177 Effect of supplemental dietary fish oil and soy oil on production and composition of milk and properties of butter from cows with low and high atherogenic index . G. Bobe*[1], S. Zimmerman[1], E. G. Hammond[1], A. E. Freeman[1], D. H. Kelley[1], J. Dedrick[1], P. A. Porter[2], C. M. Luhman[2], and D. C. Beitz[1], [1]*Iowa State University,* [2]*Land O'Lakes.*

The atherogenic index (AI), defined as AI = [%C12:0 + 4 × %C14:0 + %C16:0] ÷ [Σ%unsaturated fatty acids], characterizes the atherogenicity of dietary fats. Fats with higher AI-values are assumed to be more detrimental to the human health. Previously, we demonstrated that properties of butter differ between cows on the same diet that produce milk fat with high and low AI. Butter from low AI milk fat was more spreadable. The objective of this experiment was to determine whether the difference in properties of butter as well as the production and composition of milk of cows with high and low AI can be affected differently by feeding additional dietary fish oil and soy oil. These diets have been shown previously to decrease the AI of milk fat. A 3×3 latin square design with one replication in summer and one in fall was used. Holstein cows (60-200 days in milk) that produced before the treatment period milk fat with low AI (n=6) and high AI (n=6) were fed for three 3-week feeding periods with either a control diet (3.66% fat) or diets that contained additionally 1% fish oil and 1% soy oil as roasted beans, respectively. Feed intake and milk production was recorded during the third week on each diet. Milk samples were collected twice during the third week and analyzed for milk fat, protein, lactose, total solids, somatic cell count, and fatty acid composition. Furthermore, butter was made and analyzed for penetration distance and creep. Cows preselected for a low AI of milk fat maintained a lower AI than did cows with a high AI ($P \leq 0.05$). Feeding additional soy oil decreased the AI and increased the penetration distance in comparison to the control diet ($P \leq 0.05$), whereas feeding additional fish oil had no significant effect ($P \geq 0.05$). Feeding additional soy oil and fish oil increased numerically the difference in the response of AI and penetration distance, but the interactions were not statistically significant ($P \geq 0.05$). Dry matter intake, milk production, and milk composition were not affected by AI or diet ($P \geq 0.05$). We conclude that feeding additional soy oil and selecting cows with low AI act additively to produce a lower saturated milkfat that can be used to produce a more spreadable butter.

Key Words: Atherogenicity, Butter, Soy oil

Forages & Pastures: Silages, forage composition

178 Evaluating chemical characteristics of mixed corn plant and tomato pomace silage using experimental silos. R. Tahmasbi[1], B. Saremi*[2], and A. Naserian[2], [1]*Dasht dairy farm, Neyshabour, khorasan, Iran.,* [2]*Ferdowsi university of Mashhad, khorasan, Iran.*.

The aim of this study was to compare chemical characteristics of mixed silages (corn plant with various amounts of wet tomato pomace) and to examine whether corn plant will ferment properly with various amount of wet tomato pomace or not. Whole corn plants were chopped from a single field and mixed with 0(T1), 7.5(T2), 15(T3) and 100(T4)% (DM basis) wet tomato pomace and ensiled in 5-gallon plastic containers. The silos were packed with a hydraulic press, which permitted all silages to be made at similar densities. All containers were opened 60 days later and dry matter (DM), pH, ammoniated nitrogen (N-NH3), crude protein (CP), ASH, calcium (Ca), phosphorus (P), Acid detergent fiber (ADF), Neutral detergent fiber (NDF) were measured. Tomato pomace used in this experiment had 40.1±6.13%(DM-basis) seed. Data were analyzed using General Linear Models procedures of SAS v6.12 for ANOVA to evaluate differences among experimental groups. The design was completely randomized (equal replicates). Means were compared with Duncan test. Data showed that there was no difference for DM, NDF, Ca and P among treatments (P = 0.36, 0.09, 0.15 and 0.38 respectively). However, CP, Ash, ADF (P < 0.0001) and pH (P < 0.02) showed significant differences among treatments. Based on the results of this experiment, it seems that tomato pomace could increase crude protein of silage significantly without any reduction in the quality of silage fermentation and could reduce pH of silage to some extent because of its high concentration of organic acids.

