NIGERIAN SOCIETY FOR ANIMAL PRODUCTION
(NSAP)

Proceedings of the 35th ANNUAL CONFERENCE

14TH-17TH MARCH, 2010

THEME:
Fast-tracking
ANIMAL AGRICULTURE
in a Challenged Economy

Held at

UNIVERSITY OF IBADAN, NIGERIA

Edited by:
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ISSN:1596-5570

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PROCEEDINGS 35TH ANNUAL CONFERENCE

Editors

O. J. Babayemi, O. A. Abu and E. O. Ewuola

DEPARTMENT OF ANIMAL SCIENCE
FACULTY OF AGRICULTURE AND FORESTRY
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Proceedings Produced by: Department of Animal Science, University of Ibadan, Nigeria
Computer graphics and Layout by: Drs. O. J. Babayemi and O. A. Abu
Typesetting and formatting by: Mr. D. A. Damilola
Cover Design by: Drs O. J. Babayemi and O. A. Abu

Published by
The Nigerian Society for Animal Production

Printed by
Positive Press
Iwo Road, Ibadan, Oyo State
Phone No. 08033195982, 08055126343 e-mail: positivepressng@gmail.com

Copies of the Proceedings may be purchased or ordered from the National Secretariat, Nigerian Society for Animal Production (NSAP) C/O National Animal Production Research Institute, Shika, Zaria, Nigeria.

ORIGIN AND USES OF SOME UNCONVENTIONAL PLANT PROTEIN SOURCES

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ABSTRACT

This paper discussed the origin and use of some unconventional plant protein sources (UPPS) namely: pigeon pea, locust bean and sunflower as potential feedstuff for livestock. These UPPS are used in many ways: as human food: confectioneries, snack products, cooking oil, medicine, fodder, animal feeds, firewood, live fence and other industrial uses. Several workers have reported the nutritional potentials of these UPPS and their inclusion in diets of livestock without adverse effect on their productive performance after proper processing. Details of the origin and uses of these UPPS are fully reported in this paper.

INTRODUCTION

Unconventional feed resources as defined by Devendra (1981) refer to all those feeds that have not been traditionally used in animal feeding and/or are not normally used in commercially produced rations for livestock. It is evident that the conventional sources of feed can no longer adequately supply the needs of the fast growing livestock industry. Abubakar (1998) stated that once the supply of available nutrients for feeding livestock is increased, especially from unconventional sources, the sustainability of animal agriculture will be ensured. Despite the large number of existing legume grains in Nigeria, only soybean, cotton seed cake and groundnut cake are mainly used in livestock feeding. Several other locally available species that exhibit remarkable adaptation to tropical conditions have been under-utilized and under-exploited for livestock feeding (Apata and Ologhobo, 1994).

Origin and uses of pigeon pea (Cajanus cajan, (L) Millsp.): Pigeon pea probably evolved in South Asia and appeared about 2000 B.C. in West Africa, which is considered a second major centre of origin (Van Den Beldt, 1988). The slave trade took it to the West Indies, where its use as bird-feed led to the name "pigeon pea" in 1692 (Van der Maesen, 1986). The pigeon pea plant as a whole has been found to be useful. Pigeon pea is used for food, feed and fuel. It is most widely eaten in the form of split seeds; it contains protein with an amino acid profile similar to that of soybean (Singh *et al.*, 1990). Vegetable pigeon pea types are important in Central America as well as in Western and Eastern Africa, where pigeon pea are eaten green as a vegetable and the green peas are consumed as soups (Morton, 1976). The canning of green pigeon pea is a major industry in Puerto Rico and Trinidad and they are marketed in some parts of the world (Morton, 1976). By-products of the split and shrivelled seed are used as livestock feed. Pigeon pea provides excellent forage for livestock. Pigeon pea has been incorporated in the diets of rabbits without any deleterious effects on productive performance (Iorgyer *et al.*, 2008; Akande, 2009). Pigeon pea stems are used for fuel wood and weaving cribs and baskets. Tall, perennial pigeon peas are also often used as live fences in Africa and the Caribbean (Phatak *et al.*, 1993). Pigeon pea is used in folk medicine in India, Argentina, and Cuba (Morton, 1976).

