

**Abstracts of Theses Accepted for the Award of Post-Graduate Degree  
in the University of Agricultural Sciences, Dharwad**

**DOCTOR OF PHILOSOPHY**

**GENETICS AND PLANT BREEDING**

**Variability, Genetic and Biochemical Studies on Resistance to Shoot Fly in *Sorghum bicolor* (L.) Moench**

M.Y. KAMATAR

2000

MAJOR ADVISOR : Dr. T. SWAMY RAO

The investigation included three experiments viz., (i) the screening of 650 germplasm lines for resistance to shoot fly during two rabi seasons, (ii) genetics of resistance and associated traits during both kharif and rabi seasons, (iii) genetics of biochemical resistance.

Near immunity to high susceptibility was observed in the germplasm indicating polygenic inheritance of resistance. Resistance was relatively stable over seasons depending on shoot fly density. Indian land races possessed stable field resistance. Antixenosis played a major role, though antibiosis was also present in shine Genotypes.

Resistance was governed by both additive and non-additive gene actions. Susceptibility was over dominant in the hybrids during both kharif and rabi seasons. Both additive and non-additive gene actions were evident for seedling height, plant height, glossiness, trichome density, leaf surface wetness, leaf colour, leaf width and leaf droopiness, whereas seedling vigour, grain yield, total chlorophyll, protein, epicuticular wax, tannin and phenols were governed by non-

additive gene action, while additive gene action was evident for total sugars.

None of the hybrids exhibited heterosis for resistance, whereas considerable heterosis was observed for characters associated with resistance. All the resistance traits were positively associated with each other while they were inversely related with susceptibility. Much contribution to deadheart percentage comes from per cent oviposition and least from egg count.

An ideal plant type for resistance must have high seedling vigour; narrow, erect, pale green, glossy leaves; high seedling and plant height; high trichome density on leaves; less leaf surface wetness; high tannin, low total sugars, protein and chlorophyll content in leaves. SPSFR 94022A, SPSFR 94031A, IS 2291, IS 5480, IS 2312, IS 923, IS 2122 and IS 2314 were good general combiners for resistance which also exhibited desirable gca effects for resistance associated traits. Procedures like multiple crossing and recurrent selection are suggested for genetic enhancement of resistance.

**SEED SCIENCE AND TECHNOLOGY**

**Investigations on Seed Technological Aspects in Chilli (*Capsicum annuum* L.)**

BALARAJ, R.

1999

MAJOR ADVISOR : Dr. M.B. KURDIKERI

Field experiments were conducted on chilli cultivars viz., Byadagi kaddi, Dyavanoor local and Byadagi dabba at the Main Research Station, University of Agricultural Sciences, Dharwad during kharif 1997-98 and 1998-99 to study the effect of spacing, mother plant nutrition and growth regulator treatments on crop growth, fruit yield, seed yield and quality. Studies on effect of harvesting stages on fruit and seed quality of chilli cultivars were also conducted. The seed quality parameters were tested in the Department of Seed Science and Technology, University of Agricultural Sciences, Dharwad.

The results of the study indicated that with the increase in spacings (60 x 60 cm to 90 x 90 cm) and fertilizer levels (100:50:50 kg NPK/ha to 150:75:75 kg NPK/ha) there was significant increase in per plant total number of fruits (68.13g to 112.12 g), fruit yield (40.73 g to 100.95 g) and seed yield (19.58 g to 51.38 g). But highest per hectare fruit yield (1357 kg/ha) and seed yield (675 kg/ha) were recorded in closer spacing at higher fertilizer level followed by medium spacing (1238 and 623 kg/ha).

Among the pickings, the higher seed quality parameters viz., germination percentage, seedling length, seedling vigour index, seedling dry weight and field emergence percentage with low EC of seed leachate were recorded from first three picking seeds obtained from wider (90 x 90 cm) and medium (75 x 60 cm) spacing coupled with 150:75:75 kg NPK/ha.

The maximum number of fruits per plant, number of seeds per fruit, fruit yield and seed yield per plant and per hectare were noticed with 20 ppm NAA, 1 ppm, 2,4-D followed

by 50 ppm GA<sub>3</sub> and 10 ppm N sprayed at 35 and 50 days after transplanting.