Items	T1	T2	T3	T4	SEM
DM%	28.62^a	27.80^a	27.87^a	24.9^a	0.88
CP%	8.47^c	9.73^b	10.5^b	19.4^a	0.18
Ash%	7.63^a	7.55^a	7.38^a	5^b	0.18
Ca%	1.14^a	1.16^a	1.04^a	0.92^a	0.04
P%	0.48^a	0.55^a	0.30^a	0.30^a	0.07
ADF%	33^b	34^b	32^b	49.5^a	0.45
NDF%	61^{ab}	61.25^{ab}	57.5^b	63^a	0.82
pH	3.86^b	3.89^b	3.87^b	3.99^a	0.02
N-NH3(mg/dl)	10.32^a	10.51^a	10.43^a	3.11^b	0.05

Key Words: Tomato pomace, Corn silage, Experimental Silos

179 Chemical characteristics of alfalfa silage treated with urea and sulfuric acid. E. Khafipour, M. D. Mesgaran*, and F. E. Shahroudi, *Ferdowsi University of Mashhad,Mashhad,IRAN.*

This study was conducted to determine whether the addition of urea and/or sulfuric acid to alfalfa before ensiling would alter fermentation patterns. Second cut alfalfa (about 27% DM) was harvested, left for 8 h untill got 33% DM, then ensiled with urea (0.0 and 1% of DM) and/or sulfuric acid (0.0,0.3,0.9,1.5 and 2.1% of DM) in a complete randomized design, using small laboratory silos (4 silos per each treatment). The Chemical composition of silages was determined by the standard procedures, 45 days after ensiling. pH and N-NH3 were determined in the each silage extraction, CP and NPN in dry samples. Alfalfa silages containing urea, compared with the others, had significantly higher pH (4.28 vs 4), CP (205.9 vs 177.9 g/kg, DM) and NPN (18.7 vs 15.8 g/kg, DM)for 0.0,p< 0.05. Using sulfuric acid caused to decrease pH(4.6 vs 3.56)and N-NH3 (13.56 vs 8.18 mg/dl), but increased CP (183.4 vs 197.5g/kg) for 0.0 and 2.1% sulfuric acid respectively(p< 0.05). It has been indicated that urea, as an additive, for alfalfa silage, increased pH,CP and NPN. The effects of urea are relevant to its chemical composition as a source of nitrogen; On the other hand urea reduced heating,discoloration and visible molds in silage. Simultaneously use of urea and sulfuric acid decreased pH to the optimal range. It seems that positive effect of acid on CP content is relevant to its prohibitive function on proteins degradability in silage. Reduction in N-NH3 content of the acid treated silages is another reason for prohibitory function of acid on proteins degradation to soluble nitrogen and increasing of protein efficiency in silage. So, it has concluded that sulfuric acid can be used as a good preservative in alfalfa silage.

Key Words: Alfalfa silage, Additives, Chemical composition

180 Effect of hybrid, stage of maturity and use of silage innoculants on dry matter yield, nutritional value and digestibility of corn silage. L. O. Burciaga-Robles*, O. Ruiz-Barrera, C. Arzola-Alvarez, A. Grado-Ahuir, and Y. Castillo, *Universidad Autónoma de Chihuahua, Facultad de Zootecnia. Secretaría de Posgrado e Investigación.*

Two corn hybrids (Golden Harvest EX313 and H216) selected for high grain and high DM yield were harvested at two different stages of maturity (1: one third milkline or 2: two third of the milkline from the top of the kernel). The objective of this experiment was to evaluate the corn hybrids to determine potential differences in nutritive value of whole plant corn silage. Hybrids were grown in 2 plots of 5 Ha each in Bachniva, Chihuahua, Mexico on April 2001, harvested, and translated to the University Animal Nutrition Research Laboraory for evaluation. Samples of the plots were ensiled with or without corn silage inoculants (Control, Sill All® , Bio Sile®, and Urea) on 2 kg lab scale silos. Whole plant samples of EX313 had a lower (P < 0.05) percentage of DM content on the early harvest date, but no differences (P > 0.05) were detected on the late harvest date. Silage made from EX313 had a lower (P < 0.05) pH and CP. Silage made from H216 had lower values (P < 0.05) of lignin , IVDMD , and lactic acid. No significant differences were found on NDF, ADF, hemicelulose , or cellulose. Inoculation drastically affected the pH and lactic acid content of corn silage. There was no difference (P > 0.05) between Control, Sill All, and Bio Sile on pH values for early and late harvest. The pH values for Urea-inoculated corn silage were higher (P < 0.05) for early and late harvest for EX313 and H216. Also, the lactic acid content was higher (P < 0.05) for silage inoculated with Sill All versus the other treatments for both hybrids and

maturities. No other measures of nutritional value were affected by the silage inoculants. The hybrids evaluated in this study affected DM, CP, IVDMD, and lignin of corn silage and the use of all silage inoculants except urea imrproved the pH and lactic acid content of corn silage.

