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Postharvest Management in Agriculture

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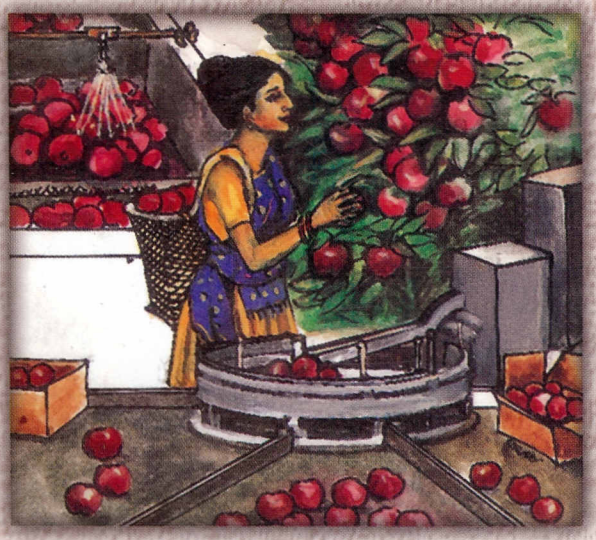

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Postharvest Management in Agriculture
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CONTENTS

1193 DUTTA, SK; NEMA, VK; BHARDWAJ, RK. 1992. **Deep-bed drying of gram**. *International Conference on Agriculture Engineering. AgEng '92.* (Uppsala (Sweden): 12th: 1992: 1-4 Jun). Jordbrukstekniska Inst. p. 224-225.

1194 GANGWAR, AC; YADAV, A. 1986. **Economic analysis of pulses (gram) in Haryana State**. *Research Bulletin, Dept. of Agricultural Economics, Haryana Agricultural Univ.*, No. 17, 69 p.

The study investigates the causes of poor performance and analyses the constraints inhibiting the cultivation of pulses, with special reference to gram (chickpeas), in Haryana. Both primary and secondary data for 1983/84 to 1984/85 were used. On the basis of the highest area under pulses, six tehsils were selected for study from Sirsa, Hisar, Bhiwani, Mahendergarh and Rothak districts. There was a decreasing trend in area of chickpeas, urd, lentils, moong and total pulses. The study of constraints inhibiting the attaining of higher yields of chickpeas indicates that moisture at time of sowing and rainfall during the growth of the crop are two important agroclimatic constraints. During the 14 year period 1970/71 to 1983/84 the arrivals during the post-harvest periods were maximum and lowest in the lean periods, and that the prices of pulses (chickpeas) were indeed higher, but that profitability continues to be low on account of low yields.

1195 GANGWAR, AC; NIWAS, S; RAI, KN. 1983. **Marketing pattern of gram in selected markets of Haryana**. *Agril. Marketing*, 26: 2, 13-17.

The marketing year for gram in selected markets of Haryana was split into three periods (1) peak marketing period (April-July), (2) mid-year period (August-November), and (3) lean period (December-March). Time series monthly data on arrivals and prices of gram were collected from six markets randomly selected for the years 1970/71 to 1979/80. The findings show that the producers'-sellers' marketing decisions were not much directed by price differences from one lean period to the next or differences between post harvest and lean period price. Even though there have been considerable increases in the prices for one lean period to the next in the same year, it did not significantly affect the farmers' gram marketing patterns because they could not withhold the produce for sale in lean months due to pressing financial needs and lack of storage facilities.

1196 KHAIRE, VM; KACHARE, BV; MOTE, UN. 1992. **Efficacy of different vegetable oils as grain protectants against pulse beetle, *Callosobruchus chinensis L.* in increasing storability of pigeonpea**. *Journal of Stored Products Research (United Kingdom)*, 28: 3, 153-156.

1197 LAL, J; CHANDRA, S. 1987. **Plant breeding challenges and constraints: suggested areas of tissue culture relevance in pulses - chickpea and pigeonpea**. *Legume Research*, 10: 1, 53-59.

