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Aspilia africana: Impacts on Animal Production

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Abstract

This paper reviewed the effects of Aspilia africana (African marigold plant) on animals. Aspilia africana is one of many plants which are fast gaining recognition as feed for animals because of its many benefits, although, there are some identified deleterious effects associated with its use. Studies have shown that the plant has positive influence on different species of animals with regards to growth, carcass yield, egg and meat quality attributes. Several findings indicate that Aspilia africana might stimulate erythropoiesis; improve haematological and serum biochemical parameters, boost immunity, stimulate lactation, enhance metabolism and wound healing but contains anti-nutritional factors and might inhibit manifestation of oestrus, implantation and conception in female animals. The plant has also been reported to be deleterious to fertility in male animals with manifestation of toxicity in some organs. Therefore, Aspilia africana could be used as growth promoter, immunity booster, lactation stimulant, wound healing agent, agent in the management of anaemia, but should not be fed to breeding animals until the discovery of anti-dote (s) which can suppress or neutralize its anti-fertility effects.

Keywords: *Aspilia africana*, Animal production, Erythropoiesis, Fertility, Growth, Lactation stimulant

1. Introduction

Feed remains an essential aspect of livestock production (Etim *et al*., 2014a). In the last few years, there has been an increasing awareness on the importance of feed supplementation in animal production (Sharifi *et al*., 2011). This is because an animal's nutritional status largely relies on dietary intake and effectiveness of metabolic processes (Bamishaiye *et al*., 2009). There is an understanding by some farmers on the importance of nutrition and its role in animal health, animal productivity and profitability (NSW, 2013). Nutritional level is also one of the factors which affect the physiology of animals (Ajao *et al*., 2013; Etim *et al*., 2014b). Therefore, animals, including those in intensive livestock production systems need a balanced diet for the specific requirements

of the animals. This means that feed offered to animals needs to contain accurate proportions of energy, protein (and specific amino acids), fibre, vitamins and minerals. In addition to these components, availability of water should be ensured (NSW, 2013).

Moreover, animals' nutritional requirements could be met with conventional feed ingredients as well as forages. For this reason, farm animals are sometimes, fed both concentrates and forages (Onyimonyi & Ene, 2003). On the other hand, forages have also been grazed by animals or fed to them as sole diet. Thus, forages continue to be an important part of animal nourishment (Oyebiyi *et al*., 2013; Schroeder, 2018). One of such forages is *Aspilia africana* (African marigold plant). *Aspilia africana* has been incorporated in the feeding of rabbits, sheep, chickens and quails (Oko *et al*., 2012; Oyebiyi *et al*., 2013; Etim *et al*., 2014c; Oko *et al*., 2014a; Adedeji *et al*., 2014; Adedeji *et al*., 2015; Etim, 2015a; Etim & Oguike, 2015; Etim, 2016a and b; 2017; Etim *et al*., 2017; Oguike *et al*., 2017; Uchewa *et al*., 2018; Etim, 2020; Etim *et al*., 2020a and b).

It is noteworthy that many forages are fed to farm animals without considering their implications on the health, physiology and productivity of the animals. Therefore, this paper examined the effects of *Aspilia africana* on animals.

2. Description, Nutritional and Phytochemical Compositions of *Aspilia africana*

Aspilia africana is a rapid growing semi-woody herb, producing usually annual stem about two meters tall from a perennial woody root stock. It has a somewhat aromatic carroty smell. The plant is ligneous at the base; its fruits quadrangular akenes and leaves opposite and hairy (Adams, 2019). It is native to Africa, Madagascar and Latin America. Moreover, *Aspilia africana* is known by various names among the Nigerian populace (Orangila in Igbo, Tozalin in Hausa, yunjun in Yoruba and Edemerong in Efik). It belongs to the family Asteraceae, genus; Aspilia (Burkil,1985).

However, the plant is a common weed of field crops in West Africa and sometimes, found in fallow lands, especially, the forest zone (Akobundu, 1987). It is grazed by cattle and sheep in Nigeria and it is used in western state as food for rabbit and hares (Burkil, 1985). Furthermore, the plant has been described as a potential growth promoter and a good source of nutrients (Eweka, 2008; Oguike & Etim, 2010). Analysis done by Okwu & Josiah (2006) revealed that it is a good source of calcium, potassium, manganese, iron and zinc. Reports by Ezeigbo *et al*. (2016) and Adegbesan (2019) conveyed the proximate composition, quantitative and qualitative profiles of phytochemicals in *Aspilia africana* leaves as presented in Figures 2, 3 and Table 1, respectively.

