Academic Research Journal of Agricultural Science and Research

Volume 3, Number 2

http://www.academicresearchjournals.org/ARJASR/Index.htm

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Academic Research Journal of Agricultural Science and Research

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academicresearchJournals

Vol. 3(2), pp. 13-20, February 2015
DOI: 10.14662/ARJASR2014.035

ISSN: 2360-7874
http://www.academicresearchjournals.org/ARJASR/Index.htm

Academic Research Journal of Agricultural Science and Research

Full Length Research

Response of Broiler Chickens fed Diets Containing Differently Processed Sesame (*Sesame indicum L.)* Seed Meal

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Accepted 7 January 2015

This study was carried out to determine the growth performance and carcass characteristics of broilers fed diets containing differently processed sesame seed meal (SSM). Five experimental diets were formulated with diet 1 (control) containing 0% SSM, while diets 2 to 5 contained sundried (Su), roasted (Ro), boiled (Bo) and soaked (So) sesame seed meal each at 15% inclusion level respectively. One hundred and eighty (180) one day-old broiler chicks average 42.15g sourced from a commercial hatchery were allocated into 5 treatments of 12 birds in 3 replicates in a completely randomised design and dietary treatment lasting 56 days. Roasting and soaking significantly (P<0.05) reduced the anti-nutritional factors in sesame seed meal better than sun drying and boiling. Final body weight, average weight gain and average daily weight gain were significantly different (P<0.05) among the treatments. Control, Ro, Bo and So showed better utilisation of feed than Su. Total feed consumption and average daily feed intake were significantly (P<0.05) higher among birds fed So. There were significant (P<0.05) differences among carcass parameters and organs weight measured between the control diet and other treatments. It can be concluded that roasting and soaking were adequate to remove toxic phytochemicals in sesame seed meal to tolerable levels for broiler diets and inclusion up to 15% of Ro and So is recommended. At these levels, growth and carcass characteristics were not significantly affected compared to the control diet.

Key words: anti-nutritional factors, oxalate, sesame seed meal, tannins, broilers, performance

INTRODUCTION

The increasing cost of feed resources in livestock production has been identified as a serious impediment to meeting the demand for animal protein particularly in developing countries (Adejinmi *et al*., 2000). Poultry production relies mainly on maize as the main energy source but it suffers intense competition as food for humans resulting in higher demand than supply, higher cost and thus lower profit margin for poultry producers. This scenario is worsened among smallholder producers who find it increasingly hard to break even under the present circumstances. However, the ever-increasing cost of poultry feeds with concomitant increase in cost of

poultry products (meat and eggs) makes it necessary to explore the use of alternative feed ingredients that are cheaper, locally available and of low human preference (Agbede *et al.,* 2002; Tuleun *et al*., 2009). Non-conventional feedstuffs offer cheaper and less competitive alternatives to producers especially during periods of scarcity of specific ingredients. Sesame (*Sesamum indicum L)* is a drought-tolerant crop adapted to many soil types (Ram *et al.,* 1990). According to Ahmed (2005) there are about 335,000 hectares of land under sesame cultivation in Nigeria with yields of between 1.5-2.0 tonnes / hectare. Full-fat sesame seed contains 22% crude protein and the meal after oil extraction about 44% crude protein (Peace Corps, 1990; Mamputu and Buhr, 1991). The amino acid composition of the protein is similar to that of soyabean meal with the exception of lower lysine (Mamputu and Buhr, 1991) and higher methionine in sesame (Olomu, 1995; Dipasa, 2003).

The seed contains 50-60% oil compared to 20% in soyabean (Kato *et al.,* 1998; Ahmed, 2005). The fibre content of the seed ranges from 2.7 to 6.7% (Beckstrom-Sternberg and Duke*,* 1994). Mukhopadhyay and Ray (1999) reported that sesame whole seed, oil and meal are considered as animal feed for long time. Sesame meal was used to substitute Soyabean meal at 25% in broiler diet (Bell *et al*., 1990). The higher level caused higher fat deposit but lower water and protein content of the carcass (Heo *et al*., 1990). Also, Tangtawewipat and Cheva-Isarakul (1992) reported that SSM could be used at 5% in growing pullet diet (6-20 weeks of age) or 10% in Japanese quail diet without adverse effect on production performance. They reported that at 15-20% of the diet, no mortality was observed. However, there is a limitation to the use of sesame seed as a non-conventional feedstuff due to the presence of anti-nutritional factors which include tannins, phytic acid, oxalates, antitrypsin inhibitors etc. These anti-nutritional factors have serious implication on the performance and health status of animals when considerable amounts are ingested in feed. Nahm (2007) reported that phytic acid (PA) reduces the biological availability of zinc, calcium, magnesium and iron to the birds. Simple biotechnological methods such as soaking in water, sun-drying, toasting, boiling, cooking, ensiling etc. have been found suitable to destroy or reduce the anti-nutritional factors inherent in non-conventional feedstuffs and make them useful as livestock feed (Amaefule and Onwudike, 2000). Amaefule and Obioha (2001) noted that cooking improved the nutritive value by destroying most of the ANFs and utilization of protein and energy in the legumes (Kankuka *et al*., 2000; Abeke *et al*., 2008). Diarra *et al*. (2007) reported that soaking is one of the most effective methods of lowering the phytic acid (PA) content of the seed. Some researchers (Obun *et al*., 2008; Uhegbu *et al*., 2009) reported the impacts of several methods of processing especially roasting and boiling on the elimination of the anti-nutritional factors (ANFs) in *D. microcarpum* seeds. How efficient these processing methods might affect composition of nutrients, anti-nutritional factors and in turn, their effects on the performance of birds are still considered as vital issue to be searched. Such work will be of potential benefits, offers recommendations to manufacturers and helps to formulate accurate diets to animals. This paper will focus mainly on the effect of differently processed sesame seed meal on the growth performance and carcass characteristics of broiler chickens.

MATERIALS AND METHODS

Experimental site

The study was conducted at the Large Animals' Experimental Station, National Veterinary Research Institute (NVRI) Vom in Plateau State, Northern Guinea Savannah zone of Nigeria in 2012.

Material collection and processing

Sesame Seeds were purchased from a local market in Zaria, Kaduna State. They were screened and winnowed to remove sand, chaff and other foreign particles. They were then subjected to the following processing methods in order to improve its nutritive value.

