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Impact of Mid-Day Meal Scheme on Education, Health and Nutrition of School Children in East Godavari District and Y.S.R. District of Andhra Pradesh

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Malnutrition in India

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Abstract

An attempt is made in this paper is to analyze the concept of malnutrition in India. It covers the magnitude of hunger population in India, fall in intake of calorie, food grains availability, survey on stunted children in Andhra Pradesh, Guidelines to reduce malnutrition, four golden rules, 1 big idea, malnutrition, quit India and programme to address malnutrition. It is found that today 46 per cent of children are stunted in India because they simply do not get enough to eat. Almost one out of every two children in this country goes to bed on an empty stomach. Malnutrition is the principle cause of child deaths. Half of all child deaths in India could be prevented if this one issue was tackled. Children die because malnutrition lowers a child's resistance to infection. As a result, they become vulnerable even when they have eminently treatable conditions like diarrhoea and respiratory infections. Meanwhile, According to the Ministry of Women and Child Development when the expectant mother gets proper nutrition, there is no place for malnutrition. This paper presents guidelines to reduce malnutrition and four golden rules.

Key words: calorie, food grains, malnutrition, quit India

Introduction

Josette Sheeran, the Executive Director of the United Nations World Food Programme (WFP) has lamented the severity of world hunger and said her biggest dream is to see no child goes hungry. Worldwide, 1.02 billion people or one in six of the world's total population are suffering from hunger and a child dies of hunger in every six seconds. Every child deserves at least one humble cup of food a day. The world food chief said her life changed in 1986 when she saw an Ethiopian mother holding her 8- month-old child in the famine. The child cried for food, but the mother could not satisfy the child's basic need, only to see the child die in her arms. In many of the world's hunger hotspots where land is too dry or too wet, she said the conditions are going to get more severe. It is predicted that it will get worse[1].

Nearly one – sixth of the people in the world are affected by chronic hunger. At any time, around a quarter of all children suffer from under – nutrition. Not only are they more likely to die, but also they do less well in school and, later in life, earn less than those who were well nourished. Proper feeding during the period from conception to a child's second birthday is critical.

According to the Food and Agriculture Organisation (FAO) 2012, said that if the right action was taken now to boost economic growth and invest in agriculture, particularly in poor countries, the U.N. goal of reducing by one-half the number of the world's hungry people by 2015 was very much within reach. To be sure, 870 million hungry people were still far too many hungry people, said the heads of the three U.N. food agencies in a foreword. About

842 million people, or roughly one in eight, suffered from chronic hunger in 2011-13, down from 868 million people reported for the 2010-12 period, according to the new *State of Food Insecurity in the World 2013* report released on October 1, 2013 by United Nations food agencies. Interestingly, the agencies observed that while a vast majority of hungry people lived in developing regions, 15.7 million lived in developed countries[4].

Malnutrition in India

"All human beings are born free and equal in dignity and rights". When it comes to nutrition, all of India's children are not equal. According to India's third National Family Health Survey (NFHS-3) of 2005-06, 20 per cent of India children under five-years-old are wasted due to acute under nutrition and 48 per cent are stunted due to chronic under nutrition. Seventy per cent of children between six months and 59 months are anaemic. Despite a booming economy, nutrition deprivation among India's children remains widespread[5].

In absolute numbers, an average 25 million children are wasted and 61 million are stunted. The state of child under-nutrition in India is-first and foremost-a major threat to the survival growth, and development and of great importance for India as a global player. Prime Minister, Manmohan Singh has referred to under-nutrition as 'a matter of national shame'.

Children who are undernourished have substantially lower chances of survival than children who are well-nourished. Undernourished children are much more likely to suffer from serious infections and to die from common childhood illnesses such as diarrhoea, pneumonia and measles. More than a third of all deaths in children aged five years or younger can be attributable to under nutrition.

A number of emerging economies have encountered nutrition challenges similar to those currently facing India. For example, China reduced child undernutrition by more than half (from 25 per cent to 8 per cent) between 1990 and 2002, Brazil reduced child undernutrition by 60 per cent (from 18 per cent to 7 per cent) from 1975 to 1989 ; Thailand reduced child undernutition by half (from 50 per cent to 25 per cent) in less than decade (1982-1986) ; and Viet Nam reduced child undernutrition by 40 per cent (from 45 per cent to 27 per cent) between 1990 and 2006 [6].

India is home to one-fifth of the world's children around (440 million) and they constitute 42 per cent of population. These young citizens of the country constitute a potential demographic resource that could propel the nation to higher orbits of economic progress and human development. Every third malnourished child in the world lives in India; every second Indian child is underweight ; three out of four children in India are anaemic ; and every second new born has reduced learning capacity due to iodine deficiency[7].

One-third of all malnourished children live in India and 44 per cent of Indian children are underweight. More than two-thirds of the infants die in the first month and 92 per cent of these deaths are due to easily preventable diseases like pneumonia and diarrhea. Eight out of 10 people among the middle class do not know that nearly two million children under five die every year of diseases and conditions that are easily treatable and preventable[8].

If the malnourished in India formed a country, it would be the world's fifth largest-almost the size of Indonesia. According to Food and Agriculture Organisation (FAO), 237.7 million Indians are currently undernourished (up from 224.6 million in 2008). The number of Indians who cannot afford the daily minimum (minimal calorie intake 2200 rural/2100 unban) could equal the entire population of Europe[9].

Today 46 per cent of children are stunted in India because they simply do not get enough to eat. India has more malnourished children than neighbouring Bangladesh. Even African countries like the Congo, Lesotho Tanzania and Rwanda are better placed than India.

Almost one out of every two children in this country goes to bed on an empty stomach. Malnutrition is the principle cause of child deaths. Half of all child deaths in India could be prevented if this one issue was tackled. Children die because malnutrition lowers a child's resistance to infection. As a result, they become vulnerable even when they have eminently treatable conditions like diarrhoea and respiratory infections.

The rate of malnourishment is going down so showly as to be virtually negligible. Between 1998-99 and 2005-06, the rate only came down by one per cent. At this rate, the challenge of cutting down on the prevalence of malnutrition in children by half by 2015, a part of the Millennium Development Goals, will be impossible[10].

One-third Andhra Pradesh children stunted: survey

One-third of children in Andhra Pradesh are stunted despite falling poverty, considerable economic growth and the development of significant policies. Stunting has serious long-term implications for health, psycho-social well-being and educational achievement.

Despite higher enrolment, drop-out and school quality remain critical issues.

Around one in four (27 per cent of Younger Cohort [YC]) who were aged 6-18 months in 2001 and were 8 years in 2009 children have low body mass index (BMI) for age, while almost one in three are stunted (Low height for age) at 8 years though it has fallen from 33 per cent at 5 years. In 2009, YC children in rural areas were experiencing a higher prevalence of low BMI for age (29 per cent) as well as stunting (34 per cent) than children from urban areas for whom the corresponding figures were 22 per cent and 16 per cent.

The experience of both stunting and thinness (BMI) is patterned by caste or ethnic back ground. Comparing the two cohorts in 2002 and 2009-when they were both aged 8-suggests stunting rates went down for the other castes and backward classes but hardly moved for Scheduled Castes and actually increased for children form Scheduled Tribe backgrounds.

Table 1 : Percentage of thin or underweight 8 years old children in in Andhra Pradesh

Category	2002	2009
Male	32.1	29.5
Female	19.9	24.6
Urban	23.7	21.6
Rural	26.6	29.6
Scheduled Tribe	20.8	22.5
Scheduled Caste	25.4	28.4
Backward Classes	29.1	30.4
Other Castes	22.0	21.4

Source : Young Lives, *The Impact of Growth on Childhood Poverty in Andhra Pradesh, 2011.*

Fall in intake of calorie, food grains availability: Despite surplus food stocks in the central pool, the per capita per day intake of calorie and protein has declined in the country between 2004-05 and 2009-10. The per capita net availability of foodgrains including rice, wheat, other cereals and pulses too declined every year between 2006 and 2010, and, while 42.5 per cent children under five years under-weight, 69.5 per cent are anaemic.

Although calorie intake is higher in the rural areas compared to urban areas, it has declined in both populations. Calorie intake in 2004-05 was 2,047 Kcal and protein intake was 57 grams in rural populations. It declined to 2020 Kcal and 55 grams in 2009-10. In urban populations, the calorie intake of 2020 Kcal and protein intake of 57 gram in 2004-05, fell to 1946 Kcal and 53.5 grams respectively in 2009-10.