3. Aspilia africana as a Medicinal Plant

Animal and human dependency and sustainability have continued to revolve around plants through their uses as food, fibers, shelters and even medicines, the use of plants as medicine is an ancient and reliable practice (Sofoworo, 2008). Plant materials and product continue to play an important role in the maintenance of animals and human health since antiquity. They are the major sources of drugs development in the pharmaceutical industry (Pharmapproach, 2020). Several plants are now being used in part or as a whole to treat many diseases. Active component of these plant are now being investigated, extracted and developed into drugs with little or no negative effects or contra- indications (Oluyemi *et al*., 2007).

Figure 1: *Aspilia africana* (African marigold plant)

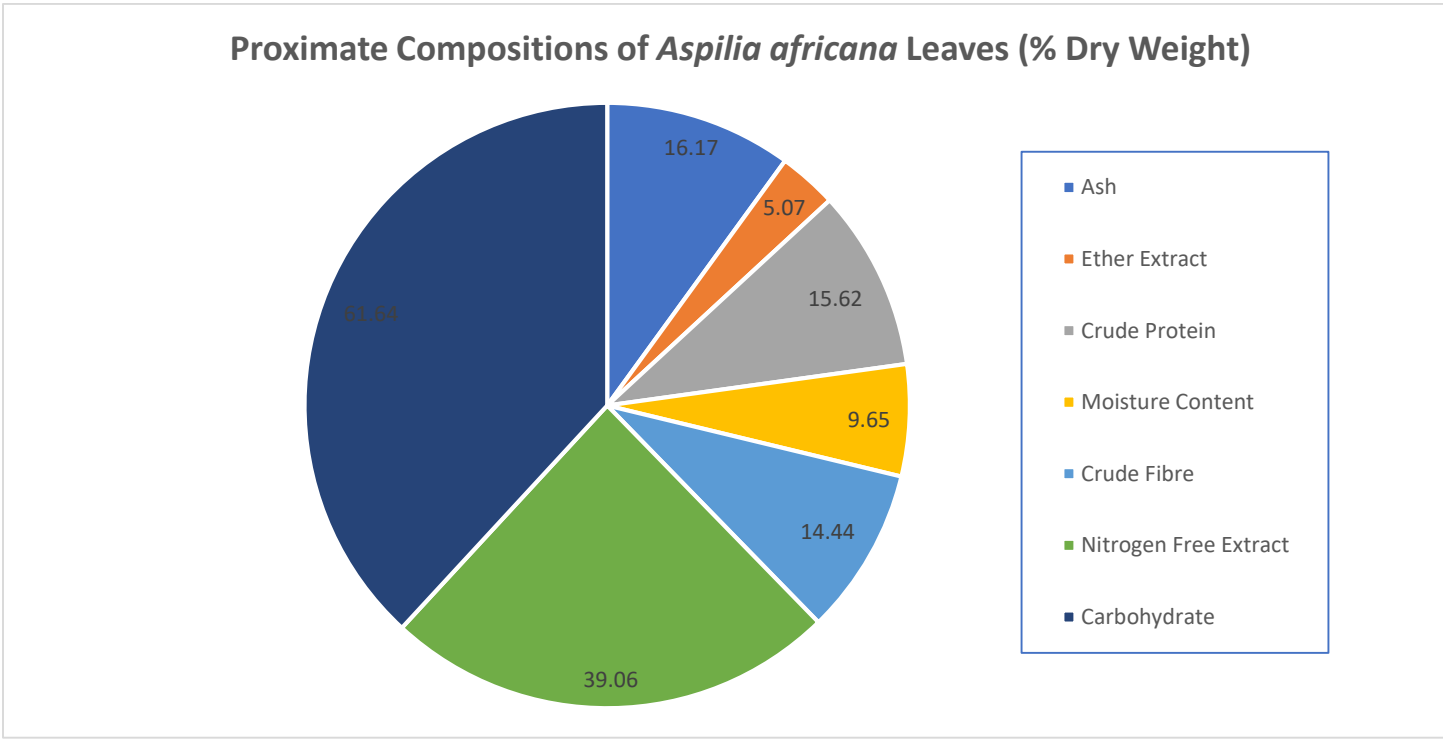

Figure 2: Proximate composition and quantitative profiles of phytochemicals in *Aspilia africana* leaves.