The method previously described by Diarra *et al.* (2007) was used to obtain Soaked (So) seed meal. The cleaned seed was soaked in tap water for 24 hours, sun-dried for 72 hours and milled. Sundried sesame seed (Su) were obtained by spread raw seed on an even surface to sundry. Sundrying was done for seven consecutive days until crisp textured before milling. Seeds were immersed in boiling water at 100^{o}C and allowed to boil continuously for thirty minutes, cooled, drained, dehydrated and milled to obtain boiled (Bo) seed meal. The seed was roasted at 80-90^{o}C in a heated aluminium pot while being constantly stirred for 30 minutes, cooled and milled to obtain roasted (Ro) seed meal.

Experimental birds, management and design

A total of 225, one day-old Anak Broiler chicks average 42.15g were purchased from a reputable Hatchery and kept together for 3days of acclimitization before they were randomly allotted to the five dietary treatments in a Completely Randomized Design (CRD). They were reared in a deep litter house partitioned into pens as

experimental units. Each treatment had 45broiler birds in triplicate. Water and feed were offered *ad libitum* through out study period. All the necessary routine management practices and the recommended vaccinations were strictly observed throughout 56-days study period.

Experimental diets

Five experimental diets were formulated with the control diet containing 0% SSM while the sun-dried, roasted, boiled and soaked sesame seed meal were included at 15% each in diets 2, 3, 4 and 5 respectively. The gross composition of the experimental diets is presented in Table 1.

Data collection

Daily feed consumption was recorded as the difference between feed offered and the surplus left over. Weight gain was measured weekly. Feed samples were collected for proximate analysis.

Carcass and Organs Weight Determination

At the end of 8 weeks, four birds per replicate were selected at random and starved for about 18h to empty their GI tract. They were then slaughtered, scalded, plucked and eviscerated. The carcass and internal organs (liver, heart, gizzard and intestines) were removed, weighed and expressed as a percentage of live weight according to 'Modified Kosher' method as described by Abe *et al*. (1996).

Chemical analysis

Proximate compositions of the sesame seed meals from the four processing methods were analysed using the method of AOAC (2000), while the presence of anti-nutritional factors were analysed as described for tannins by the Folin-Denis method (AOAC, 1990), Oxalate (AOAC, 1990) and Phytate (AOAC, 1990). Determination done at the Biochemistry Department, National Veterinary Research Institute (NVRI), Vom, Jos.

Statistical analysis

Experimental data were subjected to analysis of variance (ANOVA) using SAS (2008) software. Means were separated with Duncan multiple range test at a 5% level of significance.

RESULTS AND DISCUSSION

Proximate Composition of the Test Ingredients

The nutrient composition of the test ingredients is presented in Table 2. The nutrient composition shows that sundried sesame seed meal contained higher dry matter, ash and Nitrogen Free Extract (NFE) than those processed by other methods. The higher level of ether extract observed in all the treatments may be probably due to the higher oil content of sesame seed meal. However, percentage crude protein was not significantly ($P>0.05$) different among the methods studied although sundried and soaked sesame meal had the highest crude fibre content. These results were within the range of nutrient requirement for broiler chickens reported by Olomu (1995) and Aduku (1992). The variations in values of some chemical compositions may be attributed to differences in processing methods.

The effect of processing methods on the anti-nutritional factors of sesame seed meal is shown in Table 3. Levels of tannin, oxalates, phytates and trypsin inhibitor recorded were within the range reported by Diarra *et al.* (2007). These anti-nutritional factors were significantly ($P<0.05$) reduced in the roasted and soaked sesame meal as compared to the sundried and boiled sesame meal. Diarra *et al*. (2007) had earlier reported that soaking is one of the most effective methods of lowering the anti-nutritional factors of the seed. This means sundrying alone may not be an effective method of reducing the toxic chemicals present in the meal to safe levels for poultry ration.

Growth Performance

The performance characteristics of broiler chickens fed experimental diets for 56days are presented in Table 4. The daily feed intake of birds fed soaked sesame seed meal was significantly ($P<0.05$) higher than those fed other diets. Average daily weight gain of birds fed the control, roasted and soaked sesame seed meal diets were not significantly ($P>0.05$) different. Birds fed So consumed significantly ($P<0.05$) more feed than those on other diets. Feed conversion ratio was significantly ($P>0.05$) similar for all the treatments except T2.

The observed increase in feed intake and body weight gain among birds fed Roasted and Soaked SSM diets could be attributed to better detoxification of the anti-nutrients by these processing methods. Diarra *et al*. (2007) had earlier reported that soaking is one of the most effective methods of lowering the phytic acid (PA) content of the sesame seed. They observed that soaking in water reduced phytic acids more than any other processing methods. However, the decreased average feed intake and body weight gain of birds on Sundried

Table 1: Gross Composition of the Experimental Diets

Ingredients,%	Control	Sundried (Su)	Roasted(Ro)	Boiled(Bo)	Soaked (So)
Maize	56.30	47.90	47.90	47.90	47.90
Rice offal	0.00	6.00	6.00	6.00	6.00
Sesame Meal	0.00	15.00	15.00	15.00	15.00
GNC	36.39	27.59	27.59	27.59	27.59
Palm oil	4.00	0.00	0.00	0.00	0.00
Bone meal	3.10	3.10	3.10	3.10	3.10
Salt	0.30	0.30	0.30	0.30	0.30
Limestone	0.60	0.60	0.60	0.60	0.60
Lysine	0.16	0.16	0.16	0.16	0.16
Methionine	0.20	0.20	0.20	0.20	0.20
*Premix	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
Determined Analysis (%)					
ME kcal/kg	3069	3183	3125	3193	3164
Crude protein	21.90	21.51	21.66	21.75	21.54
Crude fibre	3.39	4.24	4.21	4.50	4.86
Ether extract	7.87	12.34	12.34	11.87	11.47
Calcium	1.10	1.17	1.22	1.22	1.17
Phosphorus	0.52	0.53	0.54	0.53	0.53
Lysine	1.02	2.02	1.80	1.91	2.04
Methionine	0.47	0.40	0.47	0.34	0.48
Methionine+cystine	0.79	0.77	0.69	0.71	0.80
Feed cost/kg, ₦	67.23	70.95	70.94	70.95	70.94