Key Words: Corn silage, Hybrids, Silage innoculants

181 Practical methodology for applying edible coverings to bunker silos. L. L. Berger* and J. R. Sewell, *University of Illinois-Urbana.*

The goal of this research was to develop a commercially feasible application method to cover bunker silos with an edible covering. In addition to easy application, the edible covering must provide effective protection, be a source of essential nutrients, be palatable, and cost effective. In previous research a starch-salt matrix had been applied by hand using a cement trowel. The previous formulation had a bread dough consistency, and had to be reformulated so that it could be sprayed. Also wheat flour was replaced with wheat ground through a 0.48 cm screen. A commercial CEJCO concrete pump, model CSS 2489 with a vertical shaft mixer and screw pump was used in this experiment. This unit was chosen because it could be powered by the hydraulic system of a farm tractor. A commercial air compressor was used to atomize the matrix as it was sprayed on the bunkers. The starch-salt matrix was applied at 30.3% moisture with a targeted thickness of 1.5 cm. Six mini-bunker silos 2.14 X 7.32 m with a packed limestone base and plywood walls were used. Approximately 5727 kg of chopped alfalfa (48.4% DM) were packed into each of six silos. The chopped alfalfa was packed with a small tractor and lawn roller. The three treatments were, uncovered, 6-mil polyethylene plastic (weighted with 15 cm corn forage), or covered with the sprayed starch-salt matrix. After the starch-salt matrix was applied an edible wax emulsion was sprayed on the covering to seal it. The silos were sealed on August 3 and opened beginning November 17, 2002 after 106 days of ensiling. When the silos were opened the starch-salt matrix was removed from the surface of the silage. The covering was fed at 2.5% of a corn silage-haylage diet for growing heifers without refusal. Samples of ensiled forage were collected from depths of 0-12.7, 12.8-25.4 and 25.5 to 38.1 cm and analyzed for percent ash and sodium. The percent ash and sodium for the three depths under the starch-salt matrix were 14.48, 12.36 12.06, and 1.15, 0.145, and 0.145, respectively. The fresh forage averaged 10.5% ash and 0.034% sodium. These sodium levels help preserve the silage immediately under the covering. This formulation and concrete pump combined proved to be an effective application method.

Key Words: Bunker silo, Edible covering, Concrete pump

182 Production response of lactating dairy cows to corn silage harvested from different varieties at different cutting heights. J. K. Bernard*[1], J. W. West[1], D. S. Trammell[1], and G. H. Cross[1], [1]*The University of Georgia, Dept. of Animal and Dairy Science.*

The objective of this trial was to determine the effect of variety and cutting height on the production response of lactating cows fed diets based on the resulting silage. Treatments were arranged as a 2 x 2 factorial to provide two corn varieties and two cutting heights. Two corn varieties (Pioneer 31G20 and 32K61) that had similar ratings for yield and nutrient content but differed in digestibility ratings were planted at a seeding rate of approximately 69,000 plants per ha on March 22, 1999. Corn within each variety was harvested on July 8 and 9, 1999 using a conventional pull type chopper at either 10.2 (LOW) or 30.5 (HI) cm cutting height. Corn was packed in a 2.4 m plastic bag and allowed to ensile. Minor differences were observed in the chemical composition (DM basis) of corn silage due to cutting height which averaged 26.4 and 25.07% acid detergent fiber (ADF), 46.0 and 44.9% neutral detergent fiber (NDF), and 67.9 and 68.5% in vitro true dry matter (DM) digestibility (IVTDMD) for LOW and HI, respectively. The DM yield at harvest was reduced by approximately 10.4% for HI compared with LOW. Four experimental diets were fed to 32 lactating Holstein cows in a 6 wk randomized design trial. Corn silage provided 40.6% of the DM in each of the experimental diets. There was an interaction ($P < 0.01$) between variety and cutting height due to higher intakes with 31G20 LOW and 31K61 HI. Milk yield and composition was not different among treatments and averaged 37.2 kg/d milk, 3.94% milk fat, and 3.17% milk protein. Apparent total tract digestibility was determined during the last week of the trial. Digestibility of ADF was higher ($P < 0.03$) for 31G20 than 32K61. An interaction was observed for DM ($P < 0.01$), CP ($P < 0.04$), ADF ($P < 0.07$) and NDF ($P < 0.07$) due to higher digestibility coefficients for diets containing 31G20 LOW and 31K61 HI compared to the other treatments. Although differences have been observed in the in vitro and in situ digestibility of corn varieties, no advantage was observed in milk production and composition among varieties reported to differ in nutrient digestibility in the current study. Although cutting height reduced the fiber content and increased IVTDMD of the resulting silage, no clear advantage was observed for increasing cutting height.

