gaon, Gobindapur, Natun Gaon and Dangori of Tinsukia district. Tinsukia district is located at the eastern most corner of Assam. The area of Tinsukia district is 3790 sq. km. The ranges of latitude and longitude are 27'23' N to 27 '48' N and 95 ° 22' E to 95 ° 38' E respectively. The altitude is 120 m to 123.5 m. Okonimuria Gaon, Gobindapur, Natun Gaon and Dangori are located at a distance of 8 km, 20km and 50 km (approximately) respectively from Tinsukia town. Okonimuria Gaon is located towards the western side, Natungaon towards the northern side and Dangori towards the eastern side of Tinsukia town.

Objective

The objective of the present investigation was to study the :

1. Use of different plant species for curing the different diseases.
2. Methods of preparation and mode of application of ethno medicines

Methodology

The study was carried out during 2013-14 in the Sonowal Kacharis inhabited villages Okonimuria Gaon, Gobindapur, Natun Gaon and Dangori were visited to meet the men and women who used phytomedicine. The information have been collected from the village chief (Gaon Burhas), medicine-men and even local peoples. Information about the plants were recorded with regards to their vernacular names, plant parts used, process of preparation of medicines either individually or in combination with other plant parts, mode of application and doses for the treatment. The specimens were collected and the collected specimens were identified with the help of "Flora of Assam" (Kanjilal *et al*, 1934-40) and BSI, Shillong.

Phytomedicine used by the people of Sonowal Kacharis tribe of Tinsukia district, Assam for controlling and curing their diseases have been presented in the table 1.

TABLE 1 ETHNOMEDICINES USED BY PEOPLE OF SONOWAL KACHARIS TRIBE

S. NO	DISEASE NAME	BOTANICAL NAME WITH FAMILY	LOCAL NAME	PARTS USED	METHOD OF PREPARATION AND USED AS MEDICINE
1.	Asthma	*Allium sativum* Linn. (Alliaceae)	Naharu	Bulbous stem	Edible portion of a bulbous stem is crushed, mixed with a glass of raw milk of cow and given to drink early in the morning for a week.
2.	Ascariasis	*Gynandropsis gynandra* Briq. (Capparidaceae)	Bhootmula	Leaf	Two teaspoonful fresh juice of leaves is given to take three times a day.
3.	Diabetes	*Moringa oleifera* Lam. (Moringaceae)	Chajina	Stem bark	Bark is crushed with small amount of water and the extracted juice is given thrice daily for a week.
4.	Diuretic	*Eclipta prostrata* (Linn.) Hassk. (Asteraceae)	Keharaj	Leaf	One teaspoonful extracted juice of leaves is given twice daily for four days.
5	Dysentery	*Musa balbisiana* Colla (Musaceae)	Athiya Kol	Fruit	Edible portion of unripe fruit is cut into 3-4 pieces and dropped in fresh water for a night. The decoction is given to drink early in the morning for three days.
6	Dysmenorrhoea	*Leucas plukenetii* (Roth) Spreng (Lamiaceae) *Piper nigrum* Linn. (Piperaceae)	Duron Jaluk	Young vegetative shoot and flower Fruit	Seven young vegetative shoots. Seven flowers of *L. plukenetii* and seven fruits of *P. nigrum* are crushed and given to take orally in the morning (empty stomach) for two days.

7	Dyspepsia	*Alternanthera sessilis* DC. (Amaranthaceae) *Oxalis corniculata* Linn. (Oxalidaceae) *Hedyotis corymbosa* (L.) Lamk	Matikaduri Soru tengechi Bonjaluk/ Lihiripatia	Young vegetative shoot Leaf Young aerial shoot	Decoction of the shoot, leaf and aerial parts of these three plants, respectively were made with a little salt. One teaspoonful of the preparation is taken three times a day.
8.	Gastric complaints	*Curcuma caesia* Rose. (Zingiberaceae) *Momordica cochinchinesis* Spreng (Cucurbitaceae) *Sapindus mukorossii* Gaertz. (Sapindaceae)	Kala Halodhi Bhat Kerela Manichal	Rhizomatous stem Root Seed	3-4 pieces of *C. caesia*, 1 piece of moniliated root of *M. cochinchinesis* and seed coat of 2-3 seeds of *S. mukorossii* are crushed together and given to take orally in the morning (empty stomach) for three days.
9.	Glossitis	*Psidium guajava* Linn. (Myrtaceae)	Madhuri	Young leaf	Extracted juice of leaves is applied over the infected tongue twice daily for three days.
10	Jaundice	*Impatiens tripetala* L. (Balsaminaceae) *Psidium guajava* L. (Myrtaceae)	Dumdeuka Madhuri	Flower Tender Leaf	15-20 flowers of *I. tripetala*, 3 tender leaves of *P. guajava* and 100 ml of raw cow milk are crushed together and given to take orally in the morning (empty stomach) for 3 days.
11.	Mumps	*Calotropis gigantea* (Linn.) R.Br. (Asclepiadaceae) *Drymaria cordata* Wild. (Caryophyllaceae) *Ficus hispida* Linn. (Moraceae)	Akon Laijabori Dimoru	Young vegetative shoot Young vegetative shoot Young vegetative shoot	Three young vegetative shoots of each plant species are crushed together and extracted juice is externally used on the infected portion.
12.	Oedema in pregnancy	*Vitex negundo* Linn. (Verbenaceae)	Pochotiya	Leaf	Leaves are dipped in boiling water and kept as such for about 5 min. The feet are kept submerged in the above preparation for about 20 minutes. It is repeated for a week.
13.	Oliguria	*Curcuma domestica* Valeton. (Zingiberaceae)	Halodhi	Rhizomatous stem	Half cup of extracted juice of the rhizome is mixed with equal amount of goat milk and given to drink early in the morning for a week.