*Su=Sundried sesame seed: Ro=roasted sesame seed: Bo=boiled sesame seed: So=soaked sesame seed. *Optimix premix supplied /kg of diet: Vit A- 13340 I.U; Vit. D_3-2680 I.U; Vit. E- 10 I.U; Vit. K- 2.68mg; Calcium pantothenate- 10.68mg; Vit. B_{12}- 0.022mg; Folic acid- 0.668mg; Choline chloride-400mg; Chlorotetracycline- 26.68mg; Manganese- 13mg; Iron- 66.68mg; Zinc, 53.34mg; Copper- 3.2mg; Iodine- 1.86mg; Cobalt- 0.268mg; Selenium- 0.108mg. ME – Metabolisable Energy

Table 2: Chemical composition of Differently Processed Sesame Seed Meal

Nutrient, %	Sundried (Su)	Roasted(Ro)	Boiled(Bo)	Soaked (So)	SEM
Dry matter	92.74^{a}	91.34^{b}	90.12^{b}	91.10^{b}	0.62
Crude protein	26.51	27.52	27.10	26.72	0.31
Crude fibre	8.04^{a}	5.87^{c}	7.25^{b}	8.20^{a}	0.58
Ether extract	54.38	56.11	55.94	54.30	0.91
Ash	5.66	5.35	5.36	4.88	0.40
NFE	5.41^{a}	2.15^{b}	2.82^{b}	4.90^{a}	0.82

NFE=Nitrogen Free Extract. SEM = Standard error of mean. a, b, c = Means in the same row having different superscripts are significantly different (P<0.05).

Table 3: Anti-nutritional factors Present in Differently Processed Sesame Seed Meal

Parameters, mg/100g	Sundried (Su)	Roasted(Ro)	Boiled(Bo)	Soaked (So)	SEM
Oxalate	1.80^{a}	0.82^{b}	1.35^{a}	0.80^{b}	0.25
Tannins	2.11^{a}	1.10^{b}	1.99^{a}	1.11^{b}	0.22
Trypsin inhibitor	1.62^{a}	0.14^{c}	1.10^{b}	0.16^{c}	0.19
Phytic acid	2.22^{a}	1.06^{b}	1.98^{a}	1.16^{b}	0.15

Determination done at the Biochemistry Department, National Veterinary Research Institute (NVRI), Vom, Jos. SEM = Standard error of mean. a, b, c = Means in the same row having different superscript are significantly different (P<0.05).

Table 4: Growth performance of Broiler Finishers Fed Diets Containing Differently Processed Sesame Seed Meal (56days)

Parameters	T1 (Control)	T2(Su)	T3(Ro)	T4(Bo)	T5(So)	SEM
Initial weight, g/b	57.15	57.14	57.15	57.16	57.14	1.59
Final weight, g/b	2225.93^{a}	1777.27^{c}	2190.74^{ab}	2126.64^{b}	2156.67^{ab}	48.07
Total weight gain, g/b	2168.78^{a}	1720.13^{c}	2133.60^{ab}	2069.50^{b}	2099.53^{ab}	46.07
Av. daily weight gain, g/b/d	38.73^{a}	30.72^{c}	38.10^{ab}	36.96^{b}	37.49^{ab}	0.85
Total Feed Intake, g/b	5425.00^{b}	5188.17^{c}	5473.61^{b}	5423.61^{b}	5548.61^{a}	27.70
Av. daily feed intake, g/b/d	96.88^{b}	92.65^{c}	97.74^{b}	96.85^{b}	99.08^{a}	0.50
FCR	2.50^{a}	3.02^{b}	2.57^{a}	2.62^{a}	2.64^{a}	0.24

a, b, c = Means in the same row having different superscript are significantly different (P<0.05). SEM = Standard error of mean; Su=Sundried sesame seed; Ro=roasted sesame seed: Bo=boiled sesame seed: So=soaked sesame seed; FCR=feed conversion ratio

Table 5: Carcass Characteristics of Broilers Fed Diets Containing Differently Processed Sesame Seed Meal

Parameters	T1(Control)	T2(Su)	T3(Ro)	T4(Bo)	T5(So)	SEM
Live weight, g	1941.70^{a}	1766.70^{b}	1950.30^{a}	1950.00^{a}	2000.00^{a}	59.58
Carcass weight, g	1429.17^{b}	1345.00^{c}	1545.00^{ab}	1587.50^{a}	1569.17^{ab}	46.87
Dressing, %	66.59^{b}	60.11^{c}	68.85^{a}	69.81^{a}	68.45^{a}	1.82
Breast, %	15.78^{b}	15.92^{b}	18.23^{a}	16.97^{ab}	16.40^{ab}	0.83
Thigh, %	11.28^{b}	12.33^{a}	12.50^{a}	12.68^{a}	11.05^{b}	0.45
Back, %	13.85	13.69	14.24	14.06	14.42	0.37
Wing, %	8.48	8.44	8.59	8.20	8.17	0.22
Drumstick, %	9.83^{bc}	9.70^{c}	10.64^{ab}	10.47^{abc}	10.74^{a}	0.19

a, b, c = Means in the same row having different superscript are significantly different (P<0.05). SEM = Standard error of means; Su=Sundried sesame seed; Ro=roasted sesame seed: Bo=boiled sesame seed: So=soaked sesame seed

SSM could be due to high residue of anti-nutritional factors (ANFs). It could be recalled that of all the processing methods studied, the level of ANFs was highest in the sundried sample. Oxalates have been reported to form complexes with mineral particularly calcium thereby making them unavailable to the body, cause irritation of the gut and resulting in low feed intake, inhibit protein and energy utilisation in broilers (Agwunobi *et al.,* 2002; Ndimantang *et al*., 2006; Okereke, 2012). Phytates impair the utilisation of protein and some minerals resulting in poor performance while tannins inhibits digestive enzymes and causes irritation of the gut. Not only does oxalate interfere with calcium absorption in the digestive tract, it also limits nitrogen retention (Hang and Preston, 2009; Hang and Binh, 2013). The improved feed conversion ratio observed in this study agrees with the findings of Bell *et al.* (1990); Diarra *et al.* (2007), Yasothai *et al.* (2008) and Agbulu *et al.* (2010). They attributed the increase in performance of birds to the roles of methionine present in sesame seed meal.