The per capita availability of food grains per year in 2006 was 162.5 kg. This has come down to 160.1 kg in 2010. The rice and wheat stocks in the country were 59.6 million tonnes as against the buffer norm of 21.2 million tonnes. While the estimated production of pulses was 17.5 million tonnes in 2012-13, the demand was 20.4 million tonnes and the gap of around 3 million tonnes is met by imports. In edible oils, the total consumption during 2011-12 was 18.9 million tonnes and 9.9 million tonnes was imported.

The total food grains allocation in the targetted Public Distribution System and for welfare schemes was 62.7 million tonnes in 2012-13. The National Food Security Bill that provides for mandatory distribution of subsidized foodgrains to 67 per cent of population[11].

Guidelines to reduce malnutrition

According to the Ministry of Women and Child Development when the expectant mother gets proper nutrition, there is no place for malnutrition.

1. The foundation of a healthy baby is laid in a healthy mother's womb.
2. A nutrition and balanced diet including green leafy vegetables, cereals, pulses, milk, eggs, fruits, etc. is necessary.
3. Pregnant mothers should eat more than their usual intake- approximately 25 per cent more.
4. Pregnant mothers should avail of iron and folic acid tables from the Anganwadi or local health centre, free of cost.
5. Pregnant mothers should get at least 8 hours of sleep in the night and at least 2 hours of rest during the daytime.
6. Pregnant mothers should avail of nutritious meals from the Anganwadi and consume it regularly.
7. Pregnant mothers should be kept tension-free. Take care that a happy environment is maintained around her.
8. If proper care of the mother is not taken during pregnancy, the child might be malnourished.

Four golden rules, 1 big idea, Malnutrition, Quit India

1. Proper nutrition for the mother during pregnancy.
2. Mother's first milk is essential for the baby.
3. Only mother's milk for the first six months.
4. And then, a nutritious diet along with mother's milk[12].

A Programme to address malnutrition

The Centre has finally approved the rollout of the Multi-sectoral Nutrition Programme to address the problems of maternal and child under-nutrition in the country. The programme, recommended by the Prime Minister's National Council on India's Nutrition Challenges in 2010, will be implemented in 200 high-burden districts in two phases at an estimated cost of Rs. 1,213.19 crore. It will be a Centrally Sponsored Scheme under the National Nutrition Mission, with the Centre-State cost sharing ratio 90:10 for all components in the north-eastern States and special Category States, and 75:25 for the other States and the Union Territories.

The first phase will begin in 100 districts in 2013-14, and the rest will be covered in the second in 2014-15. The National Mission Steering Group and the Empowered Programme Committee constituted for Integrated Child Development Services (ICDS) Mission will be the highest administrative and technical bodies for ensuring effective planning, implementation, monitoring and supervision.

The programme will bring in strong nutrition focus in various sectoral plans and provide gap-filling support to key nutrition-related intervention targets to contribute to the prevention of and reduction in child under-nutrition (underweight prevalence in children under three) ; and reduction in the levels of anaemia among children, adolescent girls and women. It will also work for the establishment of State and District Nutrition Councils[13].

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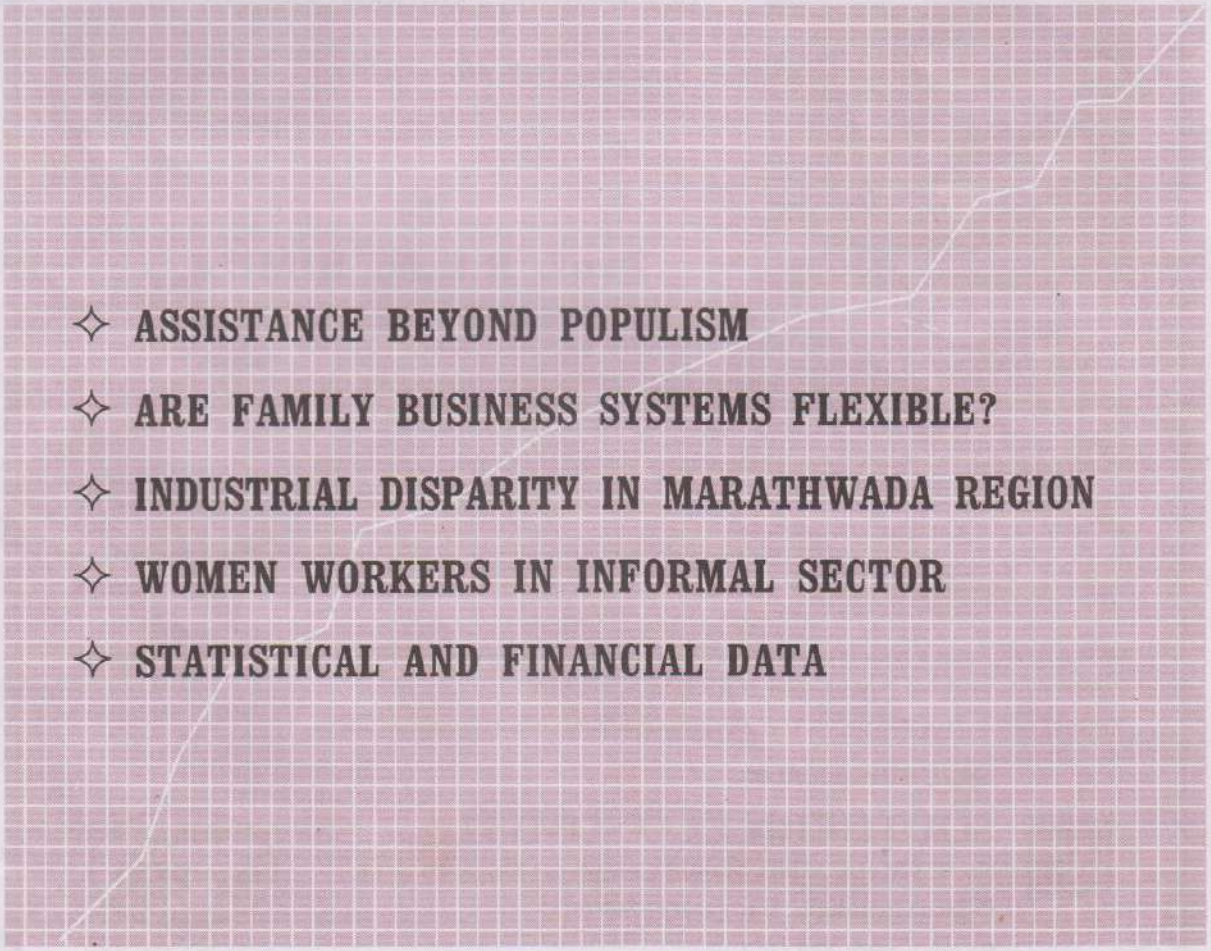

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CONTENTS

Mid-Day Meal Scheme: Role of NGOs

By S. Ramanjaneyulu*

Annamrita literally means " food as pure as nectar" and under this apt name the ISKCON Food Relief Foundation has been implementing the Mid-Day Meal Scheme of the Government of India. The Annamrita logo unit forms a triangle which connotes a nutrition pyramid and suggests a positive upward movement.

Annamrita is not just a social organization; it is a concept, an ideology, a change agent and most importantly a mother; a mother whose sole focus is to nurture her child so that he/she grows up to be a healthy, well- fed adult. Because it is food that nourishes not only body but also mind ; it is food that drives our being and help us keep our body healthy and our mind fresh.

A vast majority of the Indian population is still unable to get one square meal a day. This is because people are stuck in a vicious circle of poverty and illiteracy. Annamrita has resolved to liberate the under-privileged from this vicious circle by serving sanctified food. It is believed that imbued with a spiritual ambience in Annamrita's hi-tech kitchens, the meal so prepared nourishes the mind, body and soul of the child who eats it.

The genesis of Annamrita's vision dates back to 1974, when Srila Prabhupada, Founder Acharya of International Society for Krishna Consciousness (ISKCON), at an ISKCON temple in Mayapura (West Bengal), was looking out from the window in his room. He noticed a group of village children fighting with street dogs over scraps of food. Shocked and saddened by what he saw, Srila Prabhupada turned to his disciples and said, "No one within a ten mile radius of our temples should go hungry"

When the Government of India launched a strategic program called the Mid-Day Meal Scheme to fight two of the most pressing problems of India - hunger and illiteracy, ISKCON Food Relief Foundation saw a great opportunity to start providing children with nutritious food to support their education. And since then, it has set out on this journey of feeding children nutritious food and of staying true to the vision of the founder.