14.	Paralysis	*Peaderia foetida Linn. (Rubiaceae)*	Bhedailata	Young aerial portion	Young shoots are crushed and extracted juice is given for massage until cure. Simultaneously two teaspoonful of extracted juice also given to take orally twice daily.
15	Paronychia	*Piper betle Linn. (Piperaceae)*	Pan	Petiole of Leaf	Petiole is crushed and extracted juice is applied over the infected nail for a week.
16	Piles	*Euphorbia ligularia Roxb. (Euphorbiaceae)* *Curcuma domestica Valeton (Zingiberaceae)*	Siju Halodhi	Stem Rhizomatous stem	Equal amount of stem of these plant species are crushed finally and introduced into anus, kept as such for whole night. It is repeated for a fortnight in a 3days interval
17	Pneumonia	*Rhamnus nepalensis (Wall.) Lan's (Rhamnaceae)* *Bambusa bambos (L.) Voss (Poaceae)* *Piper nigrum L. (Piperaceae)*	Biringa Bah Jaluk	Root Root Fruit	Small pieces of each root are boiled with crushed fruits (for old-21 fruits and for child, 5-7 fruits) and given to take orally in the morning (empty stomach). For old, one glass full and child , 2-3 teaspoonful.
18.	Scabies	*Cassia sophera* Linn. (Caesalpiniaceae)	Medeluwa	Leaf	Leaves are crushed finely and extracted juice is applied over the infected portion thrice daily for a week.
19.	Scanty lactation	*Ricinus communis* Linn. (Euphorbiaceae)	Era	Leaf	Fresh leaves are crushed and applied over breast for an hour for a week.
20.	Tonsillitis	*Ananas comosus* (Linn.) Merrill (Bromeliaceae)	Matikathal	Fruit	Half cup of extracted juice, obtained from the roasted young fruit is given to take once daily for three days.
21.	Toothache	*Cynodon dactylon* (L.) Pers (Poaceae) *Allium sativum* L. (Alliaceae) *Colocasia esculenta* (Araceae) Schott.	Duboribon Naharu Kala Kachu	Apical part of vegetative shoot Bulbous stem Leaf petiole	21 number apical parts of *C. dactylon*, 3 parts of *A. sativum* and one inch from the base of leaf petiole are crushed together and kept outside the teeth for 5 minutes in the morning and then remove. This medicine is necessary to continue for 3 days.

Discussion

Today about 4.4 billion people comprising 80 per cent of World's population rely on plants as their primary sources of medicine. Our country India is also inhabited by over 550 tribal communities belonging to 227 ethnic groups constituting 7.7 per cent of the entire population. About 10,000 plants are traditionally used all over the country in various purposes

(Goel, 2009). In my present study also about 30 plant species belonging to 26 families and 30 genera are found to be used by the Sonowal Kacharis tribe for various types of ailments and these plants have indicated their potential medicine properties. A similar study was also done by Kalita and Deb (2004) on the Sonowal Kacharis tribe of the Brahmaputra Valley. Some of the common ailments that were cured are asthma, diabetes, diuretic, dysentery, dyspepsia, dysmenorrhoea, gastric complaints, jaundice, piles, paralysis, pneumonia, mumps, tonsillitis, toothache etc. For the preparation of medicines some plants are used singly and some plants are used in combination with other plants.

Conclusion

From the above study it may be concluded that the Sonowal Kacharis tribe is very rich in ethno medicines and therefore actions should be accorded to create awareness among local peoples about medicinal importance of particular plant species and their conservation and preservations. Organize to educate them about the valuable medicinal plants before extinction. Some of the medicine men and women do not know the name of plants which are used in controlling and curing of some diseases and the using plant species are not locally available. The using plant species for preparation of particular medicines are continued generation after generation. So, it is also necessary to educate them about the naming of plant species.

