



ANTI-MICROBIAL ACTIVITY OF BIGNAY (*ANTIDESMABUNIUS*) FRUIT EXTRACT AGAINST SHIGELLA SPECIES

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ABSTRACT

The study aims to determine the antimicrobial activity of Antidesmabunius fruit extract against Shigella sp. Fruit extract was prepared at different concentrations (100%, 75%, 50% and 25%). Kirby Bauer technique (Disc diffusion) was used to determine the zone of inhibition. Results reveal that Antidesmabunius fruit extract has antimicrobial activity. It also shows that 100% concentration has the highest antibacterial activity compared to 75%, 50% and 25%. This implies that Antidesmabunius fruit extract can be used in the preparation of low cost antimicrobial drugs or ointment.

KEYWORDS: *Shigellosis, Currant, Antidesmabunius, antimicrobial, zone of inhibition*

INTRODUCTION

Shigellosis is a common disease worldwide. It causes bloody stool with mucus, together with fever and abdominal cramps. The *Shigella* bacillus was discovered by the Japanese doctor Kiyoshi Shiga in the early 20th century (Trofa et al, 1999). *Shigella* spp cause almost 200 million infections per year in children under the age of 5 years (Kirk et al, 2010). Humans are the only host for *Shigella* spp. It is mostly contracted via the faecal–oral route with a low infectious dose.

Antidesmabunius contains high amounts of antioxidants such as flavonoids and phenolic compounds (e.g., anthocyanin, tannin, gallic acid (GA), catechin, epicatechin, rutin, quercetin, and vitamin C. It has many interesting pharmaceutical properties such as antibacterial and anti-inflammatory properties as well as somatic cell deceleration and anticancer properties (Dechayont et al 2012; Jorjong et al., 2015)

The nutritional value per 100 g of edible portion yields 91.11-94.80 g moisture, 0.75 g protein, 0.57-0.78 g ash, 0.12 mg calcium, 0.04 mg phosphorus, 0.001 mg iron, 0.031 mg



thiamine, 0.072 mg riboflavin, and 0.53 mg niacin (Morton 1987). The fractionation of methanolic extract of leaves yielded six polyphenols, namely, corilagin (1), gallic (2), ferrulic (3) and ellagic (4) acids in addition to the flavone vicinin II (5) and the dimmer amentoflavone (6). Total phenolic content was estimated at 90 mg/ml of gallic acid equivalent (GAE) per 100 g plant extract (Kasse et al., 2013).

Phytochemical screening for fruits yielded alkaloids, steroids, anthraquinones, saponins, poly phenols, flavonoids, and tannins (Barcelo 2015). The bark is poisonous, containing a toxic alkaloid. It also contains phenolics, flavonoids, anthocyanins and carotenoids. Methanol extract of leaves yielded six poly phenols, viz., corilagin, gallic, ferrulic, and ellagic acids, together with flavone vicinin II and dimmer amen to flavone (Kasse et al., 2013).

OBJECTIVES OF THE STUDY:

The study aims to determine the anti-microbial activity of *Antidesmabunius* (bignay) fruit extract against shigella species.

Specifically, it aims to:

1. Determine the zone of inhibition of *Antidesmabunius* (bignay) fruit extract against shigella species at different concentrations (100%, 75%, 50% and 25%).
2. Determine if there is a significant difference on the zone of inhibition between the extract and the positive control.

METHODOLOGY

Research Design

The researchers used experimental design. Different concentrations of *Antidesmabunius* fruit extract will be tested to inhibit Shigella species.

Materials

Tools such as test tubes, graduated cylinder, blender, clean cloth petri dishes, beaker, forceps, flasks, stirring rods and filter paper were used in the experiment.



Data Gathering Procedures

Unripe *Antidesmabunius* fruit was collected at Amulung Cagayan. It was washed with tap water and was dried using a clean cloth. The extract was blended for 2 minutes and the different concentrations were prepared.

Antibacterial activity of *Antidesmabunius* fruit extract was carried by disc diffusion method against *Shigella species*. Standardized suspension of test organism (1.5×10^8 cfu/ml) by McFarland standard (0.5N) was prepared then swabbed onto sterile Muller-Hinton Agar (MHA) plates using sterile cotton swabs. In each paper discs, 0.2 mL of different treatment of the extract at different concentrations (100%, 75%, 50% and 25%) was used under aseptic conditions, kept at room temperature for one hour to allow the extracts to diffuse into agar medium and incubate accordingly. Clear zones of inhibition were observed. Activity of each extract was tested in triplicate and the diameters of zones of inhibition were measured in millimetre (mm) using a transparent well-calibrated ruler. The positive control for bacteria was Ciprofloxacin at the concentration of 10mg/ml. The analysis were in triplicates and the average readings was calculated.

Statistical Analysis

Analysis of Variance (ANOVA) was used to determine the significant differences in zone of inhibition of the different concentrations of *Antidesmabunius* fruit extract.

RESULTS AND DISCUSSION

Table 1 shows the mean zone of inhibition of the different concentrations of *Antidesma bunius* fruit extract. 100% concentration has the highest zone of inhibition 30.33 while 25% has the least zone of inhibition with an inhibition of 20.33. This implies that the higher the concentration, the higher the antibacterial activity. The table also shows that the positive control has a greater mean zone of inhibition than the extract concentrations.



Table 1. Zone of inhibition of *Antidesmabunius* fruit extract at different concentrations.

Test organism	Concentration <i>Antidesmabunius</i> fruit extract	Clearing zone (mm)			Mean
		1	2	3	
<i>Shigella sp.</i>	100%	30	31	30	30.33
	75%	28	27	28	27.67
	50%	25	25	25	25.00
	25%	20	20	21	20.33
	Ciprofloxacin	32	32	32	32.00

Table 2 shows the comparison of antibacterial activity of *Antidesmabunius* fruit extract between treatments against *Shigella sp.* It is very evident that there is a significant difference between 100% ,75% ,50 % ,and 25% at 0.05. There a significant difference between the positive control (Ciprofloxacin) and different fruit extract concentrations.

Table 2. Comparison between treatments

	75%	50%	25%	POSITIVE CONTROL
100%	.001*	.000*	.000*	.016*
75%	—	.001*	.000*	.000*
50%	—	—	.000*	.000*
25%	—	—	—	.000*
POSITIVE CONTROL	—	—	—	—

*The mean difference is significant at the 0.05 level



CONCLUSION

Antidesmabunius fruit extract exhibits antibacterial activity against *Shigella sp.* 100% concentration has the highest antibacterial activity compared to lower concentrations.

RECOMMENDATIONS

1. There should be more comprehensive study on the antibacterial activity of *Antidesmabunius* fruit extract by testing its inhibitory action against other bacteria.
2. There should be proper cultivation of *Antidesmabunius* plant since it has antibacterial activity.
3. Antibacterial ointment can be developed using *Antidesmabunius* fruit extract.

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