Mid-Day Meal Scheme in A.P.: Non-Government Organizations: In Andhra Pradesh, the MDMS was implemented in 5,82,388 schools covering 74.6 lakh school children during the year 2002-03. With the Centre providing rice at free of cost and the programme is being implemented by organizations like DWCRA, Naandi, ISKCON, and Sri Buddhavarapu Charitable Trust.

Findings of the Survey: The survey was conducted through schedule method and the necessary information was collected from the ISKCON Food Relief Foundation, Rajahmundry, Kadapa and Sri Buddhavarapu Charitable Trust, Polamuru.

ISKCON Food Relief Foundation – Rajahmundry

ISKCON Food Relief Foundation, Rajahmundry is situated in ISKCON Hare Krishna Land, Gouthami Ghat, Rajahmundry, East Godavari district of Andhra Pradesh. The mid-day meal scheme was started by ISKCON, Rajahmundry on October 13, 2008. The programme covers Rajahmundry town and rural schools. The number of schools covered under the ISKCON MDMS is 61 of which 40 schools are in urban area and the remaining 21 schools in rural area. The number of students benefited are 10,012. The urban area students are 6,008 and rural schools students are 4,004.

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Table-1

Cost per student class I to V

Item	Government support	Actual cost	Difference
Rice	100 grams	100 grams	Nil
Conversion cost (Rs.)	4.35	7	2.65

Source : Field data.

Table -2

Cost per student class VI to X

Item	Government support	Actual cost	Difference
Rice	150 grams	150 grams	Nil
Conversion cost (Rs.)	6	10	4

Table -3

Menu followed

Day	Menu
Monday	Rce, Sambar, Buttermilk
Tuesday	Rice, Vegetable Curry, Rasm/Buttermilk
Wednesday	Rice, Sambar, Banana
Thursday	Rice, Green Leaves/ Vegetables/Tamota Dal/ Rasam/Buttermilk
Friday	Rice, Sambar, Buttermilk
Saturday	Sweet Pongal / Vegetable Rice/ Lemon Rice/ Tamarind Rice, Sweet / Curry

Source : Field data.

Table-4

Employees in ISKCON Rajahmundry

Sl.No.	Category	No. of Employees
1	Kitchen supervisors	2
2	Head cooks	2
3	Cooks	6
4	Helpers	14
5	Security Staff	2
6	Drivers	6
7	Assistants for vehicles	6
	Total	**38**

Source: Field data

The particulars relating to the cost of a student, menu and workers are given in tables-1 to 4.

1,600 kgs rice is cooked per day. Diesel is used as fuel. Cost of diesel is Rs. 5,000 per day. Earlier, meals was prepared with LPG and used 10 cylinders in a day. Now, the Government stopped supply of LPG at subsidized price to MDMS. Firewood is also used for preparation of curries.

Rice is supplied by the Government. Rice is always available. Availability of rice at the time of survey was 1,600 kgs. The quality of rice is not good. Conversion cost is paid. ISKCON purchases dal (redgram) form Macherla in Guntur district at the rate of Rs. 60 per kg and vegetables, other ingredients from local market.While buttermilk is prepared, curd is purchased from the market.

The meal is transported to schools by route vehicles. There are 6 vehicles of which 3 are donated by Rotary Club, Rajahmundry. The vehicle assistants will collect the attendance of students from the headmasters.

The records maintained by the ISKCON are : 1. Rice Acquaintance Register, 2. Rice Utilization Register, 3. Conversion Cost Register, 4. Menu Register, 5. Student Attendance Register, 6. Workers Attendance Register, 7. Employees Payment Acquittance Register.

The salary of the workers ranges from Rs.6,000 to 7,000 per month. The government payment of honorarium is meagre. It is not sufficient to meet the salaries of the staff. Moreover, there is no regular payment from the Government. The balance amount is adjusted from donations. The ISKCON accepts donotations in cash and kind.

Table-5 – Cost per student class I to V

Item	Government Support	Actual Cost	Difference
Rice	100 grams	100 grams	Nil
Conversion cost (Rs.)	4.35	6.5	2.15

Table-6 – Cost per student class VI to X

Item	Government Support	Actual Cost	Difference
Rice	150 grams	150 grams	Nil
Conversion cost (Rs.)	6.00	8.00	2.00

Table-7 – Menu followed

Day	Menu
Monday	Rce, Sambar, Curdrice
Tuesday	Rice, Dal, Rasam
Wednesday	Rice, Sambar, Appadam
Thursday	Rice, Chetni, Rasam
Friday	Rice, Sambar, Curdrice
Saturday	Lemon Rice, Payasam

Table-8 – Employees in ISKCON Kadapa

Sl.No.	Category	No. of Employees
1	Managers	2
2	Kitchen Supervisors	2
3	Head Cooks	2
4	Cooks	6
5	Helpers	11
6	Security Staff	3
7	Drivers	7
8	Assistants (Vehicles)	7
	Total	40

Table-9 – No.of student beneficiaries

Sl.No.	Type of school	No.of schools
1	Primary Schools	109
2	U.P. Schools	11
3	High Schools	24
	Total	144

The ISKCON, Rajahmundry, is supplying nutritious food to the school children with commitment, discipline and cleanliness. The students consume the food happily and without wastage.

The Mid-day Meal Program Director of ISKCON, Rajahmundry, Sri H.G.Satya Gopinath Das has said that the Government should supply quality rice and regular payment of conversion cost and honorarium to the workers. The conversion cost is also enhanced according to the market prices.

ISKCON Food Relief Foundation – Kadapa

ISKCON Food Relief Foundation, Kadapa is located at Industrial Estate, RIMS Road, Kadapa in Andhra Pradesh. The mid-day meal scheme was commenced on January 24, 2009 by ISKCON, Kadapa. The ISKCON is serving food to the school children of Kadapa town and rural area. The number of schools covered is 115. The urban area schools are 95 and rural area schools are 20. The students covered under the scheme are 8,009. The urban area children are 6,005 and the remaing 2,004 children belong to rural area.

The data of ISKCON Food Relief Foundation, Kadapa is shown in Tables 5 to 8.

There is no ISKCON temple in Kadapa. There is a proposal to construct a temple and a gosala. At present, the ISKCON is preparing food in Municipal Corporation Building. It is a rent free building.

Rice is delivered by Tahasildar, Kadapa. Rice is not of good quality. There are insects, muds, seeds in the rice. Rice is processed through machines. Stones, dust and other particles are eliminated by workers as well as machines. Rice is always

Table-10

Cost per student class I to V

Item	Government Support	Actual Cost	Difference
Rice	100 grams	100 grams	Nil
Conversion cost (Rs.)	4.35	8	3.65

Table-11

Cost per student class VI to X

Item	Government Support	Actual Cost	Difference
Rice	150 grams	150 grams	Nil
Conversion cost (Rs.)	6	9.5	3.5

Table-12
Menu followed

Day	Menu
Monday	Rice, Sambar and Egg
Tuesday	Rice, Vegetables and Rasam
Wednesday	Rice, Dal and Curry Leaves
Thursday	Rice, Sambar
Friday	Rice, Vegetables and Rasam
Saturday	Rice, Dal and Sweet

Table-13
Employees strength

Sl.No.	Category	No.of employees
1	Managers	2
2	Kitchen Supervisors	5
3	Head Cooks	5
4	Cooks	10
5	Helpers	40
6	Security Staff	3
7	Drivers	15
8	Assistants (Vehicles)	15
	Total	95

Source : Field data.

available. There is no rice deficit. 100 quitals of rice stock is available at the time of survey.

Rice and curries are prepared by steam. The steam is made by firewood. There is no supply of LPG. The ISKCON is purchasing firewood at the cost of Rs. 4,000 per tonne. The provisions are purchased monthly once. Vegetables are purchased everyday in the local market.

Meals are supplied to the schools on the basis of attendance of students given by the headmasters. The meals are delivered through route vehicles. The vehicles start at 10.00 a.m. from the ISKCON and deliver meals at the respective schools and collect the vessels on return. There are 6 vehicles. 5 vehicles are purchased by ISKCON and one vehicle is donated by the public. The ISKCON, Kadapa accepts donations in kind such as dal, masala items, oil, vegetables etc.

The salary of the staff ranges from Rs.5,000 to 7,000 per month. There is no regular payment of honorarium and conversion cost from the government. There is a dues of Rs. 30 lakhs from the government.

The Mid-day Meal Program Director of ISKCON, Kadapa, Sri H.G.Rupeshwar Chaitanya Das has said that there must be regular payment of bills and honorarium from the government. Quality rice is also supplied.