The ethno-medical claims reported here is merely an indication of our present state of knowledge on the traditional usage of herbal drugs by the Sonowal Kacharis studied. The findings may be relevant to modern phototherapy and medical practice as well as trans-cultural health policies. Therefore, it is greatly needed to assess these plants for phytochemical analyses and ethno pharmacological screenings so as to validate the efficacy of indigenous herbal medicine used by the Sonowal Kacharis of Tinsukia district.

References

Barua, I. and Phukan R. 1990. "Socio-Religious Aspects of Health among Sonowal Kachari". The Eastern Anthropologist, 55: 4.

Bordoloi B N and Sharba Thakur GC. 1998. Tribes of Assam, Part-II, Director, Tribal Research Institute, Assam,.

Dutta BK and Dutta PK, 2005 Potential of ethno-botanical studies in Northeast India: An overview, *Ind. J. of Traditional Knowledge*, 4 (I): 7-14

Goel AK, 2009 Conversation, value addition and commercialization of traditional knowledge in India, paper presented in National Conference of Recent Trends in Biodiversity Researches. Organized by Department of Life Science, Assam University, Silchar in collaboration with society of Ethno botanists, Lucknow and Association of plant Taxonomy, Dehradun on 16-18 March,

Kalita D and Deb B, 2004. Some folk medicines used by the Sonowal Kacharis tribe of the Brahmaputra Valley, Assam. *Natural Product Radiance*. Vol 3 (4) July – August

Kanjilal UN, Kanjilal PC, Das A, De RN, Bor NL, 1934-40. *Flora of Assam*. Vol I-VI, Publication Division, Govt. of Assam, Shillong, India.

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Indigenous Food of different Communities of North-East India

Editors
Dr. Sanjita Chetia
Miss Ankita Saikia

The Present treaties presents a collection of Sixty Research articles offered by eminent social researchers to acquaint a wide audience with the Indigenous Food of North East Communities of varied ethnic groups living in diverse habitat of North East India.

Northeastern India is one of the richest floras in India, where people depend on shifting cultivation systems and forest based food products for their sustainable survival. This region, which lies under eastern Himalayan ecosystem, is not only rich in plants diversity but also have a great treasure of cultural, social and linguistic variability, conserved by tribal people. The region is a treasure of indigenous knowledge systems pertaining to agriculture, food, medicine, and natural resources management. Women have conserved many local crops, ethnic vegetables and indigenous fruits used in local diet for food and nutritional security. Most of these indigenous materials are collected by women folk either from the forest areas, conserved in shifting land or indigenous kitchen gardens.

INDIGENOUS FOOD OF DIFFERENT COMMUNITIES OF NORTH - EAST INDIA

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Ethnomedicinal Studies Of Some Vegetables Used By People Of Different Communities Of Tinsukia District, Assam

✍ Dr. Susmita Chakraborty

INTRODUCTION

Ethno botany deals with the study the study of plants used by different ethnic group in social and day to day life. It deals relationship between human beings and plants. Ethno medico botany deals with the ethno medicines i.e folk medicine derived from plants.

Assam is known for its valuable heritage of herbal medicinal knowledge. Assam is the inhabitant of people of different communities. Assam is reach in biodiversity due to favourable climatic condition. Assam is the state where various vegetables are cultivated and some are found as wild vegetables.

The people of different communities of Tinsukia district consume vegetables in their every meal. By using the vegetables they control different types of diseases.

Among the people of different communities, there are a few herbal specialists or medicine-men who are called bez (Barua and Phukan, 1990).

STUDY AREA

The study area are Natun gaon, Laipuli, Okonimuria gaon, Bordoloi Nagar, Chaliha Nagar, Parbotia of Tinsukia Tinsukia District. Tinsukia district is located at the eastern most corner of Assam. The area of Tinsukia district is 3790 sq.km. The ranges of latitude and longitude are 27^0 23' N to 27^0 48' N and 95^0 22' E 95^0 38' E respectively. The altitude is 120 m to 123.5 m.

Laipuli, Okonimuria gaon, Guijan and Natun gaon are located at a distance of 6 km, 8km, 12km and 20km (approximately) respectively from Tinsukia Town.

Department of Botany, Tinsukia College

Laipuli and Okonimuria gaon are located towards the western side. Guijan and Natun gaon are located towards the northern side of Tinsukia town. Bordoloi Nagar, Chaliha Nagar, Parbotia are located in Tinsukia town.

OBJECTIVE

The objective of the present investigation was to study the

1. Use of different vegetables for controlling and curing the different diseases.
2. Usable parts of vegetables
3. Identification of plant species.

