NOTA BREVE

# LINEAR MODELS TO FUNGI EFFECT ON NUTRITIONAL VALUE OF *PROSOPIS JULIFLORA* {SW} D.C.*

## MODELOS LINEARES PARA A OCORRÊNCIA DE FUNGOS SOBRE O VALOR NUTRITIVO DE *PROSOPIS JULIFLORA* {SW} D.C.

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ADDITIONAL KEYWORDS

Mesquite. Nutritive value. Statistic analysis.

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Algaroba. Valor nutritivo. Análises estatísticas.

## SUMMARY

Mesquite (*Prosopis juliflora*) is a legume species that produces fruits about 20.0 cm length and honey flowers. Studies have showed that this species can survive on very low rain index, as 50 mm, and it grows on poor soils. However, when it has being cultivated in fertile soils it is more profitable. Its pods production varies to 2-8 t/ha being frequently a production between 2-3 t/ha/year for dry regions, otherwise the presence of fungi in their fruits, mainly opportunist genus as *Aspergillus*, *Fusarium* and *Thricoderma*, may cause animal intoxication with their toxins. This work aimed to evaluate the influence of fungi occurrence on nutritional value of mesquite pods. It was used a completely randomized design with a 3 x 3 factorial arrangement, where correspondent nine treatments resulting from the combination of 3 dehydration times (0, 12 and 24 hours) and 3 storage times (0, 30 and 60 days) were tested with 4 replications each. It was evaluated the effect of fungi occurrence in mesquite ground pods (percent FOMGP) on dry matter (percent DM), crude protein (percent CP), ether extract (percent EE), neutral detergent fiber (percent NDF), acid detergent fiber (ADF) and ash content. Results showed that FOMGP reduced DM content ($y= 88,321 – 0,984^* x$; $R^2= 0,50$), increased CP content ($y= 5,676 + 0,723^{**} x$; $R^2= 0,68$) and it was not observed any effect on the other variables evaluated.

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## RESUMO

A algaroba (*Prosopisjuliflora*) é uma espécie leguminosa e produz frutos com até 20,0 cm de tamanho e flores doces. Estudos têm mostrado que pode sobreviver sob baixos índices pluviométricos, tais como 50 mm, e cresce em

solos pobres. No entanto, quando cultivada em solos férteis, é bem mais produtiva. A produção de vagens varia de 2 a 8 t/ha, mantendo freqüentemente uma produção média de 2 a 3 t/ha/ano em zonas secas. Porém, é comum a presença de fungos em seus frutos, principalmente a dos gêneros *Aspergillus*, *Fusarium* e *Thricoderma*, os quais podem causar intoxicação animal. O objetivo deste trabalho foi avaliar a influência da ocorrência de fungos na composição química das suas vagens. O delineamento experimental utilizado foi o inteiramente casualizado em um fatorial 3x3, com nove tratamentos resultantes da combinação de três tempos de desidratação das vagens (0, 12 e 24 horas) e três tempos de armazenamento (0, 30 e 60 dias). Os tratamentos foram distribuídos inteiramente ao acaso, utilizando-se o esquema fatorial 3x3, com quatro repetições. Foi avaliada a ocorrência de fungos (OF) nos teores da matéria seca (MS), proteína bruta (PB), extrato etéreo (EE), fibra em detergente neutro (FDN), fibra em detergente ácido (FDA) e matéria mineral (MM). Os resultados mostraram que a OF nas vagens fez decrescer a MS ($y= 88,321 – 0,984^{*} x$; $R^2=0,50$), aumentar a PB ($y= 5,676 + 0,723^{**} x$; $R^2= 0,68$) e a ausência de diferenças significativas em relação às demais variáveis.

## INTRODUCTION

Mesquite (*Prosopis juliflora* {SW} D.C.) is a legume species and produces fruits with until 20,0 cm length and honey flowers (Muthana, 1985). Studies have showed that this species can survives in very low rain index, like 50mm, and it grows in poor soils. However, when it has being cultivated in fertile soils it is more profitable (Manso Filho, 1996). Its green bean production varies 2-8 t/ha, it being frequently a production between 2 to 3 t/ha/year for dry regions (Azevedo, 1982). Mesquite pods present high energy and crude protein content, being a suitable ingredient to substitute partially maize and wheat middlings in animal diets. However, for improving protein retention, studies have been shown the pods must be grinded when feeding animals mainly because to the lack of digestion process with non-grinded pods (Barbosa, 1977). Changes promoted by fungi in feed products are extensively known. Some of these transformations are desirable and yet necessary due to improvement on nutritional quality and flavour, like that observed on fungi ocurrence in some types of cheese. However, the fungi can promote undesirable changes in the feed as changes in organoleptic properties in different degrees.

