

A note on the pattern of feed intake in pigs fed Jerusalem artichoke (*Helianthus tuberosus* L.)

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ABSTRACT

An experiment was conducted with 12 pigs of approximately 25 kg body weight. The animals were allotted to two experimental groups where the energy source was either maize meal or raw, fresh tubers of Jerusalem artichoke (*Helianthus tuberosus* L.). The pattern of feed intake was measured for 4 hours following the supply of the meal to the animals in the morning. It was observed that the time the animals spent eating was shorter ($P \leq 0.05$) with maize than with Jerusalem artichoke. The rate of eating was significantly different ($P \leq 0.001$) in pigs fed maize or Jerusalem artichoke on a fresh weight basis (23.7 or 43.8 g fresh feed/min) but was almost equal on a dry weight basis (21.7 or 18.7 g dry feed/min) and therefore feed intake in both fresh and dry bases was the same for both treatments (1178 or 1142 g DM/pig). We suggest that pigs modify their pattern of feed intake by increasing meal frequency when high amounts of Jerusalem artichoke are offered as raw, fresh tubers, thus tending to keep the level of energy consumption constant.

KEY WORDS: pigs, Jerusalem artichoke, pattern of feed intake

INTRODUCTION

Biological harvest together with supplying an appropriate supplement of protein, vitamins and minerals has been the normal method of feeding Jerusalem artichoke to pigs generally kept in a free range environment. This feeding method is currently being utilized elsewhere (see for example Cañas, 1990; Jost, 1992) since both the fast decomposition of fresh tubers after harvesting and the significant difficulties in dehydrating the Jerusalem artichoke are constraints that have not been overcome as yet.

When tubers are offered on a raw, fresh basis to confined pigs, it has been observed that the animals spend a long time chewing and swallowing them (Piloto, unpublished data, 1992). However, there are no references to previous works describing this phenomenon in pigs fed Jerusalem artichoke which could explain to what extent the animals may compensate the intake of a bulky feed by modifying their pattern of feed intake.

MATERIAL AND METHODS

Twelve castrated male pigs of approximately 25 kg body weight were allotted in a completely randomized design to two treatments where the energy source was either maize meal or raw, fresh tubers of Jerusalem artichoke. The animals were adapted to eat either the maize meal mixed with soyabean oil meal and the vitamin and mineral supplements in a single meal at 9:00 am or the same protein, vitamin and mineral supplement first, and immediately after the Jerusalem artichoke. The amount of feed supplied to the animals is shown in Table 1.

The pattern of feed intake was studied for four hours after offering the feed at 9:00 am, following an adaptation period of 28 days. The method used was that of Faliu and Griess (1969) as described by Ly and Castro (1984), and consisted of the continuous recording of the prandial activity of the pigs during the selected observation period. At the end of the first four hours, the remainders of the feed supplied were weighed.

TABLE 1

Composition of the diets

	Diets	
	maize meal	Jerusalem artichoke tubers
Fresh basis, g		
Maize meal	1330.6	—
Jerusalem artichoke tubers	—	5780.6
Soyabean oil meal	402.9	402.9
CaHPO ₄ · 2H ₂ O	24.6	24.6
NaCl	4.5	4.5
Vitamins and trace elements	11.3	11.3
Dry basis, g/kg		
Maize meal	736.5	—
Jerusalem artichoke tubers	—	736.5
Soyabean oil meal	223.1	223.1
Vitamins and minerals	40.4	40.4

RESULTS AND DISCUSSION

The ingestion frequency of the rations offered was quite different between treatments (Figure 1). It was evident that the animals fed maize concluded their prandial activity about 70 min after the initiation of feeding. It was observed that when the pigs consumed the Jerusalem artichoke there appeared to be three peaks of consumption of the diet: the first during the first prandial hour and the