The main causes and constraints contributing to low yield in these 2 grain legumes are considered, and include such factors as lack of improved varieties, susceptibility to diseases, pests and stress, asynchronous maturity and cross incompatibility. Tissue culture techniques are seen as helping to overcome some of these constraints by allowing interspecific, intergeneric and wide hybridization, by inducing genetic variability, and by allowing preservation of pollen and the production of haploids and homozygous lines.

GROUNDNUTS

Storage

1198 BALWINDER SINGH. 1991. **A study on the pattern and economics of groundnuts storage at different levels in the Punjab**. *Economic Affairs Calcutta*, 36: 2, 90-96.

New technology in agriculture has given rise to an increased demand for storage space in the Indian rural economy. This article investigates economic aspects of the storage of groundnuts in the Punjab. The types and methods of storage are explained, as practices by producers and sellers. The kind of storage available to different farm sizes is also examined. Data from a sample of 40 traders and 60 farmers for the years 1987/88 reveal that about 80% of the farmers sold their groundnut produce immediately after the postharvest period to fulfil their cash requirements. Those who stored their produce faced inadequate facilities and used their houses to keep bags of groundnuts over long periods of time. This finding calls for an effort on the part of the government to improve facilities.

1199 GOWDA, DJ; SHIVAPRASAD, V; RAMAIAH, H. 1991. **Drying and storage studies on groundnut (DH-3-30) seeds (*Arachis hypogaea L.*)**. *Karnataka Journal of Agricultural Sciences*, 4: 1-2, 32-35; 10 ref.

Groundnuts cv. DH-3-30 seeds with initial moisture contents of 35, 43 and 67% (DW basis) were dried at 40-60°C in a model drying unit using an air flow of 4 m3/min and 5 kg seed lots. Seeds were then stored at Bangalore under ambient conditions for 6 months before

evaluating percentage germination. Seeds at 35 and 43% moisture content could be dried at temperatures of up to 50% without percentage germination after 6 months decreasing below the minimum certification level of 70%. Seeds with 67% moisture content could be dried at up to 45°. Drying time increased as temperature decreased.

1200 NAUTIYAL, PC; JOSHI, YC. 1991. **Storage of *rabi*/summer groundnut (*Arachis hypogaea L.*) with calcium chloride for prolonged seed viability and vigour**. *Tropical Science*, 31: 1, 21-26; 15 ref.

Groundnut pods stored in a gunny bag (a), poly-ethylene-lined gunny bag (b) or in a polyethylene-lined gunny bag with the desiccant $CaCl_2$ (c) showed significant differences in their seed viability. The percentage germination after eight months of storage was 10.0, 48.4 and 79.4 in (a), (b) and (c) respectively. Maintenance of viability and vigour in (c) could be attributed to low moisture percentage of the seeds during the storage period. The high viability and vigour of seeds stored in (c) was confirmed by several physiological and biochemical parameters. Accumulation of total soluble sugars and phenolics in seeds during storage was negatively correlated with seed viability.

1201 RAMAMOORTHY, K; KARIVARATHARAJU, TV. 1986. **Storability and biochemical composition of groundnut seed as influenced by packaging and seed treatment**. *Indian Agriculturist*, 30: 2, 101-106; 10 ref.

The association of certain biochemical changes with seed viability during storage of groundnut pods and seeds under ambient conditions (temp. 32.4 ± 4.5°C, RH 52.1 ± 6.1%) for 1 year using different seed treatments and containers was investigated. With the storage period, oil and protein contents decreased gradually while free fatty acid content increased accompanied by a loss in seed viability. Seed treatment with thiram + DDT gave the best preservation of seed viability. High density laminated polyvinyl bags were most suitable containers. Storage of thiram + DDT treated seeds in high density laminated polyvinyl bags was recommended for maintaining seed viability.

Storage decay

1202 BEHERA, B; NARAIN, A; SWAIN, NC; SAHU, KC. 1987. **Studies on groundnut seed coat leachate, seed extract and culture filtrates of *Aspergillus flavus* and *A. niger***. *Indian Journal of Plant Pathology*, 5: 1, 89-93; 11 ref.

