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Full Length Research

The effects of fermented Liqour and methanol extract of Beniseeds on the Biochemical and liver functioning parameters of Albino-rats

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Laboratory albino rats were grouped into different groups and fed with the methanol extract of beniseeds and the fermented liquor of the seeds for a period of 21days to assess their effects on the biochemical and liver functioning parameters of the rats. The result of the analyses showed that both the extract and liquor cause significant increase in the level of bicarbonate, urea, uric acid and calcium while the creatinine level had no significant difference. The liver functioning tests for the rats showed that both the extract and liquor cause a little increase in the serum total protein and alkaline phosphatase without any significant rise in the cholesterol level when compared with the control. There was, however a higher increase in cholesterol level in the rats fed with extract than those fed with the fermented liquor. The results obtained from these *IN-VIVO* analyses of fermented beniseed liquor and the methanol extract of beniseeds has shown that beniseed has no deleterious effect on the organs of rats as well as on their biochemical parameters. It is therefore recommended for human consumption as a good nutraceutic seed.

Keywords: Fermented Liqour, Beniseeds, Biochemical, Albino-rat

INTRODUCTION

Beniseeds serves as food in various parts of the world and is known to have medicinal properties (Odugbemi, 2006). The plant belongs to the family *Pedaliaceae* and is an annual crop that grows in tropical areas (Dutta, 2004. And Dan *et al*, 2004). The seeds are tiny, flat ovals measuring about 3mm (Oshodi *et al.,* 2010). The oil from sesame seeds is a non-drying oil, highly stable and rarely turning rancid in hot climates. It is highly rich in protein and contains polyunsaturated fat. It is presently used in large quantity for the production of margarine and cooking oils. Non-culinary uses include its use as an ingredient in soap, cosmetics, lubricants and medicines.

The simplest and commonest use of sesame seeds now is sprinkling the seeds over cakes and breads, especially in Syria and Lebanon (Encyclopedia of spices-2012). In Nigeria, the local names of the seeds are ‘eluru’ and ‘ekuku’ (Yoruba). The Ebiras call it ‘gorigo’. In French it is called ‘sesame’, ‘tahini’ in Arabic while the Japanese call it ‘goma’. (http: // plants. Jstor. Org, 2010). The fermented form of the paste has been seen to have antibacterial activity from previous work. Though not documented, the Ebira people in Kogi State of Nigeria use it for the treatment of intestinal disorder, especially in children, expecting mothers and young adults. They also use it for soup after grinding it into smooth paste with a grinding stone and they equally roast/fry it as snacks. The plant’s roots and leaves are used for treating migraine, hypertension, ulcers, constipation, chicken pox and piles (Odugbemi, 2006). Improving intestinal health using

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Table 1. Results of biochemical analyses of biosafety of methanol extract.

Parameters	A	B	C	D	E	F
Bc (mMol/L)	24.05+ 0.09^{b}	27.00+ 0.11^{d}	25.06+0.10^{c}	30.35+0.90^{f}	28.62+0.05^{e}	24.00+0.02^{a}
Cr (mMol/L)	0.09 + 0.01^{u}	0.10+0.00^{e}	0.07+0.03^{u}	0.10+0.02^{e}	0.08+0.01^{u}	0.06+0.08^{a}
Ua (mMol/L)	0.20+ 0.0^{a}	0.40 +0.02^{u}	0.30 +0.00^{c}	0.40 +0.05^{e}	0.30 +0.00^{c}	0.25 +0.06^{u}
U (mMol/L)	2.80 + 0.04^{a}	4.60 +0.09^{c}	4.90 +0.05^{u}	6.00 +0.01$^{'}$	5.00 +0.01^{e}	3.50 +0.05^{u}
Ca (mMol/L)	2.30 + 0.00^{a}	2.50 +0.10^{c}	2.30 +0.05^{a}	2.40 +0.03^{b}	2.30 +0.00^{a}	2.40. +0.02^{b}

Values followed by the same letter in a row is not significantly different at P=0.05.
Key: A=0.50ml, B=0.75ml, C=1.00ml, D=1.25ml, E=1.50ml, F=Control.
Bc=Bicaronate, Cr=Creatinine, Ua=Uric acid, U=Urea,Ca=Calcium.

Table 2. Results of biochemical analyses of biosafety of fermented beniseed liquor.