Adapted from: Adegbesan (2019)

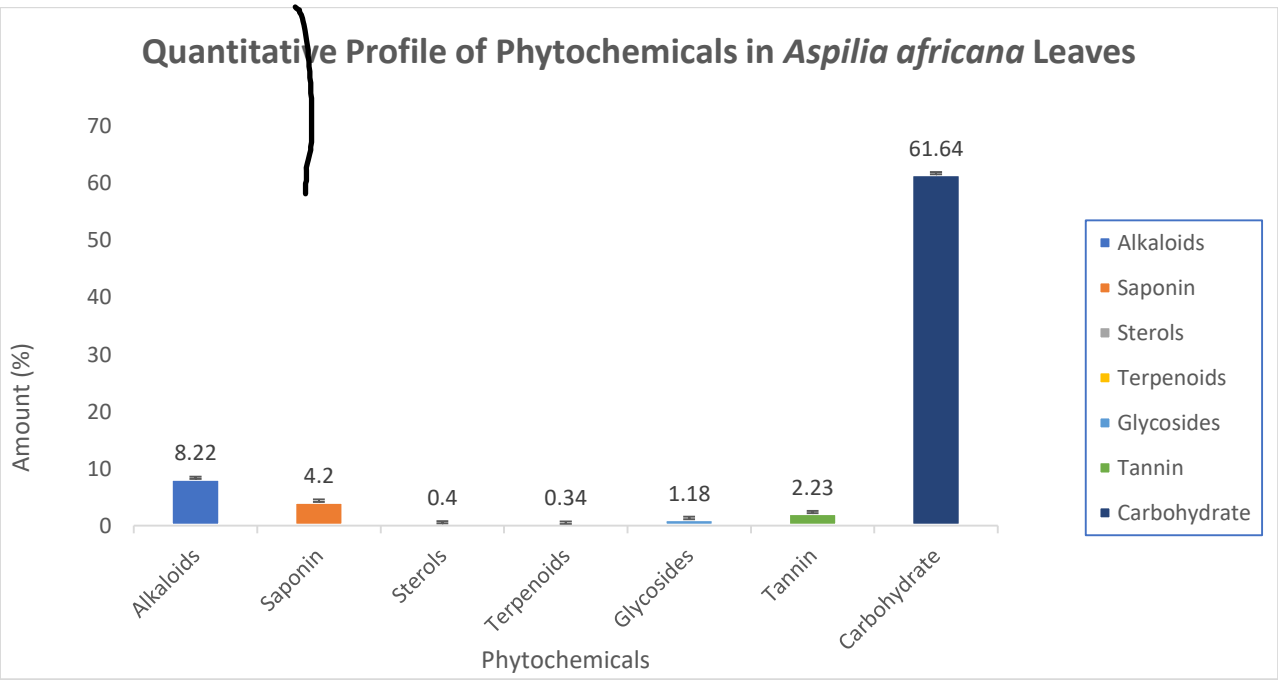

Figure 3: Quantitative profile of phytochemicals in *Aspilia africana* leaves.

Adapted from: Adegbesan (2019)

In Nigeria, many indigenous plants are used in herbal medicine to cure diseases and heal injuries. One of such plant is *Aspilia africana*. According to Okoli *et al*. (2007) and Oko *et al*. (2014b), *Aspilia africana* is one of the medicinal plants, which are fast gaining recognition. *Aspilia africana* is believed to have anti-parasitic compound extracted in the intestine of animals without necessarily digesting the leaves. Report by Eweka, (2008), indicated that *Aspilia africana* is used in ethno-medical practices in Africa for the management of various ailments. The plant has been reported to possess anti-microbial (Macfoy & Cline, 1990; Uchewa *et al.*, 2018), haemostatic anti-inflammatory (Okoli *et al*., 2007) and anti- ulcer activity of its n-hexane and methanolic extracts have also been reported (Nguelefack, 2005; Okoli *et al*., 2007).