4. METHODOLOGY

The study was carried out during 2014-2016 in the different communities people inhabited areas and also Tinsukia local market of Tinsukia District. The information have been about the medicinal value of different vegetables from the medicine-men and even local peoples. Information about the vegetables were recorded with their vernacular names, plant parts used and medicinal value. The specimens were identified with the help of "Flora of Assam" (kanjilal et al 1934-40) and BSI, Shillong.

Vegetables used by the people of different communities of Tinsukia District, Assam for controlling and curing their diseases have been presented in the table 1

Table 1. Enumeration of vegetables used by peoples of different communities for curing disease.

Sl. no	Assamese Name	English Name	Botanical Name	Family	Parts used	Medicinal use
1	Mati-kaduri	Racaba	*Alternanthera sessilis* (L) R.Br.ex Dc.	Amaranthaceae	Tender shoot with creeping stem	Leaf extract is used for regeneration of hair. Juice is good in stomach trouble and dysentery
2	Kata-khutura	Spiny amaranth	*Amaranthus spinosus* L	Amaranthaceae	Tender shoot	The tender shoot are used in diarrhea, nursing mothers and eczema

3	Moricha sak	Giant amarantha	*Amaranthus hybridus* L.	Amaranthaceae	Tender shoots, stem and leaves	Used in anemia
4	Khutura sak	Amarantha	*Amaranthus viridis* L.	Amaranthaceae	Tender shoots, stem and leaves	Tender shoots are eaten for improving eye sight. The stem paste is against snake bite, leaf paste is good against scorpion bite.
5	Bor-manimuni	Indian penny wort	*Centella asiatica* L.	Apiaceae	Whole plant	Used for stomach problem and memory loss
6	Gajor	Carrot	*Daucas carota* L.	Apiaceae	Roots	Scabies, eye problem
7	Soru-manimuni	Lawn penny wort	*Hydrocotyl sibthopiodes* .	Apiaceae	Whole plant	Good in tonsillitis and anemia
8	Bor kochu	Giant taro	*Alocasia macrorriza*	Araceae	Rhizome, leaf petiole and tender leaves	Good in tonsillitis and anemia
9	Ol-kochu	Elephant yam	*Amorphophallus paeonifolius* (Dennest). Nicolson	Araceae	Tender shoots and corm	Corm is good for piles, sinusitis, dysentery and acute rheumatism. Corm is coesidered to be stomachic, carminative and restorative
10	Kochu	Taro	*Colocasia esculenta*	Araceae	Petioles and tender leaves	Cough and anemia

11	Kola kochu	Black aroids	*Colocasia fontanesii*	Araceae	petiole	Skin cuts anemia
12	Chengmora	Spiny arum	*Lasia spinosa* L.	Araceae	Tender shoots and rhizome	Irregular menstruation leucorrhoea
13	Helonchi sak	Water cress	*Enhydra fluctuans* Lour	Asteraceae	Tender shoots	Laxative, prick heat and problem
14	Khuwa dhekia	Paco	*Diplazinum esculantum* (Retz.) Sw.	Athyriaaceae	Tender shoot	Blood purifier
15	Puroi sak	Indian spinach	*Besella alba* L.	Basellaceae	Stems and leaves	Allergy, cataract gonorrhea, urticaria, constipation children, anemia and pregnant woman
16	Broccoli	Broccoli	*Brassica oleracea* var *italica*	Brassicaceae	Inflorescence	Cancer prevention, cholesterol reduction reducing allergic reaction and inflammation, heart health
17	Mula	Radish	*Raphanus sativus* L.	Brassicaceae	Roots	Liver and gall bladder trouble
18	Amita	Papaya	*Carica papaya* L.	caricaceae	Fruits	Burn injury, ringworm, pimples, sore eyes Jaundice, antifertility, liver disorder and constipation.
19	Lai-jabori	Heart leaf drymery	*Drymaria cordata*	Caryophyllaceae	Whole plant	Sinusitis