Key Words: Corn silage, Milk yield, Nutrient digestibility

183 Effect of crop maturity and processing of whole plant corn forage at harvest on nutrient composition and particle size distribution. K. W. Cotanch*[1], T. R. Pouliot[1], E. D. Thomas[1], C. S. Ballard[1], J. W. Darrah[1], P. Mandebvu[1], H. M. Wolford[1], C. J. Sniffen[1], and T. Sato[2], [1]*W.H. Miner Agricultural Research Institute, Chazy, NY 12921,* [2]*Zennoh National Federation of Agricultural Co-operative Associations, Tokyo, Japan.*

A Pioneer hybrid, (38K06; RM 93 d) was planted on May 4, 2001 on four plots, harvested at three stages of maturity (30%, 35%, and 40% theoretical whole plant DM content), and processed using three chopping methods: (1) chopped at 0.95-cm theoretical length of cut (TLC) and unprocessed; (2) chopped at 1.91-cm TLC and processed with 3 mm roll clearance; and (3) chopped at 1.91 cm TLC and processed with 1-mm roll clearance. Chopped forages were analyzed for particle size distribution using the Penn State Separation method. Fractions from each sieve were weighed, dried at 60C to determine percent particle distribution on DM basis. Physically effective NDF (peNDF) was determined as percentage of dry forage retained on a 1.18-mm screen. Forage samples (200 g) were weighed, dried, and separated into three categories: (1) whole kernels, with no visible damage or fragmentation; (2) fragmented kernels $\geq$ 2 mm; and (3) fragmented kernels $<$ 2 mm. Fractions were expressed on DM basis. In summary, processing increased proportion of fine particles and broken kernels, decreased medium particles and peNDF, but had no effect on coarse particles. Increase in maturity increased proportion of fine particles and peNDF and decreased medium particles but had no effect on coarse particles. Maturity by processing interaction showed that kernel breakage was increased without reducing whole forage peNDF when DM of forage was 40% and 1 mm processor roll clearance was used.

Fresh Whole Plant Composition (% of DM)	30% DM	35% DM	40% DM	SE	*P*-value
Actual DM	31.1c	34.2b	43.6a	0.41	<0.001
CP	6.96b	7.45a	6.70b	0.09	0.001
ADF	25.8a	23.4b	26.0a	0.61	0.017
NDF	43.9	41.2	43.7	0.70	0.052
Acid detergent lignin	3.25a	2.71b	3.10ab	0.16	0.045
Nonfiber carbohydrates	40.7	42.9	41.1	0.66	0.106
Particle Size Distribution (% of DM)					
> 19 mm	8.9	10.0	10.0	0.53	0.767
8 - 19 mm	61.8a	59.8a	55.1b	1.19	0.003
< 8 mm	29.3b	30.2b	34.9a	1.13	0.002
peNDF	88.1b	90.9a	91.0a	0.40	0.004