The plants sprayed with 20 ppm NAA, 1 ppm 2,4-D and 50 ppm GA<sub>3</sub> at 35 and 50 days after transplanting recorded higher seed quality parameters in all the first three pickings.

In all the three varieties, the seeds obtained from full red colour fruits recorded the higher 1000 seed weight, germination percentage seedling length, seedling vigour index, seedling dry weight and field emergence percentage with low EC of seed leachate.

## SOIL SCIENCE

### Phosphorus Dynamics in Vertisols under Sunflower-Maize-Bengalgram Cropping Sequence

SHREEPAD BHAT

1999

MAJOR ADVISOR : Dr. V.S. DODDAMANI

An investigation was carried out to know the effect of single superphosphate (SSP), Mussoori rock phosphate (MRP), 25 per cent acidulated rock phosphate (PARP) and their combination and P solubilisers viz. FYM, pyrite and P solubilising microorganisms (PSM) on P transformation, available P, crop yield under sunflower-maize-bengalgram cropping sequence in Vertisols of Water Management Research Centre, Belavatagi, during 1996-97 and 1997-98. An incubation study with 28 treatment combinations was also conducted to assess the extent of release of P with time.

Results of incubation study revealed that recovery of P from SSP and SSP + PARP at 30, 60 and 90 days was 11.1, 11.3 and 11.2 and 9.2, 8.3 and 9.1 per cent, respectively. Recovery of P from MRP at corresponding period was 1.6, 1.4 and 4.4 per cent. Incorporation of FYM increased available P followed by pyrite and PSM at 30 days of incubation.

Available P at harvest of 3 crops with SSP was higher.

At harvest of second and third crop, MRP recorded 9.0 and 30.0 per cent higher available P over P control. Available P due to solubilisers was in the order of FYM>Pyrite>PSM>control.

Yield of sunflower did not differ due to P sources and solubilisers. The highest (27.07 q/ha) and lowest (24.42 q/ha) yield of maize was registered with SSP and MRP, respectively. The yield of bengalgram was also the highest (16.74 q/ha) due to residual effect of SSP and was on par with all the P sources except MRP and P control. Among the solubilisers higher grain yield of crops was observed with FYM followed by pyrite and PSM. The Ca-P was higher in MRP and PARP and with their combination with other P sources and was because of di and tri-calcium phosphate present in MRP and less solubility of Ca-P in alkaline soils. SSP and its combination with other P sources increased Al-P and Fe-P, which are well correlated with yield of crops. On the basis of crop yield available P it is inferred that the next best alternative treatment for increased crop yield and available P was SSP + PARP.

## AGRICULTURAL ENTOMOLOGY

### Investigations on Fruit Borer *Helicoverpa armigera* (Hubner) in chilli

K. SHIVARAMU

1999

MAJOR ADVISOR : Dr. K.A. KULKARNI

Studies were carried out during 1995-98, at the Department of Agricultural Entomology, University of Agricultural Sciences, Dharwad. A field survey was conducted

during 1995-97 at Dharwad and Belgaum districts. In Dharwad district the chilli fruit borer *Helicoverpa armigera* (Hubner) damage was highest (35.91%) on Byadagi dabbi with 30.00

## Abstract of Theses

per cent of whitening of fruits, compared to Belgaum district where the borer damage was 13.32 per cent with 7.98 per cent of whitening.

Biology of fruit borer, *H. armigera* was studied in the laboratory, incubation period was 3.30 to 4.50 days, larval period was 17 to 13 days and pupal period was 9 to 20 days during different seasons of the year. The economic injury level for *H. armigera* in chilli was three larvae per two plants. Evaluation of different pesticides against *H. armigera* in chilli revealed that borer damage was least with carbaryl (6.66%), followed by Dipel (7.33%), Achook (9.60%) and neem seed kernal extract (9.77%).

Screening of chilli genotypes against *H. armigera* indicated that the genotypes like SL-37, Arka lohit, Puri red,

Dewarhippangi and H.C.-28 were less susceptible to fruit borer damage which were found promising. Marigold was ideal trap crop in the management of fruit borer in chilli in the row proportion of 18:1 and 20:1. Sequential spray of Achook, Dipel and carbaryl was found effective in the management of fruit borer with marigold as trap crop.