20	Morolia sak	Common chick weed	*Stellaria media*	Caryophyllaceae	Whole plant	Piles,
21	Beet	Beet	*Beta vulgaris* L.	Chenopodiaceae	Roots	Anemia and blood purifier
22	Jilmil sak	Lamb's quarters	*Chenopodium album*	Chenopodiaceae	Tender shoots	Constipation and cough
23	Paleng sak	Spinach	*Spinacea oleraua*	Chenopodiaceae	Leaves	Blood purifier
24	Kolmow sak	Swamp cabage	*Idomaea aquatic* Forsk	Convolvulaceae	Tender shoots	Diabetes, prickly heat
25	Kumura	Ash gourd	*Benincasa hispida* (Thumb.) cong	Cucurbitaceae	Fruits and seeds	Fruits are good for jaundice, diabetes and chronic dysentery
26	Kunduli	Ivy gourd	*Coccinia grandis*	Cucurbitaceae	Fruits	Diabetes
27	Tinyah	Cucumber	*Cucumis sativus* L.	Cucurbitaceae	Fruits	Diuretic and kidney stone
28	Ronga lau	Pumpkin	*Cucurbita maxima*	Cucurbitaceae	Tender shoots and fruits	Eye problem
29	Jati lao	Bottle gourd	*Lagenaria siceraria*	Cucurbitaceae	Tender shoots and fruits	Burn injury burn injury, pox, gastritis
30	Jika	Ribbed gourd	*Luffa acutangula*	Cucurbitaceae	Fruits	Liver problem night blindness
31	Tita kerela	Bitter gourd	*Momordica charantia* L.	Cucurbitaceae	Fruits	Diabetes and piles
32	Bhat kerela	Sweet gourd	*Momordica cochinchinensis*	Cucurbitaceae	Fruits	Cough and chest pain
33	Ou-tenga	Elephant apple	*Dillenia indica* L.	Dilleniaceae	Fruits	Diabetes, dysentery, flatulence and constipation

34	Doron bon	Mother wort	*Leucas plukenetii*	Lamiaceae	Tender shoots	Sinusitis, pain killer, eczema, digestion
35	Bhendi	Ladys finger	*Abet mosehus esculantus*	Malvaceae	Fruit	Mucilage of the fruit and seeds are used in gonorrhea, thyroid
36	Tengamora	Roselle	*Hibiscus sabdarifolia* L	Malvaceae	Leaves and fruits	Stomach ailments
37	Lofa sak	Mellow	*Malva verticillata* L	Malvaceae	Leaves	Stomach ailments
38	Sajina	Drum stick	*Moringa oleifera* Lamk	Moringaceae	Leaves, flowers and fruits	High pressure, pox, measles and skin diseases
39	Athia-kol	Seeded banana	*Musa balbiciana* Colla	Musaceae	Tender sucker and inflorescence	Uric acid anemia and constipation
40	Kach kol	Vegetable banana	*Musa paradisiacal* L	Musaceae	Fruits	Diarrhea
41	Ponounowa	Spreading hog-weed	*Boerhaevia diffusa* L	Nyctaginaceae	Whole plant	Good for urinary troubles, anemia asthma, stomach troubles, gonorrhea, bronchitis, enlarged liver, dyspepsia and emetic
42	Tengesi-tenga	Indian sorrel	*Oxalis corniculata* L	Oxalidaceae	Whole plant	Dysentery, diarrhea scabies and eczema

43	Motor mah	Garden pea	*Pisum sativum* L.	Papilionaceae	Tender shoots and seeds	Emollient on face and measles
44	Methi sak		*Trigonella foenum-grecum* L.	Papilionaceae	Leaves	Useful for diabetes
45	Modhu-soleng	Red sank	*Polygonum microcephal lum* D .Don	Polygonaceae	Tender shoots	Dysentery
46	Bhedai-lota	Chick weed	*Paederia foetida*	Rubiaceae	Tender shoots and leaves	Dysentery, diarrhea, abdominal pain, flatulence, diarrhea and dysentery
47	Mosondori	Chameleo n herb	*Houttuynia cordata* Thumb	Sauraceae	Leaves	Flatulence, diarrhea and dysentery
48	Brahmi	Thyme leaved gratiola	*Bacopa monnieri*	Scrophulariaceae	Whole plant	Useful in epilepsy and hoarseness, bronchitis in children, cough, nerve disorder, brain tonic and blood purifier
49	Tikoni-borua	Prickly-ivys	*Smilax zeylanica*	Smilacaceae	Stem and tender shoots	Diabetes and useful as blood purifier
50	Bilahi	Tomato	*Lycopersico n esculentum* Mill	Solanaceae	Fruit	Useful for diabetes and cancer

Table 2. List of families along with number of occurrence

Sl.no	FAMILIES	NUMBER OF OCCURRENCE
1	Amaranthaceae	4
2	Apiaceae	3
3	Araceae	5
4	Asteraceae	1
5	Athyriaceae	1
6	Basellaceae	1
7	Brassicaceae	2
8	Caricaceae	1
9	Caryophyllaceae	2
10	Chenopodiaceae	3
11	Convolvulaceae	1
12	Cucurbitaceae	8
13	Dilleniaceae	1
14	Lamiaceae	1
15	Malvaceae	3
16	Moringaceae	1
17	Musaceae	2
18	Nyctaginaceae	1
19	Oxalidaceae	1
20	Papilionaceae	2
21	Polygonaceae	1
22	Rubiaceae	1
23	Saururaceae	1
24	Scrophulariaceae	1
25	Smilacaceae	1
26	Solanaceae	1

DISCUSSION

Today about 4.4 billion people comprising 80 percent of world's population very on plants as their primary sources of medicine. Our country India is also inhabited by over 550 tribal communities belonging to 227 ethnic groups constituency 7.7 percent of the entire population about 10,000 plants are traditionally used all over the country in various purpose (Geol 2009).