Groundnut seed leachate was more inhibitory to spore germination of *A. flavus* and *A. niger* than seed extract. Culture filtrates from these fungi adversely affected the germination of groundnut seed. A decrease in seed viability during storage was due to the seedborne fungal population. Seed treatment with 25% Bavistin [carbendazim] + TMTD [thiram] prior to storage decreased seedborne fungi and prevented seed deterioration.

1203 DANGE, SRS; PATEL, VJ. 1984. **Effect of relative humidity and storage period on fungal invasion and viability of groundnut seeds**. *Bulletin of Grain Technology*, 22: 3, 225-231.

At higher RH during storage more invasion by *Aspergillus niger*, *A. flavus* and *Rhizopus sp.* was observed on groundnut seeds of various cultivars, resulting in loss of viability. At 62% RH the invasion was low and the viability was little affected even after 180 d storage. On cultivars TMV-2 and TMV-7 little invasion was observed at 76% RH and good germination was retained even after 180 d storage but there was only 25% germination in GG-2 after 120 d. Results indicate differences in deterioration of groundnut genotypes in storage at different RH. Seed can be stored at 62% RH without loss of viability for a considerable time.

1204 DHARAM VIR; VAIDYA, A. 1987. **Efficacy of fungicides XLI. Relative efficacy of fungicides as post harvest chemical treatment for control of *Fusarium* species causing spoilage and loss of oil in stored groundnut**. *International Jrl. of Tropical Plant Diseases*, 5: 2, 211-216; 11 ref.

Spoilage of stored groundnuts was caused by *F. oxysporum*, *F. semitectum* [*F. pallidoroseum*] and *F. moniliforme* [*Gibberella fujikuroi*]; the first 2 were responsible for a reduction in the quantity and quality of the oil during pathogenesis. Treatment with propionic acid and sodium metabisulphite gave effective control of pod and kernel infection by these fungi.

1205 MITTAL, VP. 1991. **Extent of losses of groundnut varieties by groundnut *Bruchid, Caryedon serratus Fab. (Bruchidae : Coleoptera)* in storage**. *Gujarat Agricultural University Research Journal (India)*, 17: 1, 43-48.

1206 PALANISAMI, A; MANICKAM, A; NEELAKANTAN, S. 1990. **Fungal flora and aflatoxin production in relation to post-harvest practices in groundnut**. *Madras Agricultural Journal*, 77: 1, 26-31; 8 ref.

The moisture content of fresh pods harvested on 6 farms in Tamil Nadu was 22-36% and the incidence of storage

fungi ranged from 4 to 34% depending on the drying conditions. Toxigenic *Aspergillus* and *Penicillium spp.* were isolated as well as various field fungi. Aflatoxin B1 was detected from the 3rd day after stripping the pods, at levels of 40-95 μg/kg and 75-214 μg/kg in contaminated shells and pods, respectively. Immature and shrivelled pods constituted 20-48% of the total samples and were 2-3 times more heavily contaminated than mature pods.

1207 PATKAR, KL; USHA, CM; SHETTY, HS; PASTER, N; LACEY, J. 1991. **Modified atmosphere and propionic acid treatment to prevent storage fungi in groundnut**. *International Arachis Newsletter*, No. 10, 20-21.

After 90 d storage in a modified atmosphere (MA) (CO2:O2:N2 in the ratio 20:20:60, and 90% RH), only a few groundnut seeds showed visible moulding compared with an untreated control (seeds stored in ambient air) in which seeds were completely colonized after 30 d. No visible moulding occurred when groundnuts were stored in MA with additional treatment with 0.2% w/w propionic acid (PA). All seeds were colonized after 60 d when treated with PA only. The percentage of infected seeds increased during storage in all treatments except MA + PA when it decreased. Incidence of *Aspergillus flavus* decreased in all treatments. *A. niger* decreased in all treatments except MA. In contrast, *Penicillium spp.* increased in all treatments except MA.