Particle Size Distribution (DM basis)	Unprocessed	3 mm	1 mm	SE	*P*-value
> 19 mm, %	9.3	10.8	8.8	0.53	0.368
8 - 19 mm, %	64.5a	56.3b	55.7b	1.19	<0.001
< 8 mm, %	26.2b	32.9a	35.5a	1.13	<0.001
peNDF, %	93.7a	88.3b	88.1b	0.40	<0.001
Total grain fractions, %	37.9a	30.7b	30.2b	1.70	0.006
Whole kernels, % of grain	17.0a	3.5b	1.2b	1.00	<0.001
Fragmented kernels ≥ 2 mm, % of grain	77.8b	84.3a	85.1a	0.70	0.006
Fragmented kernels < 2 mm, % of grain	5.2b	12.2a	13.6a	0.70	<0.001

Key Words: Crop maturity, Processing, Particle size distribution

184 Chloride fertilization of corn grown for silage affects mycotoxin concentrations. D. P. Casper*[1], D. Spangler[1], D. Schauff[1], G. Clark[2], and D. T. Wicklow[3], [1]*Agri-King, Inc., Fulton, IL,* [2]*University of Illinois Extension,* [3]*USDA-ARS, Peoria, IL.*

Dairy cattle fed mycotoxin contaminated forages can experience many different performance problems. *Fusarium* (FUS) molds can invade forages in the field up to feeding by producing the mycotoxins zearalenone and vomitoxin. Chloride (Cl) fertilization is reported to increase plant disease resistance. To evaluate if Cl fertilization of corn could reduce mycotoxin concentrations in silage, 4 application rates of Cl (0, 56, 112, and 224 kg/ha) and 2 FUS challenge rates (non-inoculated versus inoculated) were arranged in a 4 by 2 factorial design. Three blocks of 8 treatments were randomly assigned to plot sizes of 4.6 m^2 with buffer zones of 1.5 m. The corn variety was Syngenta® N48V8 planted at the rate of 12,141 kernels/ha. Potassium chloride was applied within 3 d of planting, while FUS challenge was accomplished by inserting non-cultured and cultured (Fusarium *graminearum*) toothpicks into ears at mid-silk and the corn plants were harvested for silage 30 d later. Corn plants were harvested by hand, chopped, and silage packed into sealed mini silos. Silos were stored for 60 d and then subjected to nutrient and mycotoxin analyses. Chloride fertilization resulted in a significant (P<.01) linear increase in Cl concentrations of corn silage (.20, .30, .38, and .52% DM, respectively for 0, 56, 112, 224 kg Cl/ha). An interaction of Cl x FUS was detected (P < .02) for zearalenone, but the interaction was nonsignificant (P>.10) for vomitoxin. When corn was inoculated with FUS, zearalenone concentrations (303, 237, 75, and 106 ppb) were greatest for 0 kg/ha Cl and lowest for 112 kg/ha Cl (P<.05). The main effect of Cl demonstrated greater (P<.05) vomitoxin concentrations (3.66, 5.11, 1.78, and 3.41 ppm) for 56 than 112 kg/ha with other Cl rates being intermediate. *Fusarium* molds have high protease, amylase, and cellulose activities which resulted in greater (P<.05) digestibility of NDF (52.6 and 55.0%) and DM (65.9 and 66.9%) compared to no inoculation. Application of Cl to corn can increase corn silage Cl concentrations. Higher Cl concentrations improved disease resistance of corn, which resulted in lower zearalenone and vomitoxin concentrations in the silage. The influence of mycotoxins on dairy cattle performance could be reduced by greater application rates of Cl to crops grown for forage.

Key Words: Chloride, Fusarium, Mycotoxin

185 Effect of endophyte type on adipose tissue fatty acid composition from beef cattle grazing tall fescue. C. E. Realini*, S. K. Duckett, N. S. Hill, J. R. Sackmann, M. H. Gillis, and K. R. Smith, *The University of Georgia, Athens.*