In South Eastern Nigeria, leaves of this plant is claimed to be effective in the treatment of stomach ache and bleeding gastric ulcer, especially when taken as a aqueous decoction. In Uganda, it is used to treat gonorrhea (Okoli *et al*., 2007). In Liberia, the plant is credited with the capacity to arrest the bleeding of a severed artery, and in Tanganyika (a region in Tanzania), it is used for tuberculosis. The methanol extract of the leaves is reported to cure malaria and respiratory problems (Fasola & Iyamah, 2014). They can also be made into a cough medicine for children, while the juice extracted from the leaves, when combined with little salt and lime juice can be used

as an eye-lotion for sun-blindness, used to wash the face to relieve feverish headache, and also taken to assist in childbirth and increase milk flow (Okoli, 2007).

Table 1. Qualitative Screening of Phytochemical Constituents of the Leaves of *A. africana* Using Aqueous Extract

Phytochemicals	Concentrations/Status	Sources
Alkaloids	+++	Ezeigbo *et al*. (2016)
	++	Adegbesan (2019)
	+	Arunsi *et al*. (2020)
Flavonoids	++	Ezeigbo *et al*. (2016)
	-	Adegbesan (2019)
	+	Arunsi *et al*. (2020)
Saponins	++	Ezeigbo *et al*. (2016)
	++	Adegbesan (2019)
	+	Arunsi *et al*. (2020)
Tannins	+	Ezeigbo *et al*. (2016)
	++	Adegbesan (2019)
	++	Arunsi *et al*. (2020)
Phenols	+	Ezeigbo *et al*. (2016)
	++	Arunsi *et al*. (2020)
Cardiac glycosides	+	Adegbesan (2019)
	+	Arunsi *et al*. (2020)
Hydrogen cyanide	+++	Arunsi *et al*. (2020)

Key: +++ = high concentration/highly present
++ = moderate concentration/moderately present
+ = low concentration/slightly present
- = Absent

Leaf extract and fractions of *Aspilia africana* is used to arrest bleeding from fresh wounds, prevent microbial growth on wounds, and accelerate wound healing process (Eweka, 2008; Okoli *et al*., 2007). *Aspilia africana* is said to be used to cure ringworm and dysentery, treat bee and scorpion stings, remove foreign bodies from the eye and also thought to be used as herbal medicine by some chimpanzees. The potential of *Aspilia africana* to stop bleeding and heal wound fast could be result of its high calcium and zinc content (Eweka, 2008). It contains selenium which is useful as an antioxidant that stimulate the immune system and contributes to the formation of antibodies against infectious agents, while copper has the ability to kill a variety of potential harmful pathogens. The presence of this elements contributes to its wound healing qualities (Okoli *et al*., 2007; Oko *et al*., 2014b).

4. Effect of *Aspilia africana* on Body Weight, Milk Yield and Survival Rate of Animals

Animal breeders' desire is to get their animals to standard weight throughout their lifespan (Oguike & Etim, 2010). For this reason, many farmers resorted to using antibiotics growth promoter for their animals (National Office of Animal Health, 2001). Although, the use of antibiotics had been found to support growth and feed conversion efficiency in meat producing animals (Adedeji *et al*., 2014), it had also been reported to elicit negative effects on animals' health and production (Markovic *et al*., 2007). Thus, phytobiotics or phytogenic feed additives from several plants, including those from *A. africana* have been considered as suitable alternatives to antibiotics (Oko *et al*., 2014a and b; Adegbesan, 2019) in enhancing body weight of animals (Adedeji *et al*., 2014). According to Burkil (1985), *A. africana* could also be used as lactation stimulant.