Sri Buddhavarapu Charitable Trust – Polamuru

Sri Buddhavarapu Charitable Trust is located at Polamuru village, Anaparthi mandal, East Goadavari district of Andhra Pradesh. The Trust started the MDMS in September 2008. The Trust supplies mid-day meals with service motive. The Trust

is supplying food to 19,070 school children in 144 schools of Anaparthi, Rayavaram and Biccavole mandals. The particulars relating to the MDMS of Sri Buddhavarapu Charitable Trust are shown in tables 9 to 13.

The main objective of the MDMS is to increase the enrollment of students. But there is no improvement in the student enrollment in the schools covered by the Trust. The strength of the students from the year 2008 to till date is more or less around 19,000. Thus, the Scheme has no impact on the students enrollment. But, it has prevented not to decline in enrollment.

Rice is supplied by Food Corporation of India through Fair Price Shop Dealer. Quality rice is not supplied. There are stones, muds, insects, seeds in the rice. Rice in processed by workers. Swarna variety rice is good. Other varieties are not good. The boiled rice is starch, and not liked by students. The school children suffer from stomach pain.

The Trust purchases vegetables and other ingredients from the local market. The vegetables are curry leaves, brinjal, potato, cabbage, ladiesfinger, bottle-gourd etc.

The quantity of rice boiled is 1,300 kgs per day. The rice is boiled through steam. 10 LPG cylinders are used per day. The cost of a cylinder is Rs. 1,200. It is purchased at market price. Earlier, LPG cylinder is supplied at subsidized price of Rs. 400.

Honorarium is paid to each worker at the rate of Rs. 175 per day. Thus, a worker gets Rs. 5,250 per month. But, the government pays honorarium of Rs. 1,000 per cook-cum-helper. The difference amount is adjusted by the Trust.

The food is delivered by route vehicles. There are 15 rented vehicles for 15 routes. The rent is Rs. 600 for a vehicle per day excluding diesel cost. The total rent paid to 15 vehicles is Rs. 9,000 per day and monthly rent is Rs.2,70,000. The vehicles are loaded with meals vessels between 9.00 a.m. and 10.30 a.m. and delivered between 11.00 a.m. and 12.00 noon in the respective schools. The empty vessels are collected on the return on the same day. The strength of students of each school is collected from the headmasters the day before the meals preparation. The school headmasters will submit the bills of honorarium of cook-cum-workers and conversion cost to the Mandal Education Officer concerned. The amount will be then credited to the Trust Bank Account, State Bank of India, Anaparthi.

Sri S.Nagi Reddy, the Manager, Sri Buddhavarapu Charitable Trust, stressed that the honorarium of cook-cum-worker may be enhanced to Rs. 3,000 per month from Rs.1,000. The conversion cost per student is also enhanced according to the market prices. Cost of an egg is Rs. 4.50. The Trust is serving one egg instead of two eggs in a week due to increase in price of vegetables and eggs. He also suggested supply of eggs by the government to the MDMS like Anganwadi Centres (ICDS).

Other activities of the Trust

1. Games and sports are conducted for 144 schools students in Trust Auditorium at Polamuru in Anaparthi Mandal of East Godavari district. The winners are awarded prizes.

2. 'Godavari Harathi' is performed at Pushkar Ghat, Rajahmundry on every full moon day.

3. Dattatreya Swamy Temple is maintained by the Trust.

4. The Trust has a Kalyana Mandapam for marriages and other functions to the public.

5. In South Africa, the Trust has land of one lakh acres. The land is used for agriculture purpose. Rice and palmolin oil crops are grown. The income generated in agriculture is used for maintenance of hospitals in South Africa.

6. The Trust has a proposals to start Mid-day Meal Scheme in South Africa.

Conclusion

ISKCON Food Relief Foundation and Sri Buddavarapu Charitable Trust, are serving the mid-day meal to the school children on service motive. Though the Government supplies less quality rice, nominal payment of conversion cost for curries and meager honorarium of Rs. 1000/- per month to a cook-cum-helper, these organizations are supplying nutritious food. Once the food is ready, it is tasted and observations for temperature, colour, appearance, flavour, consistency and taste are documented. In the process, the food is untouched by hand. This ensures maintenance of high standards of hygiene and sanitation. It has positive impact on the health and nutrition of school children. The NGOs are supplying the nutritious food to the school children with commitment, discipline and cleanliness. It is suggested that more number of schools may be handed over to the NGOs for better implementation of the MDMS in order to achieve its objectives.

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A Study of Chemical Composition of some Medicinal Plants Available in the Eastern Ghats and nearby forests

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Antibacterial activity of different crude extracts of *Dodonaea viscosa*

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ABSTRACT

The present study of antimicrobial activities of various crude solvent extracts of Dodonea viscosa were determined against a wide variety of pathogenic bacteria. Crude extracts of Dodonea viscosa shows mild to significant activities for most of the treated bacteria. Crude extracts of n-hexane, dichloromethane, ethyl acetate and methanol showed antibacterial effect against most of the tested organisms. It has been expected that the present work on antimicrobial screening of the plant materials will help researchers who wish to work in designing clinical drugs concerning the killer diseases.

Key words: Antibacterial activity, Mueller-Hinton Agar (MHA), *Dodonea viscosa*

INTRUDUCTION

Many organisms can cause several diseases and now, in this world of modern science, man can face any challenge against any disease. But in spite of the tremendous advancement of medical science and technology, diseases are the leading health problem particularly in the under privileged population in the remote rural areas in the developing countries. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources, many based on their use in traditional medicine. Various medicinal plants have been used for years in daily life to treat disease all over the world. They have been used as a source of medicine. The wide spread use of herbal remedies and health care preparations, such as those described in ancient texts like Vedas and the Bible, has been traced to the occurrence of natural products with medicinal-properties. In fact, plants produce a diverse range of bioactive-molecules, making them a rich source of different types of medicines. Plants with possible antibacterial activities should be tested against an appropriate microbial model.

The plant *Dodonaea viscosa* belonging to the family Sapindaceae is distributed as a weed from coast to the elevation of more than 2000 meters. The weed is distributed in tropical as well as subtropical regions of the world.

Dodonaea viscosa has many medicinal properties and has been used by native peoples from all regions where it is found. It is a traditional medicine worldwide, administered orally or as poultice to treat a great variety of ailments. Stem or leaf infusions are used to treat sore throats; root infusions to treat colds. The stems and leaves are used to treat fever, and seeds (in combination with those of other plants and coated in honey) to treat malaria. The stems are used as fumigants to treat rheumatism. The leaves are used to relieve itching, fevers swellings, aches and can be used as a antispasmodic agent leaves and roots as a painkiller to soothe toothaches and headaches and a lotion made from unspecified plant parts to treat sprains, bruises, burns and wounds.

EXPERIMENTAL SECTION

PLANT MATERIAL: The plant material *Dodonia viscosa* was obtained from Maredumelli forest area, Andhra Pradesh, India.

PREPARATION OF EXTRACT:
The dried powdered leaf was defatted using petroleum ether later the defatted material was subjected to maceration using distilled water as a solvent. By using Methanol, N-hexane, Di- chloromethane and Ethyl acetate soxhlet extraction had been performed. Each extract was concentrated at 37° C temperature. Those obtained extracts were screened to identify the chemical constituents present; they are stored in Desiccator for further uses.

PREPARATION OF THE TESTED ORGANISMS:
The lyophilized forms of different strains of microorganisms like Escherichia coli [MTCC-2126], Staphylococcus aureus [MTCC-3160], were obtained from the Microbial Type Culture Collection and Gene bank (MTCC), Chandigarh, India and the bacterial Strains Streptococcus faecalis [NCIM-2603] and Streptococcus pyogens , Bacillus subtilis [NCIM-2655] were obtained from National Collection of Industrial Microorganisms (NCIM), Pune India. The bacterial cultures were maintained on Mueller-Hinton Agar (MHA) and were sub cultured periodically. The average number of viable organisms per ml organ stock suspension was about 10^9 colony forming units (CFU) per ml which was maintained by following McFarland Standardization[6] Each time fresh stock suspension had been prepared; constant experimental conditions were maintained to obtain close viable counts.

INOCULATION:
Single loopful of an overnight grown nutrient broth culture of each test organism served as inoculum for the antimicrobial activity determination. The average size of inoculum was about 1×10^6 cells contained in 3mm diameter of standard loop.