*In vitro* studies indicated that *Trichogramma chilonis* Ishii parasitized the eggs laid on chilli fruits to the extent of 45.22 per cent. In integrated pest management of fruit borer, the module-1 which comprised of 18:1 chilli : marigold proportion and sequential application of Achook, Dipel and carbaryl, recorded less egg and larval load with less fruit damage and highest yield with a Benefit : Cost ratio of 3.8:1 compared to other modules.

## AGRICULTURAL ECONOMICS

### An Economic Analysis of Silk Reeling Units in Karnataka

M.G. KERUTAGI

1999

MAJOR ADVISOR : Dr. K.N.R. SASTRY

Karnataka is leading in mulberry silk production. The focus of the study was on economic analysis of silk reeling units. Multistage sampling procedure was adopted and totally 250 samples were selected. Relevant data collected from primary and secondary sources were analysed through tabular, cluster, orthogonal polynomial regression, log-linear regression, frontier function and decomposition techniques.

The growth analysis of charka and cottage basins in Karnataka showed an increasing trend upto 1996, then onwards showed declining trend. Charka and cottage basins in Bangalore and Kolar districts exhibited constant increasing trend. Mysore district showed a unique pattern of declining trend in the later part of 1990s.

Renditta was 8.82, 9.57 and 9.02 kg in charka, cottage and multi-end basins respectively. The share of cocoon cost to the total cost was >85 per cent in these systems. Sources of fuel used in reeling were neither eco-friendly nor cost

effective. Net returns per kg of silk reeled were Rs.47.21, Rs.146.18 and Rs.185.28 in these systems, respectively. Medium charkas (4-5/unit) and cottage basins (6-8/unit) were found optimum. The proportion of women labour used was more in all the systems. Labour employed per kg. of silk reeled was 1.07, 1.45 and 1.34 man-days in charka, cottage and multi-end basins, respectively.

The value addition (72-18%) in cottage basin reeling over charkas was mainly due to technique of reeling (57.56%) and the remaining attributed for the use of inputs (14.62%). The package for introduction of silk reeling in new sericulture area suffers from lack of skilled labour, infrastructure, financial support and correct information about the programmes. The conditions under which children worked were most pathetic. Present laws and their efficiency of implementation have not solved the problem of child and women labour exploitation, hence needs the thorough investigation.

## HORTICULTURE

### Effect of Planting Date, Density and Nutrition on Growth and Yield of *Solanum viarum* Dunal

P.M. GANGADHARAPPA

2000

MAJOR ADVISOR : Dr. G. S. SULIKERI

Field experiments were carried out to study the effect of planting date, density and nutrition on growth and yield of *Solanum viarum* Dunal during 1997-98 and 1998-99 at the Kittur Rani Channamma College of Horticulture, Arabhavi. Among the dates of planting, July planting enhanced the vegetative growth and also the fresh and dry berry yield and yield attributes in both the years. Of the three spacings, wider spacing of 60 x 60 cm reduced the plant height and number of leaves per plant, but increased the plant spread, number of branches and stem girth. Although, wider spacing (60 x 60 cm) increased fresh and dry berry yield per plant, on hectare basis closer spacing of 60 x 30 cm with increased plant population resulted in increased fresh and dry berry yield.

The treatment combination of July planting with 60 x 30 cm followed by October planting spaced at

60 x 30 cm resulted in higher berry yield per hectare in both the years.

Application of 120 kg nitrogen and 40 kg phosphorus per hectare increased the growth parameters and fresh and dry berry yield per hectare as well as yield attributes, viz., berry bearing nodes and number of berries per plant. While, 80 kg nitrogen per hectare influenced the berry size, seed and pericarp weight per dry berry and 100 seed weight. Phosphorus application @ 40 kg/ha also resulted in higher berry size and 100 seed weight.

Interaction of nitrogen and phosphorus also had significant effect on fresh and dry berry yield. The pooled data indicated that the plants supplied with 120 kg nitrogen and 20 kg phosphorus per hectare produced the highest berry yield.