Origin and uses of locust bean (Parkia specie): Currently, the described species within the genus *Parkia* number twenty-four, ten species occur in tropical South America, ten species in tropical Asia, and four species in Africa (Hall *et al.*, 1997). The traditional uses for locust bean can be defined as non-timber forest production (NTFP), which include wood energy (fuel wood and charcoal) and all other tangible products other than timber (Chandrasekharan, 1993). Non-timber forest products derived from locust bean are food, medicine, animal fodder, charcoal and firewood (Shao, 2002). Locust bean meal has been successfully fed to rabbits without adverse effect on performance and carcass characteristics (Akande, 2009). The locust bean tree is used as timber for making pestles, mortars, bows, hoe handles and seats (Irvine, 1961; Hagos, 1962). The most significant product from locust bean is food. According to Shao (2002), in Ghana, by February or March, young green whole pods are roasted and eaten. The greatest economic value derived from locust bean is the fermented product of "dawadawa" made from the seeds. The fermented seeds of locust bean are used in all parts of Nigeria and also the West Coast of Africa for seasoning traditional soups (Ajaiyeoba, 2002). The tannins in the bark and husks of the pods of locust bean are

used for indigo dyeing and curing leather. Other non-timber forest products (NTFPs) derived from this plant are fish poisons, a source of fibre and for soap making (Campbell- Platt, 1980). In small, low flow rate river or streams, a small section can be dammed and crushed pods are added to the water. The stunned fish are harvested and with no adverse effects to humans consuming the fish. The strong fibres in the pod are used to attach arrowheads to the shaft, weaving nets for fish, strings for musical instruments and basket weaving. The wood ash resulting from burning locust bean is used both for soap making and for dyeing the traditional indigo cloth (Hall *et al.*, 1997). In Gambia, the leaves and roots are used in preparing a lotion for sore eyes (Ajaiyeoba, 2002). A decoction of the bark of locust bean is used as a bath for fever, as hot mouthwash to steam and relieve toothache, the pulped bark is used along with lemon for wound and ulcers (Irvine, 1961).

Origin and uses of sunflower (Helianthus annuus L.): Sunflower is one of the few cultivated plant native to North America. It is believed that wild sunflower covered thousands of square miles of land that is now the Western United State (Putt, 1978; Skoric, 1992). The centre of origin for wild sunflower is considered to be the Western plains of North America, but the ancestors of the cultivated type have been traced to the Missouri-Mississippi River valley areas (Relf, 1997). Sunflower is one of the most important oil crops of major economic importance and ranks second to soybean among all oil seeds globally as a source of vegetable oil (Putt, 1978). Most United States production is devoted to the oil-seed type of sunflower, while a smaller percentage is grown for whole seed confectionery uses such as candy, snack food and baked foods. Sunflower oil is considered premium oil due to it light colour, mild flavour, low level of saturated fats and ability to withstand high cooking temperatures (Putnam *et al.*, 1990). Sunflower oil is high in poly-unsaturated fatty acids, which are believed to be important dietary requirement for the prevention of accumulation of cholesterol in the blood (Relf, 1997). Sunflower oil is therefore considered superior to soybean or rapeseed oil for nutritional purposes (Ward *et al.*, 1985). The oil is excellent for cooking and frying because of its high smoke point. It is also of great value in the production of salad oil, margarine, shortening and tends to enhance shelf life of snacks (Putnam *et al.*, 1990). Sunflower seeds may be eaten as salted whole seed or as roasted nuts when dehulled. Sunflower oil has been used in certain paints, varnishes and plastics because of good semi-drying properties without colour modification associated with oils high in linolenic acid (Putnam *et al.*, 1990). Dorrell (1978) reported that a group of useful by-products obtained from processing sunflower include; tocopherol, lecithin, wax, phosphatides, distillates, filter clay among others. In Eastern Europe and the former USSR where sunflower oil is plentiful, sunflower oil is used commonly in the manufacture of soaps and detergents. The use of sunflower oil and other vegetable oils as a pesticide carrier and in the production of agro-chemicals, surfactants, adhesives, fabric softeners, lubricants and coatings has been explored. Considerable work has been done to explore the potential of sunflower as an alternative fuel source in diesel engines. Blends of sunflower oil and diesel fuel are expected to have greater potential than the burning of pure vegetable oil (Putnam *et al.*, 1990). Sunflower seed in the United States is used for birdseed, most typically mixed with millet and other grains. Sunflowers seeds are used as livestock feed. Non-dehulled or partly dehulled sunflower meal has been substituted successfully for soybean meal in isonitrogenous (equal protein) diets for ruminant animals, as well as for rabbit feeding (Akande, 2009), for poultry feeding (Adeniji and Ogunmodede, 2006) and for swine.

CONCLUSION

The high cost of conventionally used plant protein sources namely soybean, groundnut and cotton seed pose a major factor limiting their widespread use as feedstuff for livestock. Alternative or UPPS are therefore been sought for to be adapted in new feeding schemes. Pigoen pea, locust bean and sunflower are under-utilized UPPS with great potentials for incorporation in animal feeds. There is a great scope for selecting cultivars with not only higher grain yields but higher forage yields and crude protein.

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