DETERMINATION OF MINIMUM INHIBITORY CONCENTRATION [MIC]:
The solution of nutrient agar medium [250 mL] was prepared and sterilized. 25mL of media was dispersed in each of 5 conical flask, and they were autoclaved after plugged with cotton. Stock solution of Dodonaea viscosa bearing concentration of 4 mg/ml in Dimethyl sulphoxide [DMSO] was prepared. Each Petri dish was equally filled with nutrient agar about 20 mL/petri dish. The petri dishes were marked. One sterile nutrient agar plate without extract but with equal volumes of solvent served as the control plate. All plates were allowed to refrigerate overnight for uniform diffusion of the extract through the media. Those plates were dried at 37° C. A loop of an overnight grown peptone water culture of each test organism was placed in petri dish and they were marked. The spot inoculated plate was also incubated at 37° C, for 24h and the MIC values were obtained [7-8]. The experiment was repeated and the values were given in table number 01.

DETERMINATION OF ZONE OF INHIBITION:
Agar Well Assay Method: In Agar Well Assay Method 20 ml nutrient agar medium was poured in sterilized Petri plates (100 X15 mm) and allowed to solidify at room temperature. 24 h broth culture of test bacteria was used as inoculums under sterile conditions. The freshly prepared 100µl or 0.1ml (1×10^9 cells/ml) of organisms was set to 0.5 optical density spread with a sterile L shaped. Using cork borer several wells of 6mm in diameter were punched. To each well 100µl extract three sets of two dilutions (2mg/ml, 4mg/ml) of C. *Dodonaea viscosa* extracts of methanol, n-hexane, dichloro methane and ethyl acetate extracts prepared in double distilled water ,were poured into wells. The Petri dishes were incubated at 37 ºC for 24hrs and the diameter of the zone of inhibition were measured in mm. Similar procedure was adopted for the pure ciprofloxacin and the corresponding zone diameter were compared accordingly. The experiment was repeated in triplicate and average values were written in the Table no 01.

RESULTS AND DISCUSSION

Results for the antibacterial activity of *Dodonaea viscosa* extracts of n-.hexane Di- chloromethane and ethyl acetate extracts are shown in table given before. MIC and zone of inhibition of both extracts are carried out by using five bacterial strains the MIC of test compound have been compared with standard drug. From the results zone of inhibition values all the extracts have their activity on Gram positive bacteria when compared with Gram negative bacteria. According to the zone of inhibition Bacillus subtilis showed very less sensitivity to the aqueous extracts. The remaining four bacterial strains effectively inhibited by the ethanolic and aqueous extracts at various

concentration levels. From the above observations various extracts of *Dodonaea viscosa* can be selected for the further antibacterial studies against gram positive bacteria and eve pathogenic strains can be studied to know the potency of these extracts. Fascinatingly E.coli and Bacillus subtilis shown slight resistant to the standard drug ciprofloxacin. Streptococcus faecalis [NCIM-2603] shows similar sensitivity to all extracts extracts of *Dodonaea viscosa* at the same concentration levels.

Table number 01: Determination of MIC of various extracts of *Dodonaea viscosa*

S.No.	Name of the bacteria	Conc. of methanolic		Conc.of n-hexane		Conc. of Dichloro methane		Conc.of ethyl acetate	
		2mg/mL	4mg/mL	2mg/mL	4mg/mL	2mg/mL	4mg/mL	2mg/mL	4mg/mL
1.	*Staphylococcus aureus*	+	+	+	+	+	+	+	+
2.	*Bacilli subtilis*	+	+	+	+	+	+	+	+
3.	*Staphylococcus faecalis*	+	+	+	+	+	+	+	+
4.	*Streptococcus pyogens*	+	+	+	+	+	+	+	+
5.	*E.coli*	-	-	-	-	-	-	-	-

Table number 02: Determination of zone of inhibition of methanolic and n-hexane extracts of *Dodonaea viscosa*

S.No.	Name of the bacteria	Concentration of methanolic extract		Concentration of n-Hexan extract		Ciprofloxacin (µg/mL)			
		2mg/mL	4mg/mL	2mg/mL	4mg/mL	10	20	30	40
1.	*Staphylococcus aureus*	10±0.11	13±0.15	13±1.23	16±1.2	20±0.14	23±0.24	25±0.35	28±0.25
2.	*Bacilli subtilis*	07±0.34	10±0.16	10±1.25	13±1.43	-	-	-	-
3.	*Staphylococcus faecalis*	10±0.26	13±0.24	12±1.26	13±1.24	10±0.41	15±0.25	18±0.34	20±0.35
4.	*Streptococcus pyogens*	15±0.31	20±0.31	10±1.24	15±1.24	13±0.26	15±0.24	20±0.24	23±0.42
5.	*E.coli*	1±0.12	1±0.24	1±0.24	1±0.38	09±0.24	11±0.26	13±0.34	15±0.41

**All values are mean of triplicate readings; - Absent; values ± Standard deviation*

Table number 03: Determination of zone of inhibition of Dichloro methane and ethyl acetate of *Dodonaea viscosa*

S.No.	Name of the bacteria	Concentration of di chloro methane extract		Concentration of ethyl acetate extract		Ciprofloxacin (µg/mL)			
		2mg/mL	4mg/mL	2mg/mL	4mg/mL	10	20	30	40
1.	*Staphylococcus aureus*	10±0.11	13±0.15	14±1.23	18±1.2	20±0.14	23±0.24	25±0.35	28±0.25
2.	*Bacilli subtilis*	09±0.34	11±0.16	10±1.25	13±1.43	-	-	-	-
3.	*Staphylococcus faecalis*	11±0.26	13±0.24	13±1.26	14±1.24	10±0.41	15±0.25	18±0.34	20±0.35
4.	*Streptococcus pyogens*	16±0.31	22±0.31	10±1.24	15±1.24	13±0.26	15±0.24	20±0.24	23±0.42
5.	*E.coli*	1±0.12	1±0.24	1±0.24	1±0.38	09±0.24	11±0.26	13±0.34	15±0.41

Fig. no. 1: Graphical representation for the obtained results of methanolic extract of *Dodonaea viscosa*

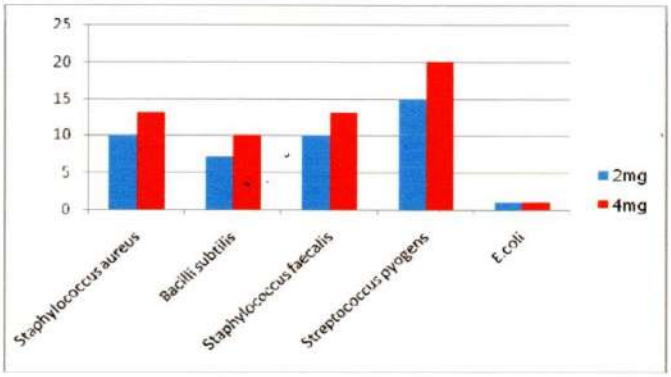


Fig. no. 2: Graphical representation for the obtained results of n-hexane extract of *Dodonaea viscosa*

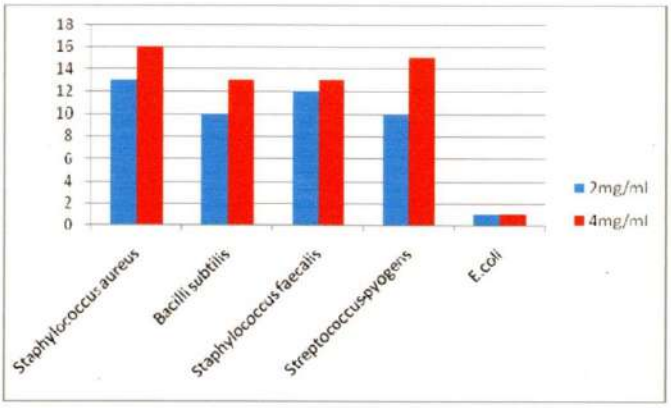


Fig. no. 3: Graphical representation for the obtained results of dichloro methane extract of *Dodonaea viscosa*

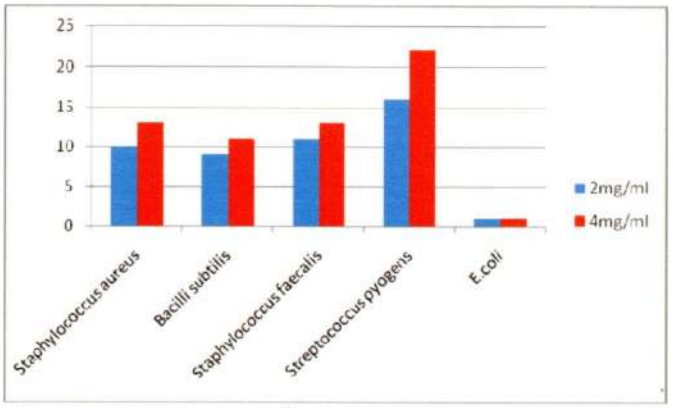


Fig. no. 4: Graphical representation for the obtained results of Ethyl acetate extract of *Dodonaea viscosa*