## MASTER OF SCIENCE

### AGRONOMY

#### Studies on Intercropping of Pigeonpea in Rainfed Cotton

B.C. KOLHAR

2000

MAJOR ADVISOR : Dr. H. L. HALEMANI

A field experiment was conducted on medium deep black soil under rainfed condition at the Agricultural Research Station, Dharwad Farm, during the kharif season of 1998-99 to study the effect of row proportions of cotton and pigeonpea (2:1, 3:1, 4:2 and 6:2) and pigeonpea population (50 and 75 per cent of sole crop) on intercropping systems. Sole crops of cotton and pigeonpea were also raised.

Sole crop of cotton and pigeonpea realised significantly higher yield than intercropping system. The seed cotton yield produced under 6:2 row proportion (1059 kg/ha) was significantly more than 2:1 (664 kg/ha), 3:1 (728 kg/ha) and 4:2 (823 kg/ha) row proportions. On the contrary, the seed yield of pigeonpea under 2:1 (1464 kg/ha), 4:2 (1463 kg/ha) and 3:1 (1421 kg/ha) row proportions were significantly higher than 6:2 row proportion (992 kg/ha). However, pigeonpea population levels and interaction effects had no significant effect on the cotton and pigeonpea yield. Based on Area Time Equivalent (ATER) Ratio, cotton and pigeonpea intercropping found to be 18 per cent more efficient in utilising land area and time than of the sole crops.

Mean of intercropping systems, intercropping of cotton with pigeonpea has recorded the lower net returns (Rs. 17,236/ha) and B:C ratio (1.04) as compared to sole cotton (Rs. 20,380/ha and 1.40, respectively). The net return and B:C ratio derived from 4:2 and 6:2 were higher over 2:1 and 3:1 row proportions. Among the cropping systems, highest gross and net returns were obtained with intercropping of cotton and pigeonpea with 6:2 row proportions at 100:50 per cent plant population followed by intercropping system with 4:2 row proportions at 100:75 per cent plant population and sole cotton. These systems gave more gross, net returns and B:C ratio than sole pigeonpea.

From the results of this investigation it is concluded that sole cotton as well as intercropping of cotton and pigeonpea with 6:2 proportions at 100:50 per cent plant population were better cropping systems than sole pigeonpea under rainfed condition.

## Abstract of Theses

### GENETICS AND PLANT BREEDING

#### Variability and Early Generation Selection Response for Productivity Related Traits in Safflower (*Carthamus tinctorius* L.)

INDUDHAR HIREMATH

2000

MAJOR ADVISOR : Dr. R.L. RAVIKUMAR

Two hundred and ninety six progenies of safflower derived from 10 different segregating populations were studied for variability and early generation selection response for productivity related traits. The mean squares due to genotype were significant for majority of the characters in all the progenies. The highest GCV and PCV were observed for seed yield, test weight and number of seeds per capitulum. The GCV and PCV in different progenies suggest that, the variability generated depends to a large extent on the parental genotypes and the trait under consideration. High heritability coupled with high genetic advance was observed for test weight and number of seeds per capitulum in all the groups of progenies suggesting the additive gene action for these traits.

The seed yield had strong and positive association with number of capitula per plant, number of branches and test weight and negative association with oil content and number of seeds per capitulum. On the other hand, oil content

was positively associated with number of seeds per capitulum and capitulum diameter. Path analysis indicated that, number of capitula, test weight, number of seeds per capitulum and capitulum diameter had higher direct effect on seed yield. Hence, combination of these four characters in optimum proportion would constitute a desirable plant type for high oil yield.

Intergeneration correlation and heritability estimates revealed that, seed yield is highly influenced by environmental conditions. Hence, early generation selection for seed yield may be based on component traits such as test weight, number of seeds per capitulum, capitulum diameter and number of capitula per plant.

The gaint, bushy and basal branching mutants did not breed true. The spinelessness and white flower colour appeared to be governed by recessive genes. A few progenies with high oil yield have been identified for further testing.

#### Production and Evaluation of Sesame Hybrids

S.B. MUDAGAL

1999

MAJOR ADVISOR : Dr. R. LOKESHA

The experiment was undertaken to know the *per se* performance, magnitude of heterosis and combining ability with respect to yield and yield attributing characters in sesame. A diallel set was obtained by crossing eight selected parents in all possible combinations. Fifty six hybrids along with their parents were evaluated in a randomised block design during Kharif 1999 at College of Agriculture, Raichur.