However, evaluating the growth promoting potentials of feedstuffs and meat production potentials of animals require collecting records of body weight and carcass weight of animals (Etim, 2015b). Several empirical evidences have revealed that *A. africana* can enhance bodyweight of several species of animals (Agiang *et al.*, 2011; Adedeji *et al*., 2014; Etim *et al*., 2014c; Oko *et al*., 2014a; Etim *et al*., 2015a; Adedeji *et al*., 2015). Findings from a study conducted by Etim *et al.* (2015a) indicated that *A. africana*, particularly, the fresh leaves have significant ($P<0.05$) growth stimulating effect on rabbit does at different physiological states. This position was drawn from the observation that animals fed fresh *A. africana* had enhanced body weight during mating (2.01kg), gestation (2.08kg), lactation (2.30kg), weaning (3.6kg) and re-mating (3.4kg). Whereas, animals that were not fed the plant had significantly ($P<0.05$) lower body weight at mating (1.75kg), gestation (1.86kg), lactation (2.07kg), weaning (2.15kg) and re-mating (2.20kg). Superior milk yield from does (Etim and Oguike, 2014) and enhanced litter weight (Etim *et al*., 2014c) were observed for kids kindled and nursed by does fed fresh *Aspilia africana* leaves (Etim, 2014c). Similar observations were reported by Adedeji *et al.* (2015) and Etim *et al*. (2020a). Other findings by Adedeji *et al.* (2015) revealed that the plant supports optimum survival in rabbits.

In addition, Adedeji *et al*. (2014) discovered that inclusion of 70g of *A. africana* leaf powder per 1kg of concentrate diet induced significant ($P<0.05$) increase in body of broiler chickens. In another experiment by Uchewa *et al*. (2018), it was observed that 250ml/2liters of water of *Aspilia africana* leaf extract could serve as growth promoter. The plant was recommended for broiler production. On the other hand, Oko *et al*. (2014a) inferred that upto 5% of dried *A. africana* leaf (AaL) per kilogram of concentrate diet produced no significant ($P>0.05$) difference in growth of broiler birds when compared to chickens that received 0% of the leaf as well as birds that received 0.2% terramycin/kg diet (antibiotics). However, a 4.22% increase in weight gain in birds fed AaL diet was reported, while, only 2.54% increase was observed in the antibiotic group. Moreover, Agiang *et al*. (2011) posited that inclusion of up to 5% aqueous extract of bush marigold leaf in the diets of growing and laying Japanese quails could improve growth performance. Moreover, Oko *et al*. (2018) documented zero mortality in quails fed 5 – 10% ethanolic extract of *A. africana* leaf (EeAaL) compared to animals that received diets with 0% EeAaL diet and 0.2% terramycin (antibiotics) diets. Arunsi *et al*. (2020) also reported no mortality for female Wistar rats exposed to upto 5000mg/kg body weight of aqueous and ethanolic *A. africana* for 24 hours.

Furthermore, findings from Etim (2016) showed that upto 3000mg/kg body weight of aqueous *Aspilia africana* extract could cause significant (P<0.05) rise in body weight of West African Dwarf rams when administered for 63 days. It was reported that the high and significant (P<0.05) increase in body weight of animals that received *Aspilia africana* might be an indication of the growth stimulating potential of the plant (Etim, 2016a).

5. Effect of *Aspilia africana* on Carcass, Egg and Meat Quality Attributes of Animals

Carcass is that part of animal which remains after removal of external and internal by-products. It consists of four main components which are muscles, connective tissues, bones and fats (Aduku & Olukosi, 2000). Proper understanding of the concept of carcass may be of help in evaluation of meat quality. Meat quality attributes represent both sensory and chemical attributes (Dhanda *et al*., 2003; Bello & Tsado, 2014; Etim & Hagan, 2019). However, the quality of nutritional materials offered to animals can have impacts on carcass value (Fasanya & Yisa, 1999). Consequently, several studies have been conducted to investigate the effects of *Aspilia africana* on carcass, egg and meat quality attributes of animals. The empirical studies have documented that *Aspilia africana* can improve the carcass characteristics of animals (Fielding, 1999; Aduku & Olukosi, 2000; Oko *et al*., 2011c; Etim *et al*., 2013; Oko *et al*., 2013; Oyebiyi *et al*. 2013; Adedeji *et al*., 2014; Oko *et al*., 2014a; Etim, 2017; Oko *et al*., 2018; Etim & Hagan, 2019).