The people of Assam have developed a rich ethno medical tradition (Saikia *et al* 2006)| and have an abundance of medicinal plants known to the native people (Asati and yadav 2004, Borthakur 1997). The vegetable which are used by the people have medicinal values(Das 2008, Dutta 2013, Khanikar 2001, Konwar 2013, Kalita 2017). In my present study also 50 plants species belongings to 26 families are found to be

used by the people of different communities from various types of ailments and these plants have indicated their potential medicines properties. Some of the common ailments that are controlled and curved are asthma , anemia cough, diabetes, diuretic dysentery dyspepsia, dysmenorrheal, eczema, eye problem, gall bladder stone, gastritis, high pressure, jaundice, kidney stone, piles, rheumatism, scabies, sinusitis, skin disease, stomach problem , thyroid, tonsillitis, uric acid etc.

CONCLUSION

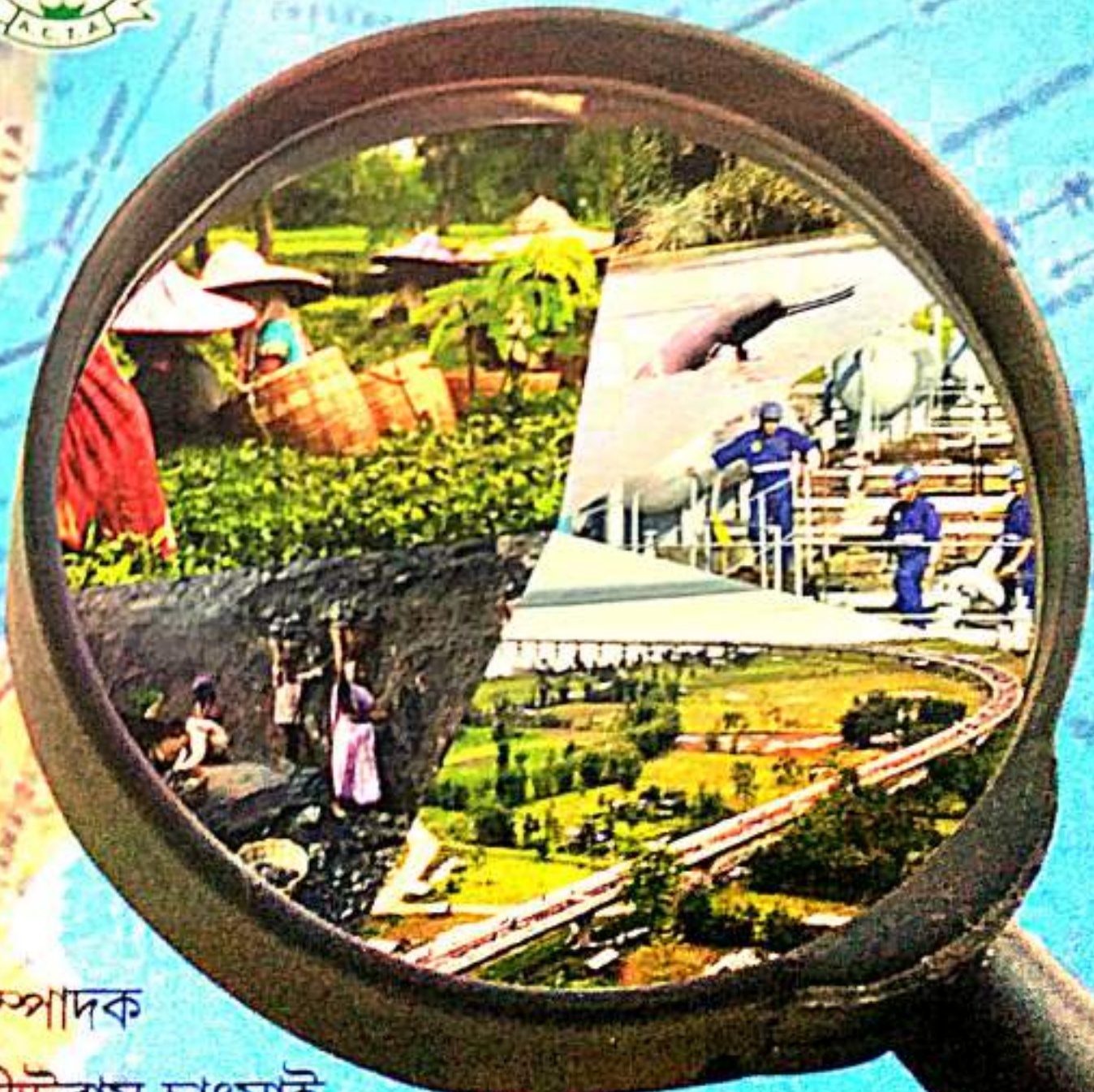
1. Tinsukia District is an inhabitant of different communities people.
2. The people of all communities consume vegetables in their every meal.
3. Vegetables are consumed either as boil or as curry or fry. Tomato, cucumber, carrot and beet also consumed as salad i.e. raw.
4. Vegetables are low in calories and fats but contain good amount of vitamins, mineral nutrients, antioxidant.
5. All the green, yellow, orange vegetables are rich sources of calcium, magnesium, potassium, iron, beta-carotene, vitamin, B-complex, vitamin-C. Vitamin A and vitamin K.
6. Vegetables are the store house of many antioxidants. These health benefiting phyto-chemical compounds protect the human body from oxidant stress, diseases and cancers.
7. Additionally, vegetables are packed with soluble as well as insoluble dietary fibre such as cellulose; mucilage, hemi-cellulose, pectin etc. These substances absorb excess water in the colon, retain a good amount of moisture in the fecal matter and help its smooth passage out of the body. Thus sufficient fibre offers protection from conditions like chronic constipation, colon cancer, irritable bowel syndrome and rectal fissures. ❑