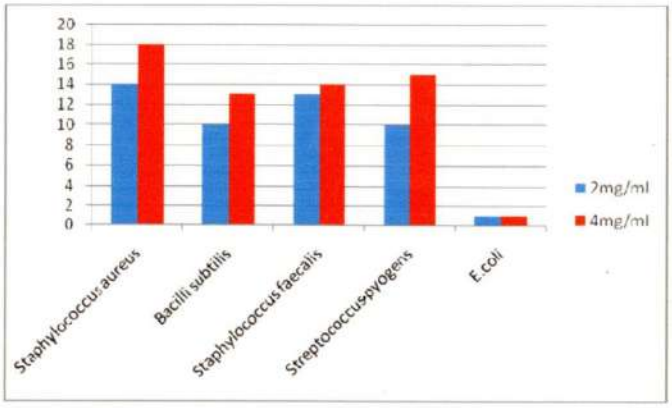
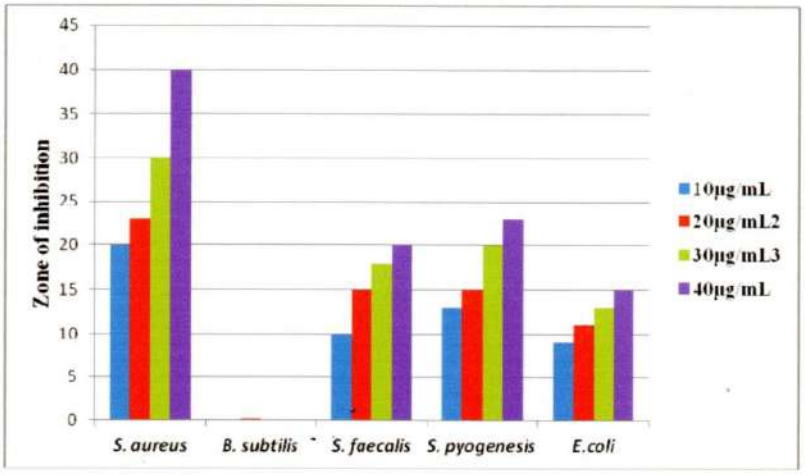


Fig. no. 5: Graphical representation for the obtained results of Ciprofloxacin



CONCLUSION

Plants are the natural sources to promote health, from the present study it can be concluded that the antibacterial activity of *Dodonaea viscosa* leaf extracts of methanolic, n-hexane, dichloro methane and ethyl acetate are effective against various gram positive organisms. And extensive studies are to be carried out to find out which of the chemical constituent might be responsible for antibacterial activity. Finally Dodonaea viscosa may be useful to various other diseases also; further investigation need to be done for this.

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Antibacterial and Antifungal Actuvity of Organic Solvent Extracts Of Knoxia Corymbosa

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Abstract
Objective: *In this study the potency of antibacterial activities of crude organic solvent extracts ethyl acetate, dichloromethane, and methanol extracts of Knoxia corymbosa were tested on bacterial pathogens Escherichia coli, Klebsiella pneumonia, Staphylococcus aureus, Streptococcus pneumonia, Bacillus subtilis and the potency of antifungal activities of crude organic solvent extracts ethyl acetate and methanol extracts were tested on fungal pathogens Aspergillus niger and Candida albicans.*
Key words: *Anti-bacterial activity, Anti-fungal activity, Potato dextrose agar (PDA), Streptomycin sulphate.*

I. Introduction

The ethno medical and ethno botanical uses of the plants are completely crude uses of plants parts like leaves, roots stem, bark etc. But the chemical analysis intended to find out to the chemical substances, which is responsible for the medicinal effect. So this is an interdisciplinary subject. A lot of work has been going on this way throughout the globe. In Andhra University a significant work has been going on. Ayurveda, the ancient healing system of India, flourished in the Vedic Era in India. According to historical facts, the classical texts of Ayurveda, Charaka Samhita and Sushruta Samhita were written around 1000B.C.The Ayurvedic Materia Medica includes 600 medicinal plants along with therapeutics. Herbs like turmeric, fenugreek, ginger, garlic and holy basil are integral part of Ayurvedic formulations. The formulations incorporate single herb or more than two herbs (poly-herbal formulations). Knoxia corymbosa is an erect perennial herb Family Rubeacea mostly 40-90 cm tall. Stems are little-branched, velvety. Leaves are narrow-lance shaped to ovate, mostly 2.5-8 cm long, 0.8-3.5 cm wide, tip pointed to long-pointed, base wedge-shaped to flat, margins with fine hairs. Both surfaces of the leaves are velvety, and the leaf-stalk is 3-10 mm long. Flowers are borne in a dense, cyme up to 4 cm long, carried on a 0.2-2.5 cm long stalk, at the end of branches. Flowers stalks are 0.5-1 mm long. Flowers are usually 1.5-2 mm long, purplish blue or rarely white. Anthers protrude out. Fruit is ellipsoid about 1.5-2 mm long, crowned by sepals, usually falling entire. Knoxia corymbosa is found in Indo-Himalaya region, peninsular India and Sri Lanka. Flowering: September-October. Knoxia corymbosa is assumed to containing some medicinal values because some authors reported that they isolated some chromone glycosides. Knoxia valerianoides is a Knoxia species from which an herbal medicine and β-sitosterol is one of its main components was isolated by Je-Chuan Ye etal. B-sitosterol is known to control cholesterol levels, reduce the activity of cancer cell, promote prostate gland health enhance immunity in the human body.

II. Materials And Methods:

Collection Of Plant Material:
Fresh plants of Knoxia corymbosa free from disease were collected from Y.Ramavaram of Addatheegala, virgin forests of Bison hills of East Godavari District Andhra Pradesh India. Location coordinates of Y.Ramavaram are 17.48330N and 82.01670c. Plant identification was verified by M.Ravikumar of Department of Botany V.S.M college Ramachandrapuram.The plants were washed thoroughly 2-3 times with running water and finally once with sterile distilled water. The plant material was then air dried on sterile blotter under shade for 5 days and then powdered with the help of a blender.

Solvent Extraction:
25gm of shade dried powder was filled in the thimble and extracted successively with Methanol, Ethyl acetate, Dichloromethane solvents in soxhlet extractor for 48 hours. The solvent extracts were concentrated under pressure and preserved at 4° C in an airtight bottle for further use.

Growth and Maintenance of Bacterial and Fungal Cultures for Antimicrobial studies:

The lyophilized forms of different strains of microorganisms like Escherichia coli [MTCC-2126], Staphylococcus aureus [MTCC-3160], were obtained from the Microbial Type Culture Collection and Gene bank (MTCC),Chandigarh, India and the bacterial Strains Streptococcus faecalis [NCIM-2603] and Streptococcus pyogens ,Bacillus subtilis [NCIM-2655] were obtained from National Collection of Industrial Microorganisms (NCIM), Pune,India.

Preparation Of Inoculum For Anti Microbial Studies:

The Gram positive (Staphylococcus aureus, Staphylococcus pneumonia and Bacillus subtilis)and Gram negative(Escherichae coli and Klebsiella pneumonia) bacteria were precultured in Nutrient Broth over night in a Rotary shaker Incubator at 370c, the culture broth was centrifuged at 10,000rpm for 5minutes, pellet was suspended in double distilled water and the cell density was standardized Spectrophotometrically(A610nm). The fungal inoculum for Aspergillus Niger was prepared from 5-10day old culture grown on Potato Dextrose Agar medium the petri dishes were flooded with 10ml of distilled water and the conidia were scroped with a sterial spatuala. The spore density of each fungus was adjusted with spectrophotometer (A 595nm) to obtain final concentration of approximately 105 spores per ml

Method: Antibacterial activity of isolated crude organic solvent extracts ethyl acetate, dichloromethane and methanol extracts of Knoxia corymbosa was checked by agar well diffusion method.