For instance, a study conducted by Etim *et al.* (2013) showed that rabbit does fed fresh *Aspilia africana* forage showed significant (P<0.05) increase in carcass weight (2.95kg), dressing percentage (92.51%), weight of liver 37.00g and kidneys 207.00g compared to the control group which weighed 1.20kg, 83.46%, 17.88g 156.15g for carcass weight, dressing percentage, liver and kidneys weight, respectively. However, in a different study by Oyebiyi *et al*. (2013), apart from the kidneys, similar organ weight and dressing percentages were observed in rabbit bucks fed concentrate diet supplemented with *Aspilia africana* and *Tridax procumbens* when compared to those feed sole concentrate diet. Previous findings also showed that rabbits fed *A. africana* had high dressing percentages (Fielding, 1999; Aduku & Olukosi, 2000).

Moreover, Adedeji *et al*. (2014) recorded significantly (P<0.05) superior organ and shank weight in broiler chickens fed 70g of *A. africana* leaf meal per 1kg of concentrate diet. Overall, in the experiment, the plant was observed to support the production of good quality carcass. Oko *et al*. (2014a) posited that inclusion of 5% *A. africana* leaf per kg concentrate diet enhanced the meat colour dressing percentages and carcass quality of broiler chickens than non-inclusion or inclusion of 0.2% terramycin/kg diet (antibiotics). Furthermore, Oko *et al*. (2018) also stated that supplementation of ethanolic extract of *Aspilia africana* leaf (EeAaL) in basal antibiotics-free diet fed to Japanese quails caused significant (P<0.05) decline in the amount of fat deposition in quail carcass, resulting in good quality carcass. Also, it was found that up to 7.5% EeAaL supplementation into diets could improve egg performance (egg number, hen day production, albumen weight, yolk weight, shell thickness and yolk colour).

Furthermore, Etim (2017) observed that up to 3000mg/kg body weight of aqueous *A. africana* extract significantly (P<0.05) increased carcass weight, dressing percentages, sensory and chemical composition as well as acceptability of meat from West African Dwarf rams. These findings revealed that *Aspilia africana* is nutritionally suitable for enhancing carcass weights.

6. Effect of *Aspilia africana* on Haematological and Serum Biochemical Parameters of Animals

Haematological parameters have been described as good indicators of the physiological status of animals (Khan & Zafar, 2005; Etim *et al*., 2014b). According to Isaac *et al*. (2013), animals that have good blood composition are likely to performance well. Hence, a readily available and quick way of assessing clinical and nutritional health status of animals on feeding trials may be the use of blood analysis, because ingestion of dietary components has measurable effects on blood composition (Maxwell *et al*., 1990) and may be considered as accurate measure of long-term nutritional status (Olabanji *et al*., 2007). In addition, Etim *et al*. (2014b) stated that diets have been established to exert measurable influences on blood components and the latter in turn are widely employed in nutritional evaluation and survey of animals.

According to Harper *et al*. (1999) and Etim & Oguike (2011), serum biochemistry can be used to determine the level of heart attack, liver and kidney as well as evaluate protein quality and amino acid requirement in animals. A serum biochemistry profile can help in providing diagnosis for many medical conditions, including kidney failure. In experiments, analysis of serum biochemical parameters can generate sufficient information about organ damage, particularly the liver and kidney (Jurcik *et al*., 2007; Ozkan *et al*., 2012). Thus, numerous studies have been conducted to examine the effects of *A. africana* on haematological and serum biochemical parameters of various species of animals (Etim & Oguike, 2011; Adedeji *et a*l., 2012; Etim, 2016b; Ajeigbe *et al*., 2013; Etim *et al*., 2017; Uchewa *et al*., 2017; Ojeaburu & Eromosele, 2019; Arunsi *et al*., 2020).

Findings by Etim & Oguike (2011) indicated that *A. africana* could stimulate erythropoiesis, boost immunity and influence metabolism in rabbit does fed with it. It was observed that non-pregnant, pregnant and lactating rabbit does fed fresh and wilted *A. africana* had mean values that were within the normal ranges of values for all the parameters measured (white blood cell, red blood cell, hemoglobin, packed cell volume and differential counts). However, the red blood cell count, haemoglobin and packed cell volume in lactating does fed *A. africana* ($6.49x10^6/mm^3$, 14.93g/ml, 45.73%, respectively) were significantly (P<0.05) superior to those from does that were not offered the plant ($4.89x10^6/mm^3$, 10.28g/ml, 31.50%, respectively). Ajeigbe *et al*. (2013) also documented similar effect in Wistar Albino rats administered 750mg/Kg/d of aqueous *A. africana* extract and described the plant as a good pharmacological source of haematopoiesis. Etim & Oguike (2011) further reported that the plant induced significant (P<0.05) rise in total protein, globulin, calcium, bicarbonate and urea in serum of rabbit does. According to Ajeigbe *et al*. (2016), the plant can enhance erythropoiesis in laboratory animals. In an experiment on male Albino rats, aqueous leaf extract of *A. africana* caused 44.1% and 102% increase in the activities of total Na+ K+ ATPase at 500mg/kg and 750 mg/kg, respectively; while, increase of 63% and 71.4% were recorded in the