Carcass Characteristics

The result of carcass characteristics of broiler chickens fed experimental diets for 56days are presented in Table 5. Birds fed Ro, Bo and So diets were significantly (P>0.05) comparable in all the carcass parameters considered. The live weight, carcass weight and dressing percentage of birds fed Su diet was significantly (P<0.05) lower than those fed other diets.

Back and wings weight were not significantly (P<0.05) different across the treatment groups.

The significant differences observed in the live weight, carcass weight and dressing percentage in this study was contrary to the report of Diarra *et al.* (2007). They observed no significant difference in slaughter, dressed

Table 6: Organs weight of Broilers Fed Diets Containing Differently Processed Sesame Seed Meal

Parameters	T1(Control)	T2(Su)	T3(Ro)	T4(Bo)	T5(So)	SEM
Liver, %	3.82	3.65	3.86	3.80	3.93	0.23
Heart, %	0.87	0.76	0.79	0.77	0.97	0.18
Gizzard, %	2.83^{bc}	2.87^{bc}	3.06^{ab}	2.57^{c}	3.39^{a}	0.11
Spleen, %	0.31	0.20	0.21	0.33	0.24	0.09
Abdominal fat, %	2.44	2.35	2.57	2.17	2.56	0.27
Intestine weight, %	8.05^{b}	10.96^{a}	9.60^{a}	8.06^{b}	10.38^{a}	0.88

a, b, c = Means in the same row having different superscript are significantly different (P<0.05). SEM = Standard error of means; Su=Sundried sesame seed: Ro=roasted sesame seed: Bo=boiled sesame seed: So=soaked sesame seed

and carcass weight when broilers were fed differently processed sesame meal diets. Also, Yakubu and Alfred (2014) evaluated the nutritional value of toasted white sesame seed meal as a source of methionine on carcass characteristics of finisher broiler chickens and reported no significant differences in all the parameters measured except abdominal fat. Although, Njidda and Isidahomen (2011) reported significant differences in dressing percentage of rabbits fed sesame seed meal, their findings were based on raw sesame seed meal alone. The weights of thigh, wings, drumstick and breast compared favourably with the report of Oluyemi and Robert (1988) but were higher than the values reported by Diarra *et al*. (2007). These differences may be due to the breed of birds used for the study, variety of sesame seed used and the climatic factors of the experimental site.

Organs weight

The results of Organs weight of broiler chickens fed experimental diets for 56days are presented in Table 6. There were no significant (P>0.05) differences in the parameters measured except the weights of gizzard and intestine. Birds fed Su, Ro, and So diets had significantly (P>0.05) higher weights for gizzard and intestine than those fed other diets. The fact that most of the internal organs measured showed no significant difference in size means that the test diets did not contain any appreciable ANFs that could be detrimental to the organs. Diarra *et al*. (2007) also observed non significant differences in the weights of organs measured when broilers were fed differently processed sesame seed meal diets. The differences observed in the weight of the intestine across the treatments may be due to their involvement in the digestion process.

CONCLUSION

On the basis of the results of this study, it was observed that roasting and soaking were adequate to remove toxic phytochemicals in sesame seed to tolerable levels for broiler chickens. Therefore, up to 15% of roasting and soaking sesame seed meal can be included in the diet of broiler chickens without adverse effect on growth performance, carcass characteristics and organs weight. Further research is therefore recommended on higher inclusion levels.

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academicresearchJournals

Vol. 3(2), pp. 21-24, February 2015
DOI: 10.14662/ARJASR2014.037

ISSN: 2360-7874
http://www.academicresearchjournals.org/ARJASR/Index.htm

Academic Research Journal of Agricultural Science and Research

Full Length Research

Evaluation the effects of black tea extract (*Comellia sinensis*) on *Staphylococcus aureus* at *invitro* condition

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Accepted 23 December 2014

Staphylococcus aureus **infections are an important cause of skin, soft tissue and invasive infections that are acquired in hospitals or community. Nowadays antibiotics play important role for treating bacterial infections, but due to the increasing resistance of bacteria and their side effects, the use of plant extracts as alternative treatment being used. Antibacterial affects different types of tea have been proven, synergistic effects of tea have also been reported with antibiotics. The aim of this study was to evaluate the inhibitory effect of black tea extract on *Staphylococcus aureus* compared with the standard antibiotic. In this study, black tea extract was prepared by using the percolation method. Bacteria were tested by antibiogram test with standard antibiotic discs containing ciprofloxacin, cefazolin and vancomycin. Data were analyzed using statistical tests and analysis of variance. The results were obtained from this study showed that black tea extract on the growth of *Staphylococcus aureus* inhibitory is dose-dependent 100 mg/ml has the maximum inhibitory effect.**

Key words: Black tea extract, *Staphylococcus aureus,* antibiogram, The inhibitory effect, invitro

INTRODUCTION

Comellia sinensis is the one of the most popular and consumed beverage in the world, Nataro (2006). Black tea use might be in China, Japan and some other countries in East Asia and India (Shoa hasani *et al*, 1998).Catkin is an antioxidant that accelerates the respiratory movements, blood circulation, energy, digestion, etc (Memarzadeh *et al.*, 2012). *Staphylococcus aureus*, is a Gram-positive bacterium which grow on the skin and Upper respiratory system (Grundmann *et al.*, 2006). It was leading pneumonia after viral infections. It also causes blood vessel inflammation, meningitis, urinary ducts infections, ect , Turkyilmaz and Kaya,(2006). It is one of the most important pathogens that make food poisoning (Adwan *et al*, 2005; El-Ghodban *et al.*, 2006). Nowadays antibiotics play important role for treating bacterial infections, but due to the increasing resistance of bacteria and their side effects, the use of plant extracts as alternative treatment being used. Khalaji and Neiestani (1996).