Hybrids showed highly significant differences for the characters studied. The GCA to SCA ratio was <1.00 for all the characters studied indicating the presence of predominant action of non-additive gene action.

Significant *per se* performance and standard heterosis was recorded in desirable direction in several crosses. The

crosses Davanagere x Kanakapura Locals, E-8 x TRS-9, DS-7 x E-8, E-8 x DS-7, Kanakapura Local x E-8 expressed heterosis to the extent of 370, 360, 309, 260 and 208 per cent over the best parent for seed yield and are found promising for commercial exploitation.

Among the parents, Kanakapura local, E-8 and DS-7 are good general combiners for yield and yield attributing characters. The crosses Davanagere x Kanakapura Locals, E-8 x TRS-9 and DS-7 x E-8 exhibited desirable sca effects and higher *per se* performance for seed yield per plant and other yield related characters. These crosses may also be tested for cultivation in paddy fallows of Tungabhadra Project Area on a large scale.

AGRICULTURAL ENTOMOLOGY

Prevention of Cross Infestation by *Sitophilus oryzae* Linn. and  
*Rhyzopertha dominica* Fab. in Stored Wheat

BASWARAJ S. BIRADAR

2000

MAJOR ADVISOR : Dr. J. S. AWAKNAVAR

Studies on the treatment of gunny bags using botanicals and insecticides was carried out in four different ways such as single dip application, single surface treatment, bimonthly treatment and monthly treatments against *S.oryzae* and *R.dominica*.

Among the four different methods, single dipping was found to be effective in which sweet flag (5%) claimed 100 per cent mortality of *S.oryzae* and *R.dominica* followed by decamethrin (0.005%) with a mortality of 97.12 and 96.30 per cent, respectively at 30 DAS. Residual toxicity of sweet flag and decamethrin lasted effectively upto 120 DAS. This method worked out to be economical however the protectants were effective only for few months.

Next best method was single application method which was found to be effective, wherein decamethrin (0.005%) caused 100.00 and 98.10 per cent mortality against *S.oryzae*

and *R. dominica*, respectively at 30 DAS. However, there was decline in the toxicity level 90 DAS. Though the cost worked out to be cheap but fails to give protection over periods.

In bimonthly application method, sweet flag (5%) had 99.79 per cent mortality of *S.oryzae* followed by decamethrin (0.005%) with a mortality of 99.43 per cent while cent per cent mortality was observed in sweet flag and decamethrin against *R.dominica* upto 240 DAS. This method worked out to be costlier, but effective over a period of storage. Minimum grain weight loss of 30.50 and 35.90 per cent at 240 DAS in sweet flag and decamethrin, respectively.

Monthly application is effective throughout the storage period, wherein sweet flag (5%) caused cent per cent mortality against *S.oryzae* and *R.dominica*, respectively at 30 DAS. However, the grain weight loss was found to be minimum with 30.89 and 27.90 per cent, respectively at 240 DAS.

HORTICULTURE

Standardization of Production Techniques in Bhendi

MOHD. SHAKEEL AHMED

1999

MAJOR ADVISOR : Dr. P. NARAYANA REDDY

Field experiments were conducted at Regional Research Station, Raichur during rabi 1998-99 to study growth, yield and post-harvest quality parameters in bhendi cultivars as by fertilizers, farm yard manure, vermi compost and growth regulators in two separate experiments.

Among different varieties, Parbhani Kranti recorded maximum plant height, number of leaves, number of nodes, internodal length, dry matter content of plants, fruit weight, number of fruits, yield and uptake of N, P and K followed by Arka Anamika and Pusa Sawani. For dehydration purpose, Arka Anamika was found to be superior when compared to other varieties.

Manurial treatments exerted significant effect on growth, yield and quality parameters of bhendi. Plot receiving vermi compost (2.5 t/ha) with full dose of recommended

fertilizer (125:62.5:62.5 Kg NPK/ha) recorded maximum growth, yield and uptake of NPK followed by treatment receiving vermi compost (2.5 t/ha) with half dose of recommended fertilizer as compared to those receiving either farm yard manure, vermi compost or chemical fertilizer alone.