ouabin sensitive ATPase activity. The researchers further reported that the plant extract decreased the osmotic fragility, and enhanced Na+ K+ ATPase activity of the red blood cell in albino rats. Arunsi *et al.* (2020) documented that *A. africana* induced significant increase ($P<0.05$) in serum liver and kidney biomarkers, high density lipoprotein, and white blood cells while some red cells indices, platelets, some lipid profile levels reduced significantly ($P<0.05$) in female Wistar rats that received up to 500mg/body weight of aqueous and ethanolic *Aspilia africana* extracts when compared to the control group. Moreover, Ojeaburu & Eromosole (2019) stated that the plant has haemostatic property, adding that aqueous extract caused elevation in white blood cells count in New Zealand rabbits but induced different effects on kidney parameters depending on the extracting solvent. While the aqueous extract was observed to cause a significant ($P<0.05$) decrease in urea, sodium, potassium concentrations in serum of test animals relative to control, chloroform extract did not significantly ($P>0.05$) change the parameters of renal function, apart from serum bicarbonate value which was significantly elevated. In another empirical study by Etim *et al*. (2017), 3000mg/kg body weight of aqueous extract from the plant was reported to significantly ($P<0.05$) improved haematological parameters measured (WBC, RBC, PCV, Hb, differential counts) as well as total protein, globulin, calcium, bicarbonate and urea in serum of West African Dwarf rams.

Also, Uchewa *et al*. (2017) opined that 150ml/2 liters of the plant extract stimulated significant ($P<0.05$) increase in white blood cells and neutrophils in broiler birds to support antimicrobial activities. Adedeji *et al*. (2012) reported that the plant promoted proliferation of white blood cells, especially, lymphocytes. This was observed when different levels of inclusion (50g/kg, 60g/kg and 70g/kg) of the leaf meal was incorporated into concentrate diet fed to broiler chickens. Packed cell volume, haemoglobin, white blood cell and platelets counts significantly ($P<0.05$) improved with increase in the level of the plant. Further findings revealed that prolonged feeding of *A. africana* enhanced the qualities of blood. There were significant ($P<0.05$) increase in erythropoesis, proliferation of lymphocytes and increased oxygen capacity of the blood in the birds at 12 weeks compared to the 8th week of the study. This was evident in the significantly ($P<0.05$) enhanced PCV (26.75%), Hb (10.47g/dl), RBC ($1.78x10^6$/ml), WBC ($2.75x10^6$/ml), platelets (36.75), lymphocytes (90.75) recorded for the birds on the 12th week of the experiment compared to mean values of 20.25%, 6.70g/dl, $0.33x10^6$/ml, $0.07x10^{6/}$ml, 31.37, 62.25 obtained on the 8th week of the study. Adedeji *et al*. (2012) also stated that the plant supported the development of stronger immunity in the birds as well as adaptability to pressure from the environment.

7.Toxic and Antifertility Effects of *Aspilia africana*

Aspilia africana has been used as a forage for feeding livestock (Etim & Oguike, 2011; Oko *et al*., 2016). It is also a plant with broad spectrum applications in ethnomedicine (Arunsi *et al*., 2020). Hence, it is necessary to investigate if there are dangers associated with its use because there is increasing evidence that phytoproducts may perturb fertility and homeostatic balance in animals if not monitored. Different extractants have been reported to have varied effects on animals (Oko *et al*., 2011a and b). They may cause degeneration of liver and kidney, oxidative stress, inflammatory response, metabolic malfunction, genotoxicity and carcinogenesis (Lee *et al*., 2018; Maphosa *et al*., 2010).