MATERIALS AND METHODS

Percolation method for the preparation of extracts, black tea transferred to a flask Meyer 2 L ethanol 70% was added. Incubation should result in confluent growth. Some *E. coli* isolates may not have sufficient growth after 24 h incubation. These are reincubated immediately and inhibition zones read after a total of 48 h incubation. Then the extract was filtered. Extract was concentrated with

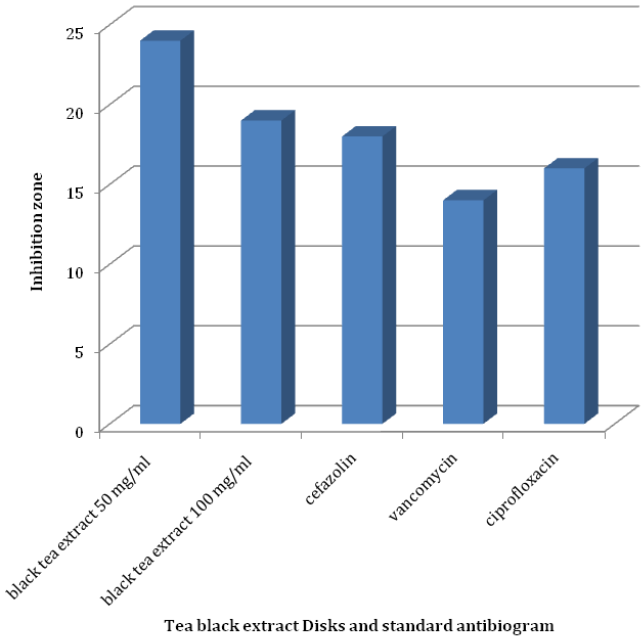

Figure 1: Evaluation inhibition zone of tea black extract disks and compare to standard antibiotic disks with Disk diffusion

extract evaporation tool and the volume titrated up to 20 mg/ml. The extract was dried with incubation at 50°C, 250mg/ml dimethyl sulfoxide (DMSO) was prepared respectively. Pure strains of *Staphylococcus aureus* ATCC: 29213 were used. Bacterial susceptibility testing was evaluated by two methods: *Disk diffusion* and *Pour plate*.

Disk diffusion method

50 and 100 mg in 25 ml of black tea extract were inoculated blank discs. Discs were incubated for one hour at 37 °C. Bacterial cultures were cultured with a sterile swab into Mueller Hinton agar medium. Black tea extract disks and antibiotics standard disks including vancomycin (5 mg), cefazolin (30 mg), and ciprofloxacin (5 mg) were placed on the Cultures individually. The plates were transferred into in an incubator at 37 °C. The results were read after 18 hours. Inhibition zone diameter around the disk containing tea extract and standard antibiotic discs were recorded with a ruler. SPSS was measured and analyzed. Statistical analysis was done by using SPSS software.

Pour plate method

In this method, black tea extract 50 and 100 mg/ ml were prepared in Thioglycolate 1ml bacterial suspension(equivalent to 0.5McFarland) was added to tea extracts which were incubated at 37 °C. One ml was transferred to sterile plates after 1, 2, 3, 5,7and 72 hours.10ml fused nutrient agar medium has been added at 45 °C. Bacteria are spread uniformly in the medium. Plates were incubated at 37 °C and the results of in vitro growth or no growth of bacteria was read after 24 hours.

RESULTS

Results shown black tea extract concentrations reduced the growth of *Staphylococcus aureus* bacteria in Pour plate method ($p>0.05$). Antibiogram test method was performed 8 times. Then the diameter of the growth inhibition were calculated and used for statistical analysis. The analysis of variance of mean inhibition zone diameter of standard antibiotic ciprofloxacin, cefazolin and vancomycin shows significant differences in two different concentrations of black tea extract.

Result indicated that black tea extract at a concentration of 100 mg/ ml had the greatest effect on *Staphylococcus aureus* compared to standard antibiotics. Comparison of the results showed that 50 mg/ml black tea extract were not significantly different with standard antibiotics ciprofloxacin, cefazolin and vancomycin ($p>0.05$) (Figure 1).

DICUSSION

Staphylococcus aureus has been introduced as a major cause of hospital infections. Future research is necessary in the organism due to the problems which make in the world and the second leading cause of wound infection after surgery.

So far, many reports on the antibacterial activity against a variety of microbes have been published (Bandyopadnyay *et al.*, 2005; Taguri and Tanakat, 2004). Synergy effects of tea have also been reported with antibiotics (Isogia *et al.*, 2001;Toda *et al.,*1989) demonstrated that tea extracts resulted in killing or inhibiting the growth of pathogenic bacteria such as *Staphylococcus aureus, Staphylococcus epidermidis*, *Shigella dysentery,* and *Vibio* strains. Other studies have also shown that green tea polyphenols leaves have inhibitory effect on the growth of *E.coli*, streptococcus (Horiuchi *et al.,* 1992).

Deterrent effect of black tea extract on growth of *Staphylococcus aureus* has been found in *invitro* codition. 50 mg/ml black tea extract were not significantly different with standard antibiotics ciprofloxacin, cefazolin and vancomycin. Greatest effect on *Streptococcus mutans* was observed in a study on luteolin polyphenol anti-bacterial plant seeds of *Prila*. Inhibitory effects of apple polyphenols and some other plants have also been reported (Yanagida *et al.,* 2000). The strong antioxidant properties of black tea have been attributed to its chemical components of thearubigins, phenolic acids, catechins, and theaflavins. Theaflavins which impart color, brightness, and astringency to black tea infusion possess potent antioxidant properties(Luczaj *et al.,* 2005 ; Ngure *et al.,* 2009).

Plant polyphenols, tannins, have been suggested to exert their growth inhibitory effects through auto-oxidation and hydrogen peroxide production, but in certain circumstances some bacterial genes may be induced (like *OxyR* in *E.coli*) so that strengthening bacterial antioxidant defense mechanisms may overcome tannin inhibitory effects (Isogia *et al.*, 2001) The concentration of the polyphenolic compounds may have some role in this process. However, the inhibition of bacterial growth after 3–24 hours of incubation with tea extracts and also the attenuation of antibiotics by tea extracts at certain concentrations all strengthen the possibility of selective drug–tea interactions.

Considering the findings of this study and comparison with other studies in this field black tea extract can be controlled growth of *Staphylococcus aureus* in vitro condition. We suggest more research of black tea extract with different concentrations.