Anti Bacterial Activity Assay:

The Gram positive bacteria Staphylococcus aureus, Staphylococcus pneumonia and Bacillus subtilis and Gram negative bacteria Escherichia coli and Klebsiella pneumonia were tested for their susceptibility to extracts of Knoxia corymbosa by disc diffusion method. Crude organic solvent extracts of Knoxia corymbosa were prepared for antimicrobial assays by reconstituting with the respective organic solvents. The test bacteria were seeded into Mueller Hinton agar medium Spread plate method10µl (106cells/ml) with overnight grown cultures of Bacteria in Nutrient broth, The Filter paper discs 5mm in diameter impregnated with 5µg/ml-1 of the crude organic solvent extracts were placed on test organism seeded plates were used for the antibacterial tests .Streptomycin sulphate (10µg /ml-1)was used as positive control and the organic solvents were used as negative control. The antibacterial assay plates in triplicates were incubated at 370C for 24 hrs.The diameters of the inhibition Zones were measured in mm.

Anti Fungal Activityassay:

Aspergillus niger and Candida albicans were tested for their susceptibility to crude organic solvent extract of Knoxia corymbosa .The antifungal activity was tested by disc diffusion method .The Potato Dextrose Agar plates were inoculated with each fungal culture (10 days old)by point inoculation.The filter paper discs (5mm in diameter)impregnated with 5µg/ml-1 concentrations of the crude organic solvent extracts were placed on test organism seeded plates .The respective organic solvents were used to dissolve the extract and was completely evaporated before application on test organism seeded plates.A blank disc impregnated with the respective organic solvent followed by drying off was used as negative control and the fungicideNystatin (10µg/ml-1) was used as positive control.The activity was determined after 72 hrs of incubation at 280C .The diameters of the clear inhibition zones were measured in mm.

III. Results And Discussion:

Ethyl acetate extract showed antibacterial activity against a total of five bacterial strains *Escherichia coli, Klebsiella pneumonia ,Staphylococcus aureus ,Streptococcus pneumonia, Bacillus subtilis* and and antifungal activity against a fungal species *Aspergillus niger*. dichloromethane extract doesn't show any antimicrobial and antifungal activity. Methanol extract showed antibacterial activity against three bacterila strains *Staphylococcus aureus ,Streptococcus pneumonia, Escherichia coli* and antifungal activity againt *Aspergillus niger.*

Table 1: Antibacterial activity of crude organic solvent extracts of knoxia corymbosa -5 µl/50 µl solvent concentration and antibiotic streptomycin sulphate (10 µg/ml) against bacterial species tested by Disc Diffusion assay

Test organism	Diameter of zone of inhibition(mm)			
Gram positive	EAE	DCME	MEE	SMS
Bacillus subtilis	4	0.00	0.00	
Streptococcus	9	0.00	2	
Staphylococcus aureus	23	0.00	4	15
Gram Negative				
Escherichia coli	20	0.00	2	18
Klebsiella pneumonia	18	0.00	0.00	0.

EAE = Ethyl acetate extract
DCME = Dichloromethane extract
MEE=Methanol extract; SMS = Streptomycin sulphate

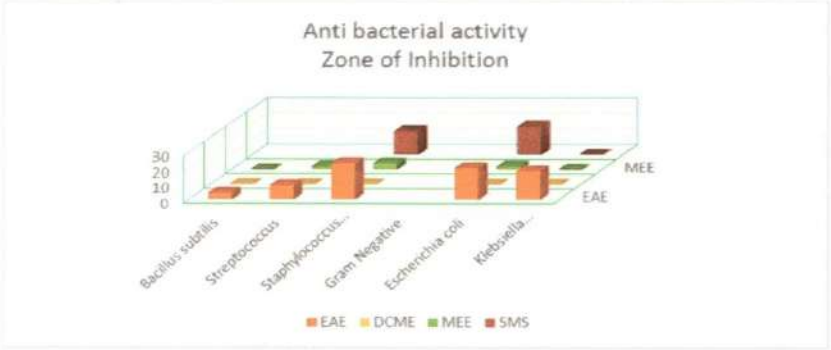
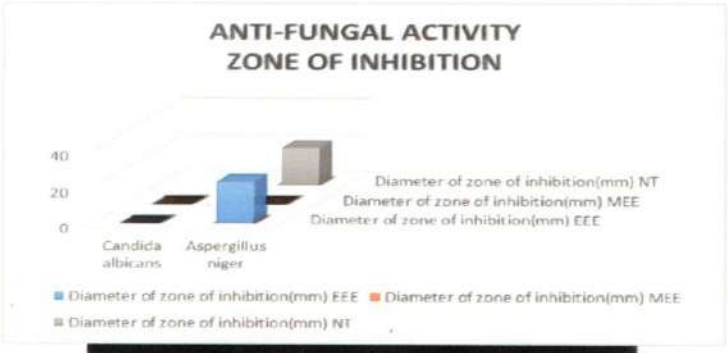
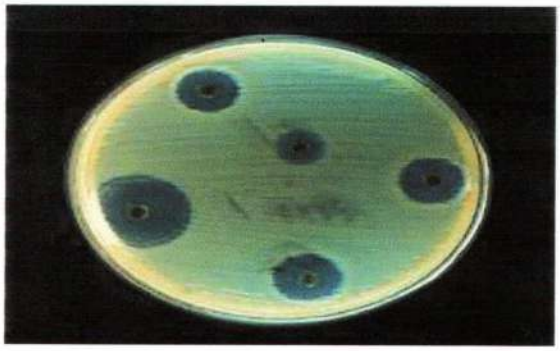


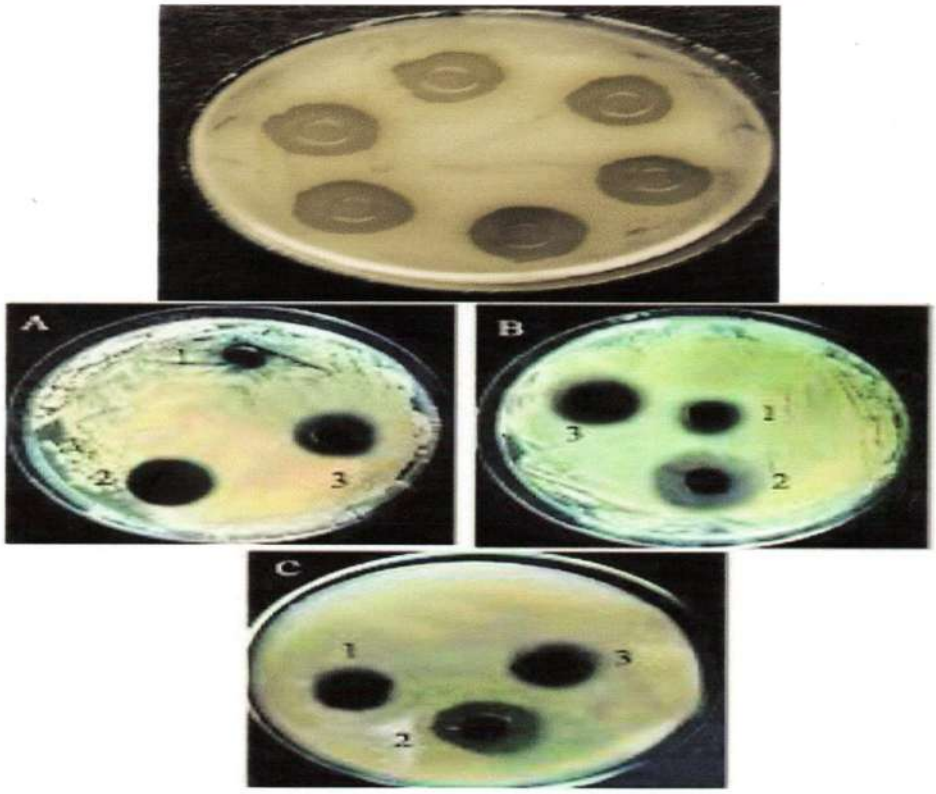
TABLE 2: Antifungal activity of crude organic solvent extracts of knoxia corymbosa -5µl/50µl solvent concentration and fungicide Nystatin against fungal species tested by Disc Diffusion assay

Test organism	Diameter of zone of inhibition(mm)		
	EEE	MEE	NT
Candida albicans	0.00	0.00	
Aspergillus niger	23	0.00	20

EAE = Ethyl acetate extract
MEE = Methane extract
NT = Fungicide Nystatin







IV. Conclusion

Plants are the natural sources to promote health, from the present study it can be concluded that the antibacterial activity of Knoxia corymbosa leaf extracts of Ethyl acetate, dichloromethane, and methanol extracts are effective against various gram positive organisms and gram negative organisms and antifungal activity against fungal organism. Extensive studies are to be carried out to find out which of the chemical constituent might be responsible for antibacterial activity and antifungal activity. Finally Knoxia corymbosa may be useful to various other diseases also; further investigation need to be done for this.