1208 RANA, IA. 1989. **Aflatoxin contamination of groundnuts in Pakistan**. *Aflatoxin contamination of groundnut: proceedings of the International Workshop*. (ICRISAT Center, India: 1987: 6-9 Oct)/edited by D McDonald; VK Mehan. Patancheru, A.P.: ICRISAT, p. 111-114; 9 ref.

The problem of aflatoxin contamination of foods, particularly groundnuts, in Pakistan is discussed.

1209 SUREKHA, M; REDDY, SM. 1987. **Mycoflora and mycotoxin production in groundnut fodder**. *Indian Journal of Mycology and Plant Pathology*, 17: 3, 337-338; 6 ref.

Details are given of the fungi isolated by the agar plate, dilution plate and humid chamber methods from 20 fodder samples. The most common isolates were *Aspergillus flavus*; 7 of 10 were able to produce aflatoxins. Of 10 *A. nidulans* isolates, 3 produced sterigmatocystin and 2 of 6 *A. terreus* produced patulin. All 6 isolates of *A. terreus* produced terreic acid and a str. of *A. ochraceus* elaborated ochratoxin A. It is concluded that the storage method of groundnut fodder should be given due care to avoid hazards to livestock.

1210 THAPAR, VK; SHOSHI PAUL; SHARMA, SS; JARNAIL SINGH. 1986. **Evaluation of aflatoxins susceptibility to different moisture contents in groundnut at different stages of post-harvest operations**. *Journal of Research, Punjab Agriculture University*, 23: 2, 267-271; 6 ref.

Kernels taken from farmers' fields were more vigorous than those from the stores of grain markets, indicating poor storage conditions. A correlation was found between ambient RH/moisture content of the kernels and growth of fungi producing aflatoxins. All types of aflatoxins (B1, B2, G1 and G2) developed at RH > 82% and corresponding high moisture contents. The aflatoxins were present in varied proportions at the different moisture contents.

1211 VAIDYA, ANJALI; DHARAM VIR. 1989. **Changes in the oil in stored groundnut due to *Aspergillus niger* and *A. flavus***. *Indian Phytopathology*, 42: 4, 525-529; 8 ref.

A. niger and *A. flavus* caused spoilage of stored groundnuts and reduced the quality and quantity of oil produced. Postharvest spray and dip treatment with propionic acid and sodium metabisulfite were effective in controlling these fungi.

1212 VAIDYA, ANJALI; DHARAM VIR. 1987. **Efficacy of fungicides XXXVIII. Evaluation of antifungal chemicals for the control of post-harvest spoilage of stored groundnut caused by *Penicillium spp.***. *Indian Journal of Mycology and Plant Pathology*, 17: 3, 241-244; 7 ref.

Chemical treatment of kernels and pods with propionic acid and sodium metabisulfite at concn ranging from 2500-10 000 p.p.m. proved highly effective in controlling postharvest deterioration of groundnuts caused by *P. chrysogenum*, *P. verrucolosum*, *P. pinophilum* and *P. oxalicum*.

1213 VAINHNAV, KA; SAVALIA, RL; PATEL, VJ; PATEL, RS. 1989. **Aflatoxin in groundnut, problems and remedies**. *Seeds and Farms*, 15: 2, 12-15; 18 ref.

A general account is given of the problem of aflatoxin production by *Aspergillus flavus* and *A. parasiticus* in stored groundnuts. Among the factors affecting production are temp., moisture content, atmospheric gases and fungal isolates. Brief accounts are given of the chemical composition of aflatoxins, aflatoxins as carcinogens and the natural occurrence of aflatoxins. *A. flavus* also caused aflarot disease of groundnut which is seedborne

and results in infected seeds becoming rancid. Of 18 cultivars listed as having resistance to seed infection by *A. flavus* or aflatoxin production, only J-11 is widely grown in India. Regulations concerning trade in affected commodities are discussed. Preventive and curative measures for controlling aflatoxin contamination are listed.