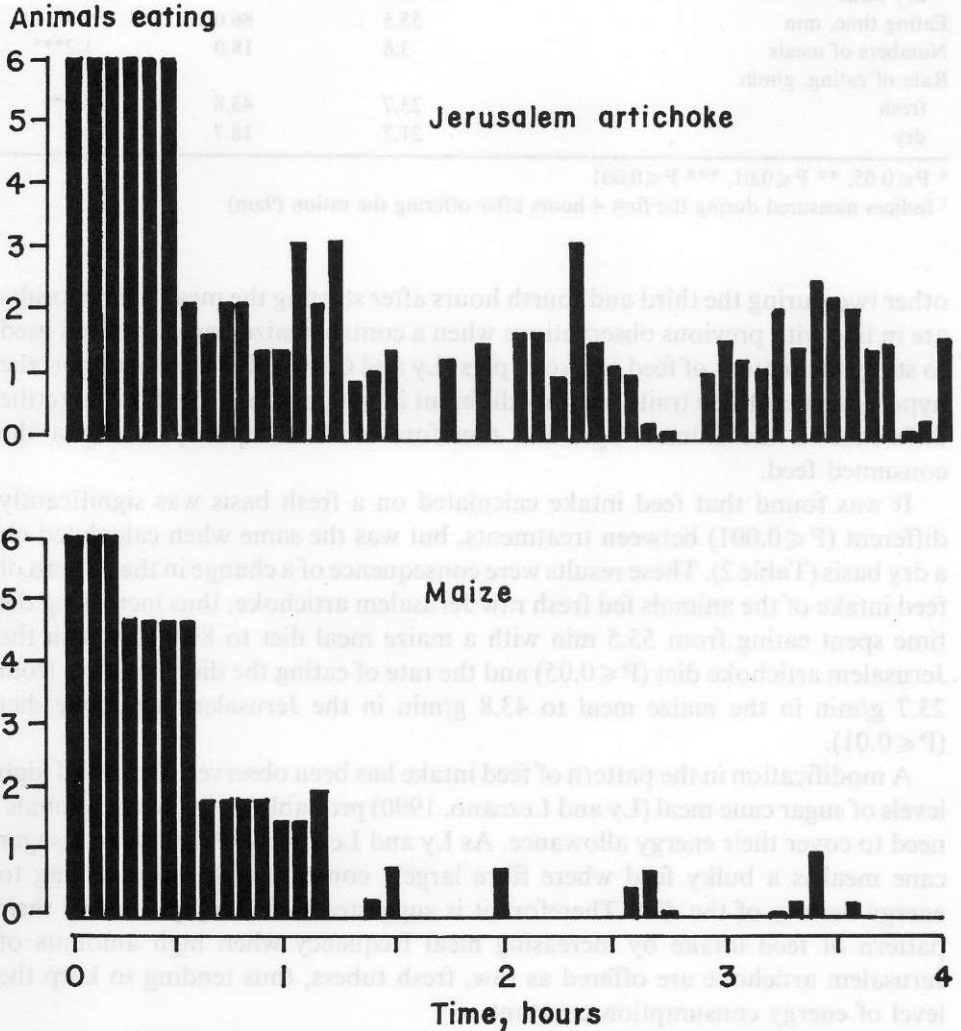


Figure 1. Frequency of ingestion of maize or Jerusalem artichoke diets in the pig. Each vertical bar represents an interval of 5 min

TABLE 2

Pattern of feed intake of pigs given maize meal or Jerusalem artichoke fresh tubers

Indices ¹	Diets		
	maize meal	Jerusalem artichoke tubers	SE
Feed intake, g			
fresh basis	1288	3600	185***
dry basis	1178	1142	152
Eating time, min	55.5	86.0	9.9*
Numbers of meals	3.6	18.0	1.2***
Rate of eating, g/min			
fresh	23.7	43.8	4.3**
dry	21.7	18.7	3.1

* $P \leq 0.05$; ** $P \leq 0.01$, *** $P \leq 0.001$ ¹ Indices measured during the first 4 hours after offering the ration (9am)

other two during the third and fourth hours after starting the meal. These results are in line with previous observations when a control maize-based diet was used to study the pattern of feed intake of pigs (Ly and Castro, 1984) and support the hypothesis that these traits are only different in magnitude, probably due to the difference in the animals age, and therefore in their capacity to digest the consumed feed.

It was found that feed intake calculated on a fresh basis was significantly different ($P \leq 0.001$) between treatments, but was the same when calculated on a dry basis (Table 2). These results were consequence of a change in the pattern of feed intake of the animals fed fresh raw Jerusalem artichoke, thus increasing the time spent eating from 55.5 min with a maize meal diet to 87.0 min with the Jerusalem artichoke diet ($P \leq 0.05$) and the rate of eating the diet in natura from 23.7 g/min in the maize meal to 43.8 g/min in the Jerusalem artichoke diet ($P \leq 0.01$).

A modification in the pattern of feed intake has been observed in pigs fed high levels of sugar cane meal (Ly and Lezcano, 1990) probably owing to the animals' need to cover their energy allowance. As Ly and Lezcano (1990) claimed, sugar cane meal is a bulky feed where fibre largely contributes to diminishing to energy density of the diet. Therefore it is suggested that the pigs modify their pattern of feed intake by increasing meal frequency when high amounts of Jerusalem artichoke are offered as raw, fresh tubers, thus tending to keep the level of energy consumption constant.

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STRESZCZENIE

Pobieranie paszy przez świnię żywno kłębami bulwy

Dwanaście wieprzków, o masie ciała około 25 kg, podzielono na dwie grupy żywieniowe, w których podstawowym źródłem energii była mączka z kukurydzy lub surowe kłębki bulwy. Pobieranie paszy przez zwierzęta rejestrowano przez 4 godziny od ich podania. Czas zjadania dawki z kukurydzą był krótszy ($P \leq 0.05$) niż z bulwą. Tempo pobierania paszy istotnie ($P \leq 0.01$) różniło się między świniami obydwóch grup: w przeliczeniu na świeżą masę wynosiło 23.7 i 43.8 g/min, w przeliczeniu na suchą masę 21.7 i 18.7 g/min, odpowiednio przy skarmianiu dawki z kukurydzą lub bulwą. Całkowite pobranie suchej masy było podobne i wynosiło odpowiednio 1178 i 1142 g/zwierzę. Wyniki wskazują, że świnię modyfikują pobieranie paszy przez zwiększenie częstotliwości posiłków, dla utrzymania stałego poziomu energii, przy skarmianiu świeżych kłębów bulwy.