In an experiment with rats and mice, Taziebou *et al*. (2007) posited that *Aspilia africana* can be classified among substances with low toxicity. The findings further indicated that dosages of 500mg/kg body-weight or more, can be toxic for a long term treatment when taken orally. Following 96 hours administration of *A. africana* extracts to Swiss Albino mice. Oko *et al.* (2011d) opined that oral administration of up to 10,000 mg/kg body weight of aqueous and ethanolic extracts of *Aspilia africana* leaf are not harmful to human and animal use. On the other hand, recent findings by Arunsi *et al*. (2020) revealed that *A. africana* leaves may not be safe as herbal medicine, despite the fact that aqueous and ethanolic extracts from the plant were found to be less toxic when administered to female Wistar rats for 2 weeks. The researchers further observed decline in organosomatic indices of rats treated with upto 500mg/kg body weight of ethanol leaf extract of the plant. Thus, showing that ethanol extract of *A. africana* may pose more harm to the animals. Few clinical signs of toxicity, such as restlessness, scratching of mouth, jumping up and loss of appetite were also observed in the experimental animals. Earlier, Oko *et al*. (2011d) recorded marked behavioural changes, forced and irregular respiration within 15-20 minutes of administration of *A. africana* extracts at a dose of 12,000-20,000 mg/kg body weight to Swiss Albino mice. This resulted in spasm and death of the animals 45 minutes post-administration. Necropsy showed that the lungs became haemorrhagic with extreme pulmonary oedema.

However, Ojeaburu & Eromosele (2019) stated that the ability of aqueous extract of *A. africana* to cause negative effects on electrolyte levels in rabbits is an indication that its consumption could be a potential risk factor for cardiovascular diseases or renal impairment. In addition, Arunsi *et al*. (2020) reported a marked alteration in hepatic and renal architectures of female Wistar rats fed aqueous and ethanolic extracts of the plant. Moreover, Etim (2020) observed mild necrosis of hepatocytes and chronic liver damage in West African Dwarf rams administered 12000mg/kg-13000mg/kg body weight of aqueous extract from the plant. Tubular necroses and degeneration in kidneys of the rams were documented by Etim *et al*. (2020b).

Furthermore, significant delay in oestrus cycles and severe damages to uterine tissues were found in Wistar Albino rats admistered methanolic extract of the plant, intraperitoneally (Oluyemi *et al*., 2007). Similarly, Oyesola *et al*. (2010) observed that the plant extract induced alteration of oestrous cycle and adverse effect on ovulation in Wistar strain rats. Eweka (2006) opined that consumption of the plant may probably have deleterious impacts on the ovaries by its adverse effects on the oocytes and stroma cells of ovary of adult Wistar rats. An oral administration of aqueous extract of *Aspilia africana* leaf was reported to cause distortion in the histology of the ovaries in female wistar rats, thus impairing fertilization (Eweka, 2009). In addition, Etim and Oguike (2014) posited that the plant negatively affected conception in rabbit does. Further studies by Oguike *et al*. (2019) demonstrated that the plant has deleterious effects on libido of rams as well as majority of semen characteristics which are measures of rating fertility. Supplementation of *A. africana* leaf meal, even at low levels negatively affected semen characteristics, testicular histology and testicular morphometric parameters in rabbits. Similarly, Etim & Hagan (2020) stated that administering more than 2000mg/kg BW of aqueous *Aspilia africana* to rams could have significant effect on oestradiol and testosterone levels which may impair libido and fertility in the animals.

8. Conclusion

Aspilia africana has been found to have both positive and negative impacts on animals. Several studies have revealed its beneficial effects, with regards to growth, carcass and organ weight as well as lactation, egg and meat quality attributes. Findings also indicate that it can be a suitable agent in the improvement of haematological and serum biochemical parameters of animals. On the other hand, other findings have shown that the plant possesses anti-nutritional factors and antifertility potentials. Reports also indicate that it is toxic to the liver and kidney of animals. Thus, the plant is recommended for use as growth promoter, agent in the management of anemia, immune booster and lactation stimulant. Nevertheless, the plant should not be fed to breeding animals until the discovery of antidote (s) which can suppress or neutralize its antifertility effects.

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