Acknowledgments

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Isolation of Urosilic Acid from *Knoxia corymbosa*

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Abstract

Air-dried, milled leaves of *Knoxia corymbosa* (220 gm) were extracted repeatedly with dichloromethane. After removal of solvent in vacuo, the CH_2Cl_2-solvent residue was fractionated by using hexane and ethyl acetate solvents. After fractionation, all fractions are submitted for NMR spectroscopy. Out of all fractions interesting fractions are subjected to column chromatography, so that we isolated one pure compound as Ursolic acid which is a known compound as it is characterized by using reference data. This is the first time to be isolated the above compound from this species. Ursolic acid is a five-membered cyclic triterpenoid compound. A structure of the isolated compound has been assigned on the basis of their analytical data. By surveying the literature, we came to understand that the compound ursolic acid is a cyclic five-member triterpenoid first to be isolated from *Knoxia corymbosa*. And also, it is first time to isolate the above compound from this species *Knoxia corymbosa*.

Keywords: *Knoxia corymbosa*; CH_2Cl_2; Ursolic acid; Column chromatography; Spectroscopy

Introduction

Pharmacological activities of plants and plant derived drugs necessitate for the search of new and useful drugs globally. India is the largest producer of medicinal herbs. These values are shown vast and tremendous biodiversity potential in India, which can be utilized in drug industry. *Knoxia corymbosa* is assumed to containing some medicinal values [1-6] because girijans of the forest area are using for fevers and skin diseases. Some authors reported that they isolated some chromone glycosides [7,8] from *Knoxia corymbosa*. Knoxia species reported to contain herbal medicine, β-sitosterol which is one of its main components was isolated. β-sitosterol is known to control cholesterol levels, reduce the activity of cancer cell, promote prostate gland health enhance immunity in the human body. The plants of family Rubiacea is an important source of medicinal natural products, particularly alkaloids and triterpenes, quinovic acid glycosides, flavonoids and coumarins have been isolated from this family. Pharmacological studies are described according to cytotoxicity, anti-inflammatory, antiviral, immune stimulation, antioxidant, CNS-related response, vascular, hypertensive, mutagenicity and antibacterial properties. The compounds obtained from this family are used as immunomodulatory, anti-inflammatory and vascular-related conditions. The information summarized here is intended to serve as a reference tool to practitioners in the fields of ethno pharmacology and natural products chemistry.

Various natural products occur in Rubiaceae plants. Extensive phytochemical investigation has been realized regarding the natural occurrence of triterpenoids [10-16], anthraquinones and indole alkaloids [17-20] in the family. Rubiaceae family plants exhibited antimalarial, antimicrobial, antihypertension, antidiabetic, antioxidant, and anti-inflammatory activities. Bioactive compounds including indole alkaloids, terpenoids, anthraquinones and anti-tumors have been isolated from these plants.

Materials and Methods

220 gms of shade dried powder leaves of *Knoxia corymbosa* were filled in the thimble and extracted successively with n-hexane, dichloromethane, ethyl acetate and methanol solvents in soxhlet extractor for 48 hours intervals. The solvent extracts were concentrated under pressure and preserved at 40°C in an airtight bottle for further use. After fractionation, all fractions are submitted to NMR Spectroscopy. Out of all fractions dichloromethane fraction is subjected to column chromatography. By thin layer chromatography (TLC) method Dichloromethane extract seems to be containing more compounds. So, the extract from dichloromethane is subjected to column chromatography with n-hexane and ethyl acetate solvents. The purity of fractions was tested with the help of TLC.

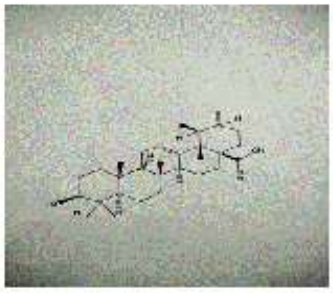

Figure 1: Structure of Ursolic acid. IUPAC Name of ursolic acid is: 3-beta-3-hydroxy-urs-12-ene-28-oic-acid, or 3-β-hydroxy-urs-12-en-28-oic acid, urson, prunol or malol.

Out of all fractions, the fractions having similar R_f values were combined together and isolated three samples. The obtained samples were submitted to UV, IR, NMR and Mass Spectroscopy. The obtained data is compared with reference data and confirmed that, out of three samples one sample i.e., sample-3 (sample-1 and sample-2 are not pure so rejected). seems to be pure one and confirmed the structure. The obtained data is compared with reference data and confirmed the structures and the compound is identified and confirmed as ursolic acid (Figure 1).

Spectral data of *Knoxia corymbosa*

UV spectral data is at 474, 442 and 422.

FT-IR KB Absorption bands assigned to the compound are C-O stretching is (1036.04 cm^{-1}) olefinic system (C=C) (1458.48 cm^{-1} and 2860.52 cm^{-1}), carboxylic acid stretching is (2928.24 cm^{-1}), carbonyl system (1690.38 cm^{-1}), and hydroxyl group (3444.99 cm^{-1}).

^{1}H NMR: (400 MHz, CD3OD): δH=0.728 (3H, s, CH_3, H-27), 0.768 (3H, s, CH_3, 25), 0.884 (3H, CH_3 H-30), 1.05 (3H, S, CH_3, H-26), 0.965(3H, d, CH_3, H-29), 1.28 (3H, S, CH_3, H-23), 1.106 (3H, s, CH_3, H-24), 1.352-2.025 (13H, m, [1, 2, 5-7, 9, 11, 15, 16,19-22]), 2.178 (1H, d, H-18), 3.303 (1H, d, H-3) and 5.217(1H, m, olelifinic proton, H-12).

^{13}C NMR: (400 MHz, CD3OD): δC=38.14 (C-1), 27.88 (C-2), 79.69 (C-3), 38.14 (C-4), 54.40 (C-5), 17.83 (C-6), 31.8 (C-7), 39.83 (C-8), 48.14 (C-9), 34.33 (C-10), 21.60 (C-11), 126.80 (C-12), 139.71 (C-13), 40.76 (C-14), 28.7 (C-15), 24.08 (C-16), 43.24 (C-17), 54.40 (C-18), 39.83 (C-19), 39.99 (C-20), 30.76 (C-21), 34.33 (C-22), 27.88 (C-23), 16.06 (C-24), 16.38 (C-25), 17.66 (C-26), 24.08 (C-27), 181.98 (C-28), 17.83 (C-29), 21.60 (C-30).

Mass spectrum: $C_{30}H_{48}O_3$; Molecular weight-456.5 (m/z 457 (M^+), 389, 300, 248, 207, 203, 189, 147, 133, 119, 105, 44).

Results and Discussion

Dichloromethane extract to column chromatography with n-hexane and ethyl acetate as eluting solvent mixture and obtained 198 fractions. One pure compound obtained from fractions of 159 to 176. The fractions are subject to thin layer chromatography TLC. The fractions having same R_f values are combined together [23]. The sample sent to IICT Hyderabad for spectral data. The data obtained is compared with the existing data and concluded the results and confirmed the structure and name of the is confirmed.

Modern man is confronted with increasing incidences of cancer and cancer deaths annually. Statistics indicate that men are largely plagued by lung, colon, rectal and prostate cancer, while women increasingly suffer from breast, colon, rectal, and stomach cancer [24]. The literature indicates that many natural products are available as chemo protective agents against commonly occurring cancer types [25]. Species of Rubiaceae as well as their isolated compounds possess diverse biological activities, including anti-inflammatory, antitumor, antimicrobial, larvicidal, antioxidant, gastrointestinal, anti-ulcer, and hepato protective, with alkaloids and iridoids as the major active principles. Crude leaf extracts of *Knoxia corymbosa* is proved to having antibacterial and antifungal activity [26].

Conclusion

Ursolic acid is the important constituent of leaves of *Knoxia corymbosa* which are proved to be having very effective medicinal value. Researches proved that ursolic acid having potency of curing tumors and killing cancer cells, induces eryptosis, reduces muscle atrophy, shows potential cardio protection, induces neural regeneration after sciatic nerve injury, liver disorders etc., So, it is necessary to do much more work on the above plant as the above mentioned diseases are challenging to the health sciences. Utilization of natural products as drugs is not only good for human health but also no side effects. In fact, plants produce a diverse range of bioactive molecules, making them a rich source of different types of medicines. Plants with possible antibacterial activities should be tested against an appropriate microbial model to confirm the activity and to ascertain the parameters associated with it.

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