The maximum net return was obtained in treatment  $V_2F_2$  (Parbhani Kranti with vermi compost + 100% RDF) which was marginally higher than  $V_2F_7$  (Parbhani Kranti with vermi compost + 50% RDF) while the benefit cost ratio was higher in  $V_2F_7$  (4.45) than  $V_2F_2$  (4.17).

The highest fruit yield was recorded in CCC 150 ppm (seed soaking + foliar spray) at 20 and 40 DAS which was statistically on par with CCC 100 ppm as foliar spray at 20 and 40 DAS. However, the maximum benefit cost ratio was recorded in CCC 100 ppm foliar spray at 20 and 40 DAS.

**AGRICULTURAL MARKETING AND AGRI BUSINESS MANAGEMENT**

**Business Performance of Co-operative Oil Mills - A Management Appraisal**

ASHRAF ALI, F

2000

MAJOR ADVISOR : DR. BASAVARAJ BANAKAR

India is the third largest oil economy in the world. Indian vegetable oil industry undertakes number of activities ranging from kernel crushing to Vanaspathi manufacturing. All the three sectors (co-operative, private and public) of this industry are hit with problems but the co-operative sector is the worst in its sufferings. Therefore business performance analysis of the co-operative oil mills is highly significant. Two oil mills, one each under large scale and medium scale, from the Gadag district were considered for the study.

The primary data, for 1998-99 was collected through a pretested questionnaire while the secondary data, from 1994-95 to 1998-99, was collected from various records of the mills. Data were analysed using percentages, financial ratios and comparative rating methods

The study revealed that capital investment increased with size of the unit. The patterns for procurement of raw materials and marketing of finished products were similar in

both mills. In processing costs, the fixed costs increased with increase in size of the unit while variable costs decreased with increased capacity utilization. The cost of carrying the inventory was influenced by quantity and type of inventory held by the unit. The benefit cost ratio of processing was 0.92 in the large scale unit and 1.35 in the medium scale unit.

The financial indicators revealed that the performance of medium scale unit was just satisfactory while that of large scale unit was far below the satisfactory limits. The problems faced by both the mills were identical (inadequate raw materials, infrastructural facilities and high processing costs) and severity of problem varied with units. Therefore, upgradation of infrastructural facilities and implementation of strategies to strengthen raw material base, inventory management and financial management, coupled with policies to cut tax charges is necessary to improve the performance of co-operative oil mills.

**Input Purchase Management-A case of  
Nandi Co-operative Sugar Factory Limited, Krishnanagar, Bijapur**

KASHIPATI PATIL

2000

MAJOR ADVISOR : Dr. H.S. VIJAYAKUMAR

To identify the, internal and external factors influencing the performance of the management in procuring cane and to suggest ways to improve average seasonal sugar recovery and capacity utilization. The Nandi Co-operative Sugar Factory Limited, Krishnanagar, Bijapur was selected for the study. Primary and secondary source of data were utilised for the study. The data pertains for the period 1991-92 to 1997-98.

Fertilizers worth Rs.200 lakhs and cane sets worth Rs.75.56 lakhs were supplied to the needy farmers by the factory. The total sugarcane area planted under plant and ratoon canes was highest in 1997-98 (8647 and 8890 acres, respectively). Further, it was found that COC671 variety covered maximum average area (88.21%).

The average cane price index of the factory was 84.70 per tonne. The average price paid by the factory in installment constituted as much as 68.17 per cent of the total cane bill. The average quantity of extraneous matter deducted from the total quantity of procured cane was 1.44 per cent. Staling of

cane for every two hours delay in crushing showed a loss of sugar recovery by about 0.02 per cent. Gangs were hired on contract basis to harvest the crop and an advance of Rs. 60,000 was paid for the purpose.

Sugarcane area harvested on an average, was maximum during December and January. The total proportion of available cane area under sugarcane was 16184, 11226 and 11618 acres, respectively during 1994-95, 1995-96 and 1996-97. The average total cane area covered for procurement of sugarcane over the years was 11045 acres from the operational area and 1361 acres from the outside area. The average total sugarcane area utilized for purposes other than supplying to the factory was 1964 acres.