MUSHROOMS

Postharvest handling

1214 JOSHI, VK; CHAUHAN, SK. 1994. **Postharvest technology of mushroom**. *Intensive Agric. (Details not ascertainable)*

1215 LAL, BB; SHARMA, KD. 1994. **Postharvest technology of mushrooms**/edited by KL Chadha. New Delhi: Indian Council of Agricultural Research.

1216 MAINI, SB; ROY, SK. 1986. **Post harvest problems of mushrooms**. *National Workshop on Mushroom*. (1986: 23-24 Sept). Division of Fruit & Hort. Technology, Indian Agricultural Research Institute, New Delhi.

1217 VIJAY, S; ANAND, JC. 1986. **Post harvest care of mushrooms**. *Ind. J. Mushroom*, 10-11: 1&2, 7.

Preservation

1218 ROY, MK; BAHL, N. 1984. **Gamma radiation for preservation of *Agaricus bisporus***. *Mushroom Journal*, No. 136, 124-125; 8 ref.

Mature, unopened fruiting bodies were harvested, placed in perforated polyethylene bags, irradiated at doses of 250, 400 or 550 krad, and stored at 15° ± 1°C. After 2 weeks' storage the number of opened caps was 8-12% in irradiated treatments and 95% in non-irradiated controls. Irradiated buttons showed no or negligible growth and spoilage during storage whereas controls continued to grow and many [unquantified] became unmarketable due to spoilage. There was very little difference between treatments in weight loss (16-19%), colour, and cap firmness during storage.

1219 ROY, MK; BAHL, N. 1984. **Studies on gamma radiation preservation of *Agaricus bisporus***. *Mushroom Journal*, No. 144, 411-414; 11 ref.

Data on weight loss, percentage of caps open, colour and texture are presented for mushrooms irradiated at 0-400 krad and stored at 1-25°C in perforated polyethylene bags. Irradiation at 250 krad was sufficient for satisfactory storage at 15° for 9-10 days.

1220 SATHE, AV; DIGHE, SANGITA. 1987. **A simple and economic method for long-term preservation of mushroom culture**. *Current Science, India*, 56: 10, 485; 3 ref.

The method described, for use with *Pleurotus pulmonarius* [*P. ostreatus*], involves taking 3 mm diameter discs from agar cultures of the fungus in Petri dishes and storing the discs at room temperature in glass tubes (9 X 75 mm) containing 1 ml of liquid paraffin and plugged with non-absorbant cotton [cotton wool], the mouths of the tubes being covered with tin foil; all materials used in handling and storing the fungus are sterilized prior to use. Cultures stored in this way remained viable for 8 years. The method is considered suitable for developing, tropical countries.

Storage

1221 MAINI, SB; SETHI, V; DIWAN, B; MUNJAL, RL. 1987. **Pretreating mushrooms to enhance their shelf life and marketability**. *Proceedings Int. Conf. on Science and Cultivation Technology of edible fungi*. Srinagar: R.R.L. pp. 215.

1222 RAI, RD; SAXENA, SANJEEV. 1989. **Biochemical changes during post-harvest storage of button mushroom (*Agaricus bisporus*)**. *Current Science*, 58: 9, 508-510; 12 ref.

Button mushrooms (3.5±0.2 cm cap diameter) with a differentiated but non-stretched velum were harvested, cleaned and packed in 100-gauge-thick, perforated polyethylene bags, then stored at 5°C and 85-90% RH, 10° and 70-75% RH, or 15° and 55-60% RH. Chemical composition and protease activity were determined daily for 4 days. Changes in chemical composition during storage are tabulated. Total sugar, protein and phenolic compound contents decreased during storage, particularly at higher temperatures. The activity of polyphenol oxidase [catechol oxidase] (PPO; which catalyses the browning reaction) at 15° was almost twice that at 10° and 5°. It is concluded that increased browning at higher storage temperatures is due to the direct effect of temperature on enzyme activity.

1223 SUMAN, BC; JANDAIK, CL. 1992. **Influence of storage temperature on productivity of the spawn of *Agaricus bisporus (Lange) Singh***.*Indian Journal of Mycology and Plant Pathology*, 22: 3, 289-290.