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academicresearchJournals

Vol. 3(2), pp. 25-31, February 2015
DOI: 10.14662/ARJASR2014.038

ISSN: 2360-7874
http://www.academicresearchjournals.org/ARJASR/Index.htm

Academic Research Journal of Agricultural Science and Research

Full Length Research

Effects of Educational Background on Students' Attitudes toward Agriculture at king Saud University

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Accepted 30 December 2014

The primary purpose of the study was to determine the attitudes of students at king Saud University toward agriculture programs and the field of agriculture in an effort to better identify, recruit, and retain students in the College of agriculture. The population of the study was 860 students from king Saud University .The retain were 200 from Sciences Colleges and 300 from Humanities Colleges. Questionnaire reviewed for content and face validity by a panel of experts from department of agricultural extension at the college of agriculture, King Saud University. A three-point Likert -type scale was used. Cronbach's alpha coefficient was found to be 0.89, which indicated the internal consistency of the scale. Generally, the attitudes of students from Sciences Colleges toward the field of agriculture were positive. The attitudes of students from Humanities Colleges toward the field of agriculture were somewhat negative. Nearly 71% of respondents from Science Colleges and 28% of respondents from Humanities Colleges indicated that Agriculture is a scientific area of study. Only 41% of the respondents from Science Colleges and 20% from Humanities Colleges indicated that more students should be encouraged to enroll in the College of food and Agricultural sciences. Sixty one percent of respondents from Sciences Colleges and 56 percent of respondents from humanities colleges indicated that Colleges of agriculture are better suited to male students. Significant differences at the level of 0.01 were detected, in means of students from Sciences Colleges and those students from humanities Colleges. Students from Sciences Colleges displayed different attitudes toward the field of agriculture than did students from humanities Colleges. Generally, students from Sciences Colleges possessed attitudes, which were supportive of agriculture as a career field. They viewed agriculture as being both scientific and technical. It was recommended that a counseling program should be implemented to better create awareness between students and identify and retain students who may be interested in pursuing degrees from the College of Agriculture

Keywords: attitudes, education, agriculture, colleges

INTRODUCTION

The total population of the Middle East was Bedouin. They are animal herders who migrate into the desert during the rainy winter season and move back toward the cultivated land in the dry summer months. Although the Bedouin, as a matter of caste, traditionally despise agricultural work and other manual labor, many of them have become sedentary because of political and economic development.

In 1910 King Abdul Aziz worked on the idea of converting Bedouin tribes to sedentary farmers, rather than leaving them to roam desert searching for water and pasture. Programs for the launching of a settlement for

Bedouin were started in 1912. The purposes of the programs were to teach Bedouin how to cultivate the land, and how to live impermanent homes. In each settlement, an agricultural worker was appointed to teach, educate and train the sons of the Bedouin on the arts of agriculture (Al-shenaifi, 1990)

His Majesty the King Abdul Aziz had put the building blocks for the development of technical education and vocational training in the Kingdom. Education and training is of great importance in raising the efficiency of the members of our country to push behind the technological revolution that is taking many forms and dimensions.

The Technical and Vocational Training Corporation, which was formerly known as General Organization for Technical Education and Vocational Training is the Saudi Government leading provider of Training. With collages and institutions all across the Kingdom of Saudi Arabia, TVTC caters for more than 120 000 trainees in more than 100 locations (TVTC)

The high economic growth of Saudi Arabia during the oil boom in the 1970s and 1980s resulted in a shortage in the number of workers needed to support the growing economy. It leads Saudi Arabia to relies heavily on a core of foreign workers cutting across all sectors and skill levels. The transformation from an economy based on nomadic trade, fishing, grazing, hunting, and agriculture to an economy based on hydrocarbon, construction and service industries using modern technological production processes, resulted in the need for a new breed of skilled workers, who were not available locally.

Saudi Arabian society holds a negative perception of skilled and manual jobs. One of the main contributory factors is the association of these jobs with expatriates. The absolute majority of these jobs are held by low paid expatriates with a low social status. In addition, Saudi Arabian families and Bedouin tribes take pride in not being involved in the so called downcast work and take pride in working in the prestige sectors i.e. administrative work in the public sector. (KAMEL, 2000)

Research on socialization showed that, attitudes toward things develop very early in life. Parents are known to pass their values onto their children. But, education had a positive impact on the attitude of individuals.

Attitude is a term of favor or disfavor toward a person, event, place or thing. Attitude can be formed from a person's past and present. (Allport, 1935) It can be defined as a positive or negative evaluation of people, objects, event, activities, ideas, or just about anything in your environment.

Social and cultural values are found to be very strong in discouraging students from acquiring vocational skills leading to skilled manual jobs. Students perceive that their pride and social acceptance are related to the type of work they do and the sector they work in. They argue that Saudi families and Bedouin tribes take pride in not being involved in manual work associated with dirty work practices. Although, technology has changed the way these jobs are carried out by becoming more technical, society still holds the same views about working in these sectors. For example, after one college secured a job offer for a graduate to work as production supervisor in a footwear company, the college was criticized by the student's family for trying to involve the student in the leather sector.

One of the negative attitudes of youth in Saudi Arabia toward manual labor is to dislike working in agriculture. It is due originally to the Bedouin lifestyle .The Bedouin criticizes working in occupations such as agriculture, forging, and carpentry. This negative attitude has become one of the values of Bedouin. It prevails in many of the Bedouin communities.And even with the changes in circumstances, Bedouin still prefer certain jobs such as driving a car or a guard or military services (Al-shenaifi 1993).

The problem addressed by this study was how to identify students who are likely to enroll in an agricultural program of instruction and seek employment in the industry of agriculture. A person intended to pursue study in a field of agriculture or to become actively involved in an agricultural career may be predicted by analyzing his beliefs about agriculture. Greenwald (1989) reported that individuals with positive attitudes toward a subject or situation tend to evaluate it positively. Indeed, once you know someone's attitudes, you would think you would be able to predict his behavior toward the object. Attitudes can be useful prediction tools

Purpose

The primary purpose of the study was to determine the attitudes of students at king Saud University toward agriculture programs and the field of agriculture in an effort to better identify, recruit, and retain students in the College of food and agricultural sciences. The questions used to guide the study were:

1. What were the attitudes of students toward college of food and Agriculture?
2. What were the attitudes of students toward the field of Agriculture?
3. Was there significant differences between the Attitudes of students from Sciences colleges and students from humanities colleges?

METHODOLOGY

The study was a descriptive survey design. The population of the study was 860 students from King Saud University. A questionnaire were distributed on eight hundred sixty students from KSU in student center (Alba

how) on 3and 4 of September 2014 from 8AM to 2PM. The returned were 200 questionnaires from Sciences colleges and 300 questionnaires from Humanities colleges. Statements of the questionnaire were taken, with some modifications, from research by Osborne and Dyer 1996. Questionnaire reviewed for content and face validity by a panel of experts from department of agricultural extension at the college of food and agriculture, King Saud University. A three-point Likert - type scale (1 = agree, 2 = Uncertain, 3 = Disagree) was used. Cronbach's alpha coefficient was found to be 0.89, which indicated the internal consistency of the scale. Data was analyzed using descriptive statistics, including frequency, measures of central tendency and T test. Significant differences were tested on the level 0.01of significance.