The average working period during the entire season was 4198.49 hours, with an average number of 175.33 days. Average total hours of crushing was 2857.01 hour. The average capacity utilization of the factory was 61.73 per cent over the years.

FOODS AND NUTRITION

Nutritive Value and Acceptability of *Luffa Tuberosa* Roxb (*Karchikai*)

VEENA S. MASTI

2000

MAJOR ADVISOR : PUSHPA BHARATI

The present investigation was undertaken to assess the physical characteristics, nutritional composition, storage stability of fresh *Karchikai* effect of processing on nutrients, development of value added products and evaluation of developed products in terms of biochemical changes, shelf life and acceptability. The *Karchikai* fruit was 2.6 cm long and 0.95 cm broad with a diameter of 1.85 cm at the broadest. The fresh *Karchikai* contained 84.53 per cent of moisture, 160.77 mg per 100 g of ascorbic acid and 224.9 µg per 100 g of β-carotene on fresh weight basis. The reducing, non-reducing and total sugar content was 0.48, 0.22 and 0.7 per cent, respectively. The *Karchikai* had 3.26, 1.61, 5.63, 1.25 and 3.72 per cent of protein, fat, crude fibre, ash and carbohydrates, respectively; and 35.130 and 5.5 mg per 100 g of calcium, phosphorus and iron, respectively on dry weight basis. The shelf life of fresh vegetable was extended upto seven days when covered tightly with a muslin cloth and refrigerated. The

loss of nutrients was minimum with pressure cooking and maximum with roasting. Roasted *Karchikai bhaji* scored between highly acceptable and acceptable while, that prepared by pressure cooking scored between fairly acceptable and poorly acceptable. The moisture content and peroxide value of chips and *balaka* were found to increase significantly with the progress of storage. *Karchikai* chips and *balaka* on frying were acceptable throughout the storage period. The lemon treated chips received slightly lower scores for appearance and colour while, curds treated chips and those treated with salt alone were scored higher both by trained judges and consumers. *Balaka* was scored between highly acceptable and acceptable throughout the storage period of six months. The moisture and ascorbic acid contents of *Karchikai* pickles decreased significantly while, titrable acidity and free fatty acids increased throughout the storage period. The lemon based pickle was accepted better than vinegar based, both at laboratory and consumer level. The former had higher bacterial counts than latter. The pickles did not harbour any fungi.

VETERINARY PATHOLOGY

Immuno Pathological Studies of Aflatoxin in Pregnant Rabbits

BADARIPRASAD DESHPANDE

2000

MAJOR ADVISOR : Dr. D.G.K.RAO

The study was undertaken to find out the immunological and histological changes in the lymphoid organs of aflatoxin treated pregnant rabbits.

In this study, 21 mature female rabbits 9 male rabbits were included. The female rabbits were divided in three groups. After confirming the pregnancy, the group II and group III were given feed containing aflatoxin at 1 ppm and 3 ppm respectively.

Clinically aflatoxin treated rabbits showed symptoms like anorexia, dullness reduced body weight and emaciation. Haematological study in treated rabbits showed decrease in erythrocyte count Packed cell volume, haemoglobin values and total leukocytic counts. Differential leukocytic counts revealed neutrophilia and lymphocytopenia.

The treated rabbit showed increased serum enzyme levels, prolonged bleeding time and clotting time and reduced

serum protein levels. The postmortem examination of treated groups revealed trannish discolouration of liver with inspissated bile in gall bladder, atrophied spleen and congested caecum (appendix).

On histological examination liver showed peripotal bile duct proliferation, microthrombi formation, hepatocytomegaly, karyomagly and fibrosis. The histological lesion in lymphoid organ spleen, shoed depletion of lymphocytes, haemorrhages and scanty germinal centres. The caecum (appendix) revealed vacuolation, lymphocytic with formation of epitheloid cells. The lesions were dose dependent. The humoral immune response were lower in treated groups which were evaluated by quantification of immunoglobulins by radial immunodiffusion and tuberculin test respectively.

These results showed that aflatoxin causes immunosuppression in pregnant rabbits.

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