References :

- Asati BS and Yadav DS (2004). Diversity of Horticultural crops in North Eastern regions ENVIS Bulletin: Himalaya Ecology 12: 1-11.
- Barua I and Phukan R (190) "Socio – Religious aspects of health among Sonowal Kachari". The Eastern Anthropologist, 55:4.
- Goel AK ((2009). Conservation value addition and commercialization of traditional knowledge in India . Paper presented in national Conference of Recent Trends in biodiversity Researches. Organized by Department of Life Science, Assam University, Silchar in collaboration with society of Ethno botanists Luckhnow and Association of Plant Taxonomy , Dehradun on 16 -18 March.
- Kalita D (2017). "ETHNOBOTANY AND MEDICINAL PLANTS" Published by Kaustabh Prakashan ISBN 978-93-82283-62-1
- Kanjilal UN, Kanjilal PC, Das A, De RN, Bor NL,(1934-40). *Flora of Assam* Vol I – VI, Publication Division, Govt. of Assam, Shillong, India.
- Konwar BK (2013). "MEDICINAL PLANT REPERTOIRE" A Perspective Biogeographical Gateway of India, Published by Nagaland University ISBN: 978-81759-6902-5

প্রত্যবেক্ষা

অসম কলেজ শিক্ষক সংস্থা



সম্পাদক
জীউৰাম চাংমাই
ডঃ ৰত্ন গোপাল গগৈ

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সম্পাদনা সমিতি

মুখ্য উপদেষ্টা

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উপদেষ্টা

ড' দেৱ কুমাৰ বৰা, ড' দেৱজিৎ সিংহ, ড' অৰুণ চন্দ্ৰ দত্ত,
ড' বাজীদ চৌধৰ, অধ্যাপক হিমাংশু মৰল, অধ্যাপক পার্থ কুমাৰ নৱহ

সম্পাদকদ্বয়

অধ্যাপক জীউৰাম চাংমাই, ড' ৰত্ন গোপাল গগৈ

সহকাৰী সম্পাদক

অধ্যাপক বৈকুণ্ঠ দাস

সদস্য/সদস্যা

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বেঠাৰ অংকন

অধ্যাপক হেমন্ত দেউৰী

প্রকাশক

অধ্যাপক তুলসী দাস, সাধাৰণ সম্পাদক
অসম কলেজ শিক্ষক সংস্থা
পাঞ্চজন্য বুকছ
সৰস্বতী ৰোড, পাণবজাৰ, গুৱাহাটী-৭৮১০০১

মূল্য : ৫০০.০০ টকা
গ্রন্থ স্বত্ব : অসম কলেজ শিক্ষক সংস্থা
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মুদ্রণ

ইণ্ডাষ্ট্রিয়েল প্রিণ্টার্চ, নুনমাটি, গুৱাহাটী-২০
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SONOWAL KACHARIS OF TINSUKIA DISTRICT AND THEIR CULTURE

Dr. Susmita Chakraborty

The Sonowal Kacharis are amongst the Royal Dynastics of the North East part of India. The Sonowal Kacharis from the third largest plain tribe of Assam. This tribe is a branch of the great Bodo-Kacharis of Assam. They are Mongoloid in origin they are mainly found in Tinsukia, Dibrugarh Dhemaji, Lakhimpur and Sivasagar districts of Assam. The total population of this tribe is about 3,50,000. The term Sonowal might have come from the term "Son" meaning gold. The forefathers of the Sonowal Kacharis were engaged in washing and collecting gold particles from the Brahmaputra and its tributaries like the sonwanshiri, the Na-Dihing, the Buri-Dihing and Dhansiri during the Ahom reign of Medieval period. The Sonowal Kacharis are descendants of the 'Hammusa' family.