FINDINGS

Question one: What were the attitudes of students toward college of food and Agriculture?

Few of the students, as shown in Table 1, indicated that more students should encourage enrolling in the College of food and Agricultural Sciences. Only 41% of the respondents from Science colleges and 20% from Humanities Colleges indicated that more students should be encouraged in enrolling in the College of food and Agricultural sciences. Whereas 41 % students from Science Colleges and 47%from Humanities Colleges disagreed in encouraging students to enroll in the College of food and Agricultural sciences. Forty percent of students from Science colleges and 44% students from humanities colleges reported that only students pursuing careers in agriculture should enroll in the college of food and Agricultural Sciences, sixty three percent of students from Science colleges and 40% students from humanities colleges agreed that studying agriculture is easier than most of other majors. Sixty two percent of students from Science colleges and 56% of students from humanities colleges viewed college of food and Agricultural sciences as better suited to male students than female students.

Question Two: What were the attitudes of students toward the field of Agriculture?

Generally, the attitudes of students from Science Colleges toward the field of agriculture were positive, whereas, the attitudes of students from Humanities Colleges toward the field of agriculture were somewhat negative. As indicated in Table 2. Sevent-one percent of respondents from Science Colleges and 28% from Humanities Colleges viewed Agriculture as a scientific area of study. Sixty three percent of respondents from Science Colleges and 37% from Humanities Colleges viewed the field of agriculture as blend of scientific principles and agricultural practices. Eight five percent of respondents from Science Colleges and 35% from Humanities Colleges viewed agriculture as a highly technical field of study. Forty six percent of the respondents from Science Colleges and 51% from Humanities Colleges do not believe that the image of agriculture is improving. Seventy seven percent of respondents from Science Colleges and 62% from Humanities Colleges agreed that only students with a farm background should pursue agricultural careers

Question three: Was there a significant difference between the Attitudes of students from Sciences colleges and humanities Colleges?

Significant differences at the level of 0.01 were detected, in means of students from Sciences colleges and those students from humanities colleges, as shown in Table 3. Students from Sciences colleges displayed different attitudes toward the field of agriculture than did students from humanities colleges. Generally, students from Sciences colleges possessed attitudes, which were supportive of

Agriculture as a career field, they viewed agriculture as being both scientific and technical. They also have more positive attitudes toward agriculture programs, and agriculture as a career than do students from humanities colleges. All students agreed with the statements that agricultural programs courses are better suited for male students and students pursuing careers in agriculture should enroll in agriculture. Students from humanities colleges do not see any changes in the image of agriculture, whereas students from sciences colleges see some improvement in the image of agriculture. Both students agreed that, only students pursuing careers in agriculture should enroll in college of agriculture and all students believed that, only students with farm backgrounds should pursue careers in agriculture.

DISCUSSION

There are a number of colleges in agriculture in Saudi Arabia. The first College of Agriculture was established, at King Saud University (formerly University of Riyadh) in 1965, then the Faculty of Agricultural and Food Sciences, in King Faisal University in1975. The college of veterinary medicine was established in 1976. The Faculty of Meteorology, Environment and Arid Land Agriculture was established in 1981. The establishment of the College of Agriculture and Veterinary Medicine at University of Qassim was established in 1982.

Agricultural education is a kind of technical education,

Table1. Attitudes of students toward college of food and agricultural sciences

Statement		Science Colleges (N200)			Humanities Colleges (N300)		
		Agree	Uncertain	Disagree	Agree	Uncertain	Disagree
More students should be encouraged to enroll in college of agriculture.	F	83	35	82	60	100	140
	%	41.5	17.5	41	20	33.33	46.67
College study in agriculture is easier than in most other majors	F	126	41	33	119	69	112
	%	63	20.5	16.5	39.67	23	37.33
Only students pursuing careers in agriculture should enroll in college agriculture courses	F	98	56	46	131	53	116
	%	49	28	23	43.67	17.67	38.66
Colleges of agriculture are better suited to male students.	F	123	39	38	168	43	89
	%	61.5	19.5	19	56	14.33	29.67

Table 2. Attitudes of students toward Agriculture as an Area of Study

Statement		Science Colleges (N200)			Humanities Colleges (N300		
		Agree	Uncertain	Disagree	Agree	Uncertain	Disagree
Agriculture is a scientific area of study	F	141	40	19	85	67	148
	%	70.5	20	9.5	28.33	22.33	49.34
Agriculture is a blend of scientific principles and agricultural practices	F	125	29	46	112	46	142
	%	62.5	14.5	23	37.33	15.33	47.34
Agriculture is a highly technical field of study.	F	169	10	21	105	67	128
	%	84.5	5	10.5	35	22.33	42.67
The image of agriculture is improving.	F	70	38	92	123	23	154
	%	35	19	46	41	7.67	51.33
Only students with farm backgrounds should pursue careers in agriculture	F	153	12	35	185	53	62
	%	76.5	6	17.5	61.67	17.67	20.66

which aims to give the individual a degree of culture and technical information in agriculture, and to provide students with practical skills through fielded exercises, to enable them to master the performance of agricultural operations effectively and efficiently. And to prepare workers required for working in the agricultural sector.

Agriculture is a science, an art, trading and industrialization of plant crop and animal that are beneficial to human's consumption. The definition of agriculture as a science is new. Agriculture was used to be seen as old practices. Sowing, plowing, adjustment of land and putting seeds in the soil were seen as old habits. Farmers put seeds in the soil to grow under natural conditions until the time of harvesting. Agricultural practices were seen as an old legacy and experiences that passes from generation to generation.

Agriculture in addition to being science, it is also a profession. The science of agriculture can be acquired from studying books and references, but the art of agriculture cannot be acquired from studying in books alone. The precision in agricultural work, the conduction of various agricultural practices and agricultural timing, need a lot of individual's training to become an expert in the performance of these practices in the field. Therefore, the field, not the class room, is the best place to master the craft of agriculture**.**

Agriculture is also an industry. It is as products sold in the market. The prices of agricultural products are affected by many factors that require the farms to be familiar with buying and selling wisely. Farmers should also know the means by which, they can reduce production costs. And they should know the other information that enables them to get a higher profit with minimal effort and low costs.

