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In vitro study of antibacterial activity of *Agave americana* L.

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Abstract
The present paper deals with *In vitro* study of *Agave americana* L. The activity was carried out by using acetone and ethyl acetate as solvents. The extraction was made by Soxhlet's apparatus and agar well diffusion method was followed. A maximum inhibition zone (20mm) against *E.coli* was recorded in ethyl acetate solvent. While, a zone of (21 mm) was observed against *E.coli* in acetone extract. Thereby it is proved that *Agave americana* L. possess a congenial anti-bacterial activity in both solvents.

Keywords: *Agave americana* L, Soxhlet's, solvents and *E.coli*

1. Introduction
Agave americana L. is cultivated as ornamental plant in gardens, belongs to family Agavaceae, other names of *Agave americana* L. are American aloes and century plant. The plant is stout rhizomatous with aerial stem concealed by the leaf base (Anonymous, 2008) [1], and is native of Mexico and distributed throughout world, mainly found in tropical countries like America, Kenya, Cuba, Africa and Asia, (Alice *et al*.,(1996) [2]. In India it is extensively grow on road sides and river banks but more on railway tracks as land areas, and used for extraction of fibres. The plant possess lot of phytochemicals such as steroidal saponins, hydrocarbons, alkaloids etc. in leaves. Therefore it revealed the anti-inflammatory activity (Peana *et al*., 1997) [5], antitumor activity (Mana *et al*., 2010) [6], anti-bacterial activity, (Parmar *et al*., 1992, Khare, C.P. 2007 and Kandhasamy *et al*., 2015) [7-9]. Many reports documented about extraction, isolation, purification and structural elucidation of the steroidal saponins from *Agave americana* L. Hence, an attempt was made to screen antibacterial activity of bulbils of *Agave americana* L. under laboratory conditions. So that these phytochemicals can be exploited for management of plant diseases.

2. Material and Methods
Fresh bulbils were harvested from Shivaji University campus, during morning hours the collected bulbils were brought to laboratory and surface sterilised using distilled water. The rinsed bulbils were then cut into small pieces, soon kept for drying at room temperature for two consecutive days. Subsequently kept in electric oven at 55-58^{0}C for consecutive four days. The dried sample was then powdered with electric grinder to fine powder. The resultant fine powder was subjected for extraction using Soxhlet's apparatus. Acetone and Ethyl acetate were used as solvents. Each of these extracts were further concentrated by rotary vacuum evaporator. Resulted semi-solid liquid extraction was used for studying antibacterial properties.
While studying antibacterial activity bacteria such as *Bacillus cereus*, *Stephalococcus aureus*, *Pseudomonas aeruginosa*, and *E.coli* were obtained from Department of Microbiology, Shivaji University, Kolhapur and were maintained in nutrient agar media. The bacterial suspension prepared using saline water and mixed with 100 ml of seeded media was transferred to sterile Petri plates. After solidification, well or cup was scooped with the help of cork borer 5mm diameter. The test solutions were poured in the wells with the help of sterilized micropipettes. Antibacterial activity was carried out by agar well diffusion method (Alice and Sivaprakasam, 1996) [2]. The cultures were kept in incubator at 25^0 C for 48 hours and zone of inhibition was recorded in millimetres (mm).

3. Result and Discussion
The results were depicted in Table-1. A high zone of inhibition was recorded in acetone extract of bulbils of *Agave americana* L. (Table-1) 21 mm against test bacteria *E.coli*, simultaneously a zone of 20 mm was recorded in ethyl acetate solvent against the same bacterium. This clearly indicates that bulbils of *Agave americana* L. possess congenial quantity of antibacterial properties as compared to control which was used as solvents (Acetone and ethyl acetate). A parallel result was recorded by Nagaraja *et al*., (2008) [10] in *Barringtonia acutangula* L. Meanwhile, ethyl acetate extract also proven to be a possess good bactericidal properties against test bacteria such as *Staphylococcus aureus* and *pseudomonas aeruginosa*, shows 15 mm and 14 mm zone of inhibition respectively (Table-1). A similar type of zone of inhibition was recorded by Nagaraja (2012) [11] and Nagaraja (2013) [12] in leaves of *Anacardium occidentale* L. and *Calophyllum inophyllum* Lin. Thus ethyl acetate proven to be good solvent

for these phytochemicals and present study may be helpful in exploiting such phytochemicals for the management of plant diseases.

Table 1: Acetone and ethyl acetate extract of bulbils of *Agave americana* L. against some test bacteria.

Sr.no	Test bacteria	Zone of inhibition (mm)			
		Acetone		Ethyl acetate	
		Control	mm in diameter	Control	mm in diameter
1	*Bacillus cereus*	12	13	10	10
2	*Staphylococcus aureus*	12	14	10	15
3	*Pseudomonas aeruginosa*	12	01	10	14
4	*E.coli*	12	21	10	20

Values are mean of three.

4. Acknowledgement

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