Adipose tissue fatty acid composition was evaluated from 14 Hereford steers grazing tall fescue infected with either wild-type (TOXIC, n=6) or novel, non-toxic (MAXQ, n=8) endophyte for 135 d. Steers were harvested at a commercial meat plant, the ribeye roll and the clod removed and transported to the UGA. The fatty acid profile of the subcutaneous (SQ), intramuscular (IM), and ground beef (GB) fat was determined by GLC. Data were analyzed as a 2 x 3 factorial with endophyte type treatment, adipose tissue site, and two-way interaction in the model. Interactions between adipose tissue and endophyte type were not significant (P > 0.05) with the exception of myristoleic (P < 0.05, C14:1). TOXIC and MAXQ had similar (P > 0.05) content of C14:1 in GB and SQ, whereas C14:1 was higher (P < 0.05) in the IM from MAXQ than TOXIC. Total lipid content was unaffected (P > 0.05) by endophyte type. Adipose tissues from TOXIC cattle had higher (P < 0.05) proportions of stearic, and lower (P < 0.05) proportions of palmitoleic and oleic acids than MAXQ. The percent of saturated fatty acids (SFA) was higher (P < 0.05) and monounsaturated fatty acids (MUFA) lower (P < 0.05) for TOXIC than MAXQ. Endophyte type did not alter (P > 0.05) the percent of polyunsaturated fatty acids (PUFA) and total conjugated linoleic acid (CLA), or the polyunsaturated:saturated (P:S) and omega-6:omega3 (n-6:n-3) fatty acid ratios. However, MAXQ tended (P < 0.10) to have a higher proportion of CLA isomer c9t11 than TOXIC (9.8 vs. 8.4 mg CLA/g lipid). GB and IM had higher (P < 0.05) concentrations of SFA, MUFA, and CLA c9t11; and lower (P < 0.05) concentrations of PUFA and P:S ratio than SQ fat. Presence of alkaloids in SQ fat from TOXIC cattle was detected by ELISA. Adipose tissues from TOXIC cattle showed greater degree of saturation and accumulation of alkaloids than MAXQ. Fescue toxicosis appears to influence fatty acid metabolism, which may be involved in the occurrence of fat necrosis. Finishing cattle on tall fescue pastures showed potential to enhance the fatty acid profile of beef including CLA and omega-3 fatty acids from a human health perspective.

Key Words: Tall fescue, Endophyte, Fatty acids

186 Stage of maturity, time of sampling, and method of drying effects on forage quality of Haybet barley. L.M.M. Surber*, S. D. Cash, J.G.P. Bowman, and K. M. Rolfe, *Montana State University, Bozeman, MT 59717.*

Forage barley varieties are an increasingly important crop in Montana accounting for 15.2 % of the barley varieties grown. Approximately half of Montana grain hay production comes from barley. The objective of this research was to evaluate method of sample drying, stage of maturity and time of sampling effects on forage quality of Haybet barley. Haybet barley was grown under irrigated conditions in 2002 near Bozeman, MT. Forage clip samples (5 cm) were collected at the boot (B) and water early-milk stage (W) of maturity. At each stage of maturity samples were collected in the morning (AM) and evening (PM) of two consecutive days. Clip samples were divided into two aliquots that were either freeze-dried (FD) with liquid nitrogen or oven dried (OD) at 60C in a forced air oven. At each stage, time, and drying method three replicates were taken. Each sample (n = 48) was ground through a 5-mm screen and evaluated for in situ DM disappearance (ISDMD) at 48 h. A sub-sample was ground through a 1-mm screen and evaluated for DM, NDF, ADF, CP, and NO_3-N. Stage of maturity affected ($P < 0.01$) all forage quality parameters. Neutral detergent fiber was 4.8% greater ($P < 0.01$) at W stage of maturity when compared to B stage of maturity (54.43 vs. 51.95%, respectively). Nitrate concentration was 45% lower ($P < 0.01$) at the W stage of maturity when compared to B stage of maturity (0.140 vs. 0.253%, respectively), however it was unaffected ($P > 0.10$) by time of sampling or method of drying. Crude protein content was 53% lower ($P < 0.01$) at W when compared to B stage of maturity (11.86 vs. 18.14%, respectively). Acid detergent fiber was 3.2% lower ($P = 0.08$) at PM than at AM (30.43 vs. 31.44%, respectively). In situ DMD tended to increase ($P = 0.11$) at PM compared to AM (76.45 vs. 75.21%, respectively). Freeze drying decreased ($P = 0.05$) ADF content by 3.6% when compared to OD (30.36 vs. 31.51%, respectively). Freeze drying increased ($P < 0.01$) ISDMD at 48 h, in contrast to OD (77.18 vs. 74.49%, respectively). Stage of maturity greatly affected forage quality of Haybet forage barley. Haybet cut in the evening tended to yield hay that was lower in ADF and higher in digestibility. Freeze or oven drying were equally effective methods of sample preparation for nitrate concentration determination.

Key Words: Haybet barley, Stage of maturity, Method of drying

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