According to Cruz (1985), food decomposition may lead to bad consequences for people and animal health, thus book references have a lot of works with registers on fungi contamination of feed and causing toxicological symptoms to the feeders.

Feedstuff and feed contamination by fungi refer mainly to the utilization of contaminated grains by fungi toxins, bad feedstuff stocking conditions or by ingestion of contaminated forage by endophytics fungi (Cavalcante, 1998).

Thus, the aim of this study was to determine the influence of fungi occurrence in chemical composition of mesquite ground pods.

## MATERIAL AND METHODS

Mesquite ground pods were collected on September, 2002 at Palmeira dos Indios City, located in the dry region of

Alagoas State. It is 290 meters over sea level, wet and hot weather, 17°C minimum and 34°C maximum temperatures, with its economy based on farming. The experimental period was September, 2002 until January, 2003. This work was conducted in the Laboratory of Aquatic Organisms Nutrition-Chemical Division, from UFAL (Federal University of Alagoas). It was studied 3 periods of dehydration with sun exposition by 0, 12 and 24 hours and 3 periods of no sun exposition storage by 0, 30 and 60 days. Selected experimental outline was randomized completely 3x3 factorial design with 4 replications.

Samples were analyzed for DM, CP, EE, NDF, ADF and ash content (percent), according to AOAC (1984). Fungi were identified on level of genera based in taxonomic keys wrote by Barnett and Hunter (1987). Fungi occurrence influence on chemical composition was observed by regression analysis, F and *t* test to regression coefficients' significance ($p<0.1$).

## RESULTS AND DISCUSSION

This study was possible by the arithmetic average inside of each storage period (AAIS), considering all the 13 fungi species that may occur or not in mesquite pods outer layer and their seeds. The used method was calculated by the mathematics formula which calculated the relation between the total percentage of each fungi occurrence (TPFO) in the mesquite pods and the identified species numbers (ISN) in the same material.

percent AAIS= percent TPFO/ISN

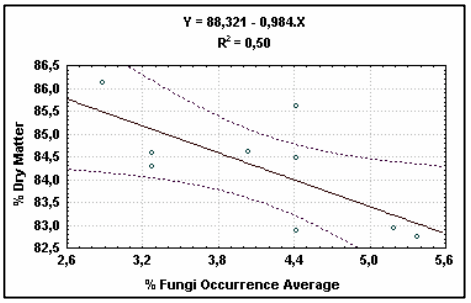


***Figure 1.*** *Effect of fungi occurrence on dry matter content of mesquite pods.* (Efeito da ocorrência de fungos sobre a matéria seca da algaroba).

The **figure 1** shows the linear regression model to the DM in relation to the average percentage by fungi occurrence in the mesquite ground pods. It can be observed when it prolongs the storage period there is a decrease in DM content. This model has 50.0 percent of adjustment degree. It may be inferred that the hygroscope capability of the mesquite pods and the high relative humidity during the experimental period caused this trend.

The **figure 2** shows the linear

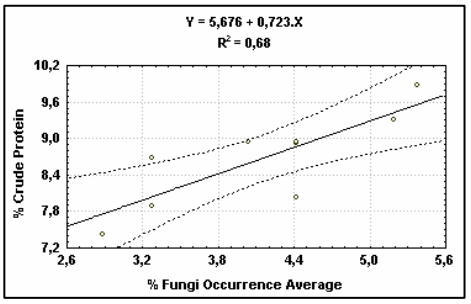


***Figure 2.*** *Effect of fungi occurrence on crude protein content of mesquite pods.* (Efeito da ocorrência de fungos sobre a proteína bruta da algaroba).

***Table I.*** *Resume of all statistics analysis relative to the influence of fungi occurrence on mesquite pods chemical quality*. (Resumo das análises estatísticas para a influência de fungos sobre a composição química das vagens de algaroba).

| Variables (percent) | F test | $R^2$ | Regression equation |
|---|---|---|---|
| Dry matter | * | 0.50 | y= 88.32 – 0.98* x |
| Crude protein | ** | 0.68 | y= 5.68 + 0.72** x |
| Ether extract | ns | 0.02 | - |
| Neutral detergent fiber | ns | 0.16 | - |
| Acid detergent fiber | ns | 0.21 | - |
| Ash | ns | 0.14 | - |

*p<0.05; **p<0,01. ns= not significant (p≥0.05).

regression model to the CP in relation to the average percentage of fungi occurrence in the mesquite ground pods. It can be observed when it prolongs the storage period there is an increase on CP content. This model has 68.0 percent of adjustment degree. It may be inferred that proper presence of fungi and insects on stocked material added value to nitrogen content increasing its biological protein in the CP mesquite pods percentage.

The **table I** shows a resume of all statistics analyses relative to the influence of fungi occurrence in the mesquite pods chemical quality.

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