Agriculture is the main industry, which relies upon it other industries. It is the first industry that pushed the

Table 3. Comparison of Attitudes of students of Science Colleges Versus students of Humanities Colleges

Statements					
1-Agriculture as an Area of Study	**Groups of students**	**Means**	**SD**	**T**	**P**
Agriculture is a scientific area of study	Humanities Colleges	4.12	.62	16.96	.0001*
	Sciences Colleges	2.95	.67		
Agriculture is a blend of scientific principles and agricultural practices	Humanities Colleges	4.35	.66	15.41	.0003*
	Sciences Colleges	2.70	.723		
Agriculture is a highly technical field of study.	Humanities Colleges	3.90	.99	13.99	.0005*
	Sciences Colleges	1.71	.59		
The image of agriculture is improving	Humanities Colleges	3.15	.84	5.68	.0003*
	Sciences Colleges	2.45	.51		
Only students with farm backgrounds should pursue careers in agriculture.	Humanities Colleges	1.12	.89	4.68	.15
	Sciences Colleges	1.65	.68		
2- College of Agriculture					
More students should be encouraged to enroll in college of agriculture.	Humanities Colleges	3.32	.74	4.49	.0001*
	Sciences Colleges	2.53	1.1		
College agriculture courses are better suited to male students.	Humanities Colleges	3.65	.89	12.78	.025
	Sciences Colleges	3.74	.69		
College study in agriculture is easier than in most other majors.	Humanities Colleges	2.54	.60	18.46	.0001*
	Sciences Colleges	4.81	.88		
Only students pursuing careers in agriculture should enroll in college of agriculture.	Humanities Colleges	176	.66	14.34	.062
	Sciences Colleges	1.62	.87		

* Significant differences on level 0.0

industrial sector to the progress. It is the basic supplier of raw materials, capital and manpower needed for other industries. It is the source of the population food and cloths.

Agriculture is not only the land, plant and animal but also the farmer and his family, their social, economic, cultural and physical needs have effects on agriculture. So supplying the needs of farmers are just important as the land and crops

Global agriculture is classified in three group, advanced agriculture, underdeveloped agriculture and third traditional agriculture. Advanced agriculture, uses new technology to produce goods, which led to the satisfaction and wishes of the population. The traditional agriculture uses undeveloped conventional elements in the production of agricultural commodities which hardly satisfy the desires of the population Developing agriculture is that type of agriculture, which is located between the traditional and advanced agriculture. This agriculture began to take reasons for progress through the use of modern means of production.

Successful agriculture depends on three main components. Technological success, economic success in marketing agricultural crops, and finally, social success which mean living a good life full of excitement and free of problems.

Attitudes can be defined “as a positive or negative evaluation of people, objects, event, activities, ideas, or just about anything in our environment” (Zimbardo et al., 1999). Attitudes form from our experiences and serve to guide our future behavior.

Students in Saudi Arabia are taught to dislike agricultural education indirectly. Students who their greed point averages are low, are sent to enroll in agricultural colleges. That gives students an impression that agriculture education is for poor students. The major reason listed for not enrolling in agriculture courses was, the poor reputation of agricultural program among students; it is the education of poor students. (shenaifi, 1993)

In Saudi Arabia, female enroll in colleges of food and agriculture in the areas of human nutrition. They are not allowed to enroll in other departments. Saudi laws based on the Shari's guarantee a woman's right to work, but stipulate that she should work in an appropriate environment i.e., not mixing with men or being exposed to harassment. Occupation gender segregation in professional jobs is therefore prevalent. Women are concentrated in professions that are seen as feminine and remain in less distinguished positions than men.

The Saudi government is making major efforts to improve the status of women in terms of employment. However, a number of social, legal, educational, and occupational factors continue to hinder Saudi women's full participation in the labor market, preventing the Kingdom from reaching its full economic potential. Although incorporating women fully into the labor market may not be achieved overnight, it can and must be achieved if the Kingdom is to transit to a knowledge-based economy.

The public sector is the largest employer of Saudi women, and women currently represent around 30 percent of government employees. Around 95 percent of working Saudi women are in the public sector: 85 percent in education, in both teaching and administrative positions, 6 percent in public health, and 4 percent in administration. (strategy, 2014)

People hold different attitudes toward agriculture, in Texas, USA the minority students had more negative attitudes toward agriculture and agricultural occupations than did white students. (Talbert and Alvin, 1992). The findings of Isabella Gidarakoa (1999) indicated that the attitudes of girls toward farm employments remain extremely negative. Their attitudes to the prospect a having a farmer for husband is more flexible, but only in certain condition. In Illinois, USA results indicated that approximately 90% of both students and parents perceived the science applications in agriculture courses to be of 'Excellent" or "Good" quality. Both students and parents reported positive attitudes toward agriculture as a career field and toward agricultural technologies. Each expressed views classified as "uncertain "toward educational programs in agriculture. Whereas students expressed positive attitudes toward careers in agriculture, parents were reluctant to recommend those careers **(**Osborne, and. Dyer2000) .Eck and Torres findings suggest that administrators tend to have a moderately favorable attitude toward agricultural education at the primary school level. Factors found to be associated with attitude were age, level of education, and years experience in public education.

Previous studies in USA showed that high school students had relatively low attitude and belief scores, indicating they did not value learning about international agricultural issues, and had limited awareness of international agricultural concepts .College students demonstrated a similar lack of knowledge and understanding about international agricultural issues (Redmann, Schupp, & Richardson, 1998).

CONCLUSION

Student from Science Colleges viewed agriculture as being both scientific and technical. They have more positive attitudes toward agricultural programs and agriculture as a career than do students from humanities colleges. If the mission of the college of Agriculture is to produce graduates for entry into the agricultural industry, Improvement needs to be made in both the identification and retention of students who are accepted into colleges of agriculture and who are expected to complete a degree within the college. The agricultural industry places considerable importance on the background and experience of graduates

RECOMMENDATION

1. A counseling program should be implemented to better identify and retain students who may be
Interested in pursuing degrees from the College of Agriculture

2. Most students in King Saud University do not have an opportunity to get to know agriculture in high
School, therefore the agriculture programs should be expanded to high school so that all students have.
The opportunity for agricultural experience

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