Parameters	A	B	C	D	E	F
Bc (mMol/L)	25.05+ 0.09^{b}	26.00+ 0.01^{b}	25.06+0.10^{b}	28.35+0.90^{d}	28.62+0.05^{c}	24.00+0.02^{a}
Cr (mMol/L)	0.09 + 0.01^{c}	0.10+0.00^{u}	0.08+0.03^{u}	0.09+0.02^{c}	0.08+0.01^{u}	0.06+0.08^{a}
Ua (mMol/L)	0.20+ 0.0^{a}	0.40 +0.02^{u}	0.30 +0.00^{c}	0.40 +0.05^{u}	0.30 +0.00^{c}	0.25 +0.06^{u}
U (mMol/L)	2.80 + 0.04^{a}	4.60 +0.09^{u}	4.90 +0.05^{e}	4.00 +0.01^{c}	5.00 +0.01$^{'}$	3.50 +0.05^{u}
Ca (mMol/L)	2.30 + 0.00^{a}	2.90 +0.10^{d}	2.60 +0.05^{c}	2.50 +0.03^{c}	2.60 +0.00^{c}	2.40. +0.02^{b}

Values followed by the same letter in a row is not significantly different at P=0.05.
Key: A=0.50ml, B=0.75ml, C=1.00ml, D=1.25ml, E=1.50ml, F=Control.
Bc=Bicaronate, Cr=Creatinine, Ua=Uric acid, U=Urea,Ca=Calcium.

inexpensive and effective nutraceutic agents such as beniseed is presently being explored by medical sciences according to Oyetayo, (2009) and Adebolu, (2007). This research is therefore focused on the assessment of the immune-stimulatory potential of methanol extract of beniseed on albino rats.

MATERIALS AND METHODS

The beniseeds were purchased at Okene central market in Kogi State of Nigeria. The seed's taxonomic identity was confirmed at the department of Crop Science of the Federal University of Technology, Akure, Ondo State, Nigeria.

Extraction with methanol

Ninety-eight percent methanol was used to extract the active components of beniseeds according to the method of Ogundare, 2006.

Fermentation of Seed

500g of the seed was soaked in 1000ml of water for 3 days and grounded into a smooth paste. It was then filtered using muslin bag. It was stored in refrigerator at 4^{0}C after allowing it to settle for 3hrs. The liquor was allowed to undergo natural fermentation at that temperature for 3days before using it to feed the albino rats according to the method of Adebolu et al., 2011.

Administration of samples and analyses.

After feeding the rats with a known concentration of the extract and liquor for 21days according to Erah *et al.*, (1996), the following tests carried out on the blood of the animals to assess the effects of the extract and fermented liquor on the rats:

a. Biochemical tests such as determination of bicarbonate, creatinine, calcium, uric acid and urea level.

b. Liver functioning test (LFT) such as the total bilirubin, serum total protein, serum albumin, serum globulin and alkaline phosphatase to ascertain the liver functioning extent according to the method of Baker *et al.*, (2006) and Monica, (2006)

RESULTS

The results of the biochemistry analysis showed that as there is increase in the dose of beniseed liquor and extract administered to the rats, there was increase in the

Table 3. Liver functioning test of albino rats fed with methanol extract of beniseeds.

Parameter	A	B	C	D	E	F
BT (uMol/L)	11.0±0.07^{d}	13.5±0.12^{e}	8.0±0.11^{a}	8.9±0.25^{b}	14.5±0.09^{f}	10.5±0.20^{c}
STP (g/L)	62.5 ±0.60^{a}	67.1 ±0.33^{c}	63. 9±0.52^{b}	71. 4±0.08^{d}	63.7 ±0.26^{b}	62.0 ±0.15^{a}
AST(GOT) (iu/L)	18.92±0.92^{a}	20.50±0.45^{b}	21.99±0.60^{b}	29.38±1.22^{d}	25.87±0.99^{c}	24.08±0.68^{c}
ALT(GPT) (iu/L)	34.20±1.02^{e}	26.80±0.99^{a}	27.55±0.83^{b}	36.92±0.29^{f}	30.75±0.53^{d}	28.70±0.12^{c}
ALK.PHOS (iu/L)	31.02±0.55^{c}	23.95±0.48^{a}	40.50±0.62^{f}	35.88±0.49^{d}	39.00±0.37^{e}	26.45±1.22^{b}
Cholesterol (mMol/L)	1.20±0.41^{a}	1.28±0.65^{b}	1.46±0.43^{d}	1.39±0.18^{d}	1.80±0.09^{e}	1.50±0.02^{c}

Values followed by the same letter in a row is not significantly different at P=0.05.
Key: A=0.50ml, B=0.75ml, C=1.00ml, D=1.25ml, E=1.50ml, F=Control.
BT=Bilirubin total, STP=Serum total protein, AST=Asparate transferase test, ALT=Antilymphocyte transferase test, ALK=Alkaline phosphatase.