Tinsukia district is located at the eastern most corner of Assam. The area of Tinsukia district is 3790 sq. km. The ranges of latitude and longitude are 27°23′ N to 27°48% N and 95°22′E to 95°38′ respectively. The attitude is 120m to 123.5m. The climate type is evergreen to monsoonal.

The Sonowal Kacharis are scattered in Tinsukia district. They are found in almost all the places of Tinsukia district. An opinion has been given by Dr. Lila Gogoi that 'Manik', a king of the Sonowal Kacharis, rules 'Sadiya Rajya' sometime back in the 11th or 12th century AD.

The Sonowal Kachari people mainly speak in Assamese. The habitual food of Sonowal Kacharis comprises savoury rice items alongside a variety range of traditional vegetarian dishes. The food habits reflect the unique cultural traits and traditional legacy of the Sonowal people. Sonowal Kacharis also have a habit of taking various light jalpans like Komol Chaul, Chira, Pitha, Chewa Diya Bora Bhat, Chungat Diya Bhat etc. People prepare several indigenous drinks from rice and fruits.

People often prefer to wear colourful tribal outfits, with Dhoti-Kurta and decorated Phulam Gamusa. Weaving is a traditional art handed down through generations among the Sonowal Kacharis. Warm and colourful embroidered hand - woven items such as - Eri-Sadar, Muga-Sadar, Borkapur, Mugar Mekhela. Mugar-Sadar, Kopahi-Mekhela, Kopahi-Sadar, Riha, Dhuti, Gamusa, Tiyoni and Seleng Kapur, make magnificent souvenirs. Sonowal Kachari women always use a 'Tokoya to cover their head. Sonowal Kachari women are very fond of their traditional ornaments, which are - Gam-Kharu, Hansor Mora Kharu, Keru, Thuria, Zangphai, Biri, Kongkon, Dugdugi, Latumoni etc.

The Sonowal Kachari community celebrates its own array of festivals with extreme devotion and enthusiasm. Bihus are the main festival of the Sonowal Kacharis. Festivals, marriages, harvests or just the joy of moment are occasions for the Sonowal Kacharis to burst into dance.

The traditional religion of the Sonowal Kacharis is animistic, though conceptions of a supreme creator and an afterlife are in existence. Nature is seen to be alive with invisible forces, minor deities and spirits with which priests and medicine

men mediate. A portion of Sonowal Kacharis still follow the ancient religion of Animism. According to the principles of animism, the followers worship their ancestors, who are believed to help them from any kind of difficult predicament. Every Sonowal Kachari village has an identical Namghar that-follows strict religious rituals and customs.

Though the Sonowal Kacharis have faith in the Vaishnavas Nam Dharma which is completely against the worship of any other God or Goddess with or without sacrifice, yet they cannot entirely abandon their religious systems. They still continue to hold sacrificial worship to their traditional deities. They have traditional beliefs about some animals, birds and trees which they worship for the welfare of the society. There are two kinds of worship, community worship and household worship. They worship household deities to maintain peace in their family and community worship for the welfare of the society.

Monogamy is the most popular form of marriage but acquiring more than one wife is permissible if the first wife gives her consent to it due to some reasons. The practice of inter-caste marriage is not rare. Though this system of marriage is generally not supported by the parents yet it is seen that there is no hard and fast rule regarding this matter. In case, a Sonowal Kachari girl marries a boy of other caste then their society accept them easily. Nowadays birds price among Sonowal Kacharis is not accepted. In the prsent day society, five types of marriages are performed among them. These are - Santi Biya, Nowa Dhowa or Borbiya, Hom Diya Biya, Gandharba Biya and Rabha Sarakai Diya Biya.

The ethnobotanical lore of the Sonowal Kacharis is very

rich - they have some native plants which are used in their daily life as medicine, food, dye etc. The Sonowal Kacharis are strong believers in traditional herbal medicine and do not advocate alternative forms of medicine such as allopathic homeopathic and ayurvedic medicines. The knowledge of herbs and plants in thier medicinal properties are established and passed down from generation to generation. The people of the Sonowal Kacharis believes that the information of these medicines should be kept secret.

The culture of the Sonowal Kacharis is very rish. They have an unique culture in all respects.

References

1. en. wikipedia.org
2. Sonowal Kacharir Bornomoi Kristi-Sanskriti- Gahin Sonowal

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