Table 4: Liver functioning test of albino rats fed with fermented beniseeds liquor.

Parameter	A	B	C	D	E	F
BT (uMol/L)	11.6±0.03^{d}	13.5±0.21^{e}	8.0±0.09^{a}	9.5±0.35^{b}	15.7±0.11^{f}	10.5±0.38^{c}
STP (g/L)	67.5 ±0.72^{c}	67.1 ±0.51^{c}	63. 9±0.39^{a}	73. 4±0.25^{d}	65.7 ±0.60^{b}	63.6 ±0.31^{a}
AST(GOT) (iu/L)	17.95±0.29^{a}	22.55±0.75^{b}	24.99±0.60^{c}	29.38±0.37^{e}	25.87±0.41^{c}	25.38±0.74^{d}
ALT(GPT) (iu/L)	39.20±0.33^{e}	26.00±0.60^{a}	27.55±0.71^{a}	36.92±0.38^{d}	30.75±0.15^{c}	28.70±0.11^{b}
ALK.PHOS (iu/L)	30.90±0.20^{c}	23.95±0.32^{a}	40.50±0.65^{f}	35.88±0.25^{d}	39.00±0.00^{e}	26.45±0.38^{a}
Cholesterol (mMol/L)	1.27±0.30^{a}	1.30±0.00^{a}	1.45±0.40^{b}	1.71±0.51^{c}	2.8±0.27^{d}	1.30±0.20^{a}

Values followed by the same letter in a row is not significantly different at P=0.05.
Key: A=0.50ml, B=0.75ml, C=1.00ml, D=1.25ml, E=1.50ml, F=Control.
BT=Bilirubin total, STP=Serum total protein, AST=Asparate transferase test, ALT=Antilymphocyte transferase test, ALK=Alkaline phosphatase.

level of the biochemical parameters tested for. However, no record was above the normal level/range as shown in tables 1 and 2.

Liver functioning test results

The results of the LFTs were all within the normal range. However, the group of rats treated with the extract had higher cholesterol values than that of the liquor and as the dose of the extract increases, the cholesterol level increases. This is shown in tables 3 and 4 respectively.

DISCUSSION

The bicarbonate results showed the acid-base balance in the blood gas of the rats and according to Rob (2006), an alteration or increase from the normal level of bicarbonate, urea, uric acid and creatinine is a pointer to the malfunctioning state of either the heart, liver or kidneys. Since both the extract and the fermented liquor of beniseeds did not cause any significant increase of these biochemical parameters, they have medicinal value. However, the results obtained for the rats fed with fermented liquor are more close to the average normal range than those obtained for the extract thereby giving a fact that the liquor is a bit more effective than the extract. This may be due to the fact that some of the active nutrients may still be left in the residue of the extract which the methanol was unable to extract or bring out. Such nutrient or bioactive component may also be more soluble in water than methanol, Oladunmoye, (2007).

The results of the liver functioning tests (LFT) showed that aspartate transferase enzyme was present in the liver, heart muscles and kidneys at a very low level. Nancy, (2008) stated that an increase in the level of this enzyme is the commonest indication of liver disease. Therefore, both the extract and fermented liquor of beniseeds are good for the liver, heart and kidney cells. Serum glutamic-oxidase transaminase (SGOT) is an enzyme excreted by damaged heart muscles and there is

raised level of it in chronic myocardial infarction (Peter, 2008). This enzyme was greatly lowered by fermented beniseed liquor, an indication that fermented beniseed liquor can be used in treatment of myocardial infarction of the heart. Also, according to Robinson et al., (2006), serum glutamic-pyruvic transaminase is an enzyme excreted by the parenchymal cells of the liver and a raised level of it in the blood indicates infectious hepatitis. The administration of beniseed extract and fermented liquor showed no significant increase in the level of the enzyme in the blood, beniseeds may possess the property that can be harnessed for the treatment of infectious hepatitis According to Baker et al., (2007) and Girard et al., (2005), once this enzyme is intact in an animal, the kupffer cells lining the sinosoids form part of the reticulo-endothelial system which are involved in the normal destruction of old matured erythrocytes and also prevent its over destruction thereby preventing jaundice. From the results obtained from this in-vivo analyses of fermented beniseed liquor and its extract, beniseeds possess an excellent nutraceutic properties with good immunostimulatory potential and is a good anti-diarrhoeagenic agent.

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