IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

A Review on Banana blossom as an effective agent For polycystic ovarian syndrome (PCOD)

Miss .Shweta shankar Jadhav[1*] ,Miss. Shweta Kachare[2], Mrs Komal Hole[3],

Name of organisation - Institute of pharmaceutical science and research for girls,Swami chincholi,Tal-Daund,Dist-pune

ABSTRACT

A well-known food crop, the fruit's (Musaceae spp.) is mostly consumed as a considerable output in most developing nations. But its flowers will always become agricultural waste. These by-product's are also abundant in bioactive substances and crucial to maintaining our health. Banana bloom has comparable phytochemical concentrations, according to recent investigations. Banana blossoms are therefore a potential functional food with a variety of nutraceutical values, and this review intends to investigate their phytochemical components, antioxidant characteristics, and health benefits.Based on research in the literature, this review identified the bioactive substances present in this banana blossom, involving phenolics, flavonoids, dietary the fibres, tannins, saponins, and vitamins. It also identified the banana blossom's potential biological activities, including antioxidant, anti-, anti-inflammatory, and antimicrobial qualities. This leads to conclusion that banana blossoms have enough levels of healthy secondary metabolites that are important for preserving good health.

Keywords: Banana bloosom, Antibacterial activity, Antidiabetic properties,

Polycystic ovarian disease, Gastroprotective effect .

INTRODUCTION :

A well-known tropical fruit, the banana is the biggest herbaceous flowering plant in the family Musaceae and is grown in tropical and subtropical regions. Using the banana flower, stem, and leaves treating many illnesses[1].The flower helps with lactation, decreases menstrual bleeding problems, assists in overcoming diabetes, aids in weight loss, and is helpful for gastrointestinal health. It is also used to cure ulcers, dysentery, bronchitis, and other disorders.[2] The banana plant's tip contains banana blossoms, an edible bloom that is rich in vitamins. It is an abundant source of antioxidants and nutrients, both of which offer numerous health advantages. People of all ages can purportedly get relief from intestinal problems from the juice of the male blossom.

This bloom was eaten by Sri Lankans as a curry with rice and wheat bread. Dietary fibre is crucial for sustaining our overall health, decreasing the amount of cholesterol, and preserving the obesity in the human body.[3]

- **Origin and dispersal :**

Though it has travelled to India and Burma, this banana species is thought that it developed in Malaysia. They grow at the end of the stem and drape from the banana clusters.It is thought to have initially been domesticated more than 7000 years ago and to have its origins in South-east Asia and the Pacific region. Secondary domestication centres can be found all through East and Central Africa.

The edible fruits, blooms, leaves, stems, and roots of banana plants make up the main sections (Figure 1).,. The petals are finger-shaped, big, meaty, and covered with scales that are purple or reddish in colour and that will fall off when the fruit ripens. Both male and female flowers will be current, with female flowers blooming first. Without pollination, the flowers will turn into banana "hands" and the ovaries will grow into seeds- fruits. When all of the fruits from female flowers become mature[5]. Similar to banana fruits, the banana flower also has a number of nutritional benefits. The blossom extract of the banana plant has longer been taken for its incredible health benefits due to the presence of numerous different bioactive compounds. These include phenols, tannins, steroids, glycosides, flavonoids, and saponins. In addition, this wholesome meal also advertises. Antioxidant, anti-cancer, anti-diabetic, and antimicrobial properties are a few of the blossom's qualities that have been established. It is also ingested because it has significant health advantages for women. This review seeks to provide an overview and compile data from earlier literature studies on the therapeutic advantages, phytochemical component an antioxidant activities of banana (Musa sp.) bloom. [6]

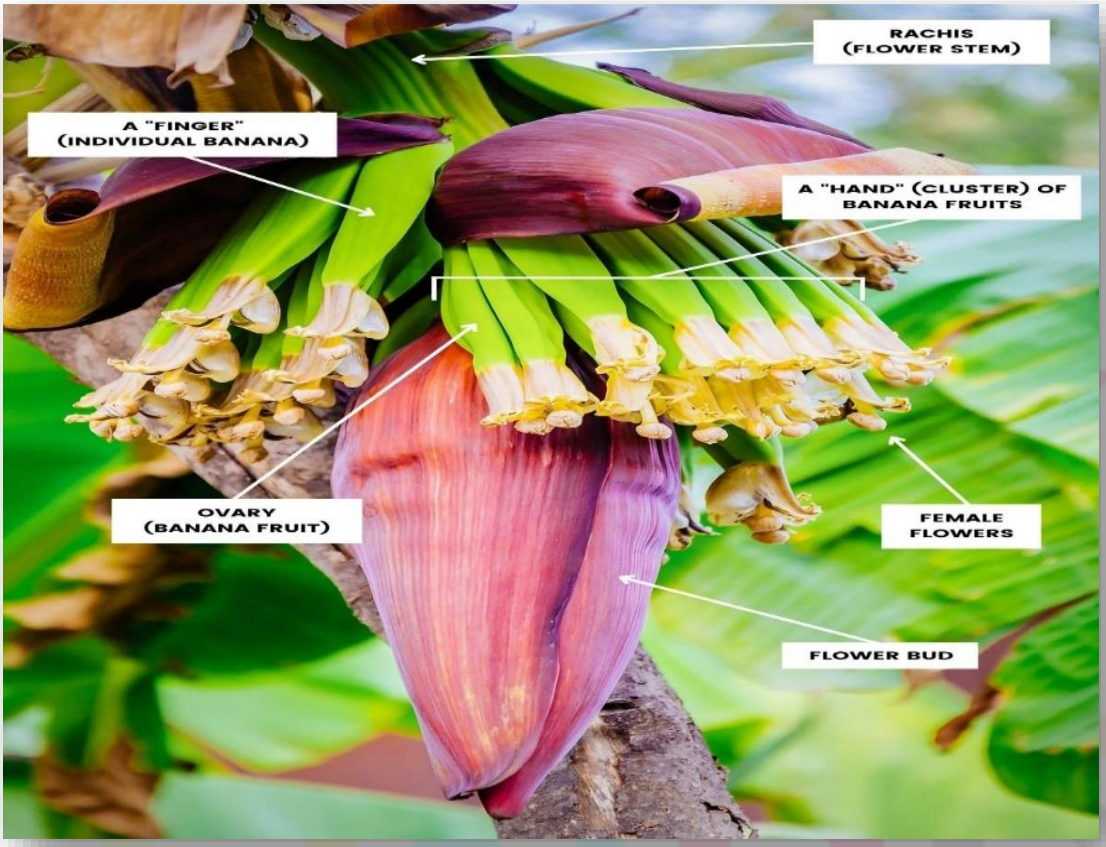


Figure 1:Flower of Musa paradisiasa

Chemical constituents of banana bloosoms

Parameter	Fresh banana blossoms	Dehydrated banana blossoms*
Water activity	0.92±0.01 a**	0.58±0.00 b
Moisture (g/100g)	88.75±1.17 a***	5.18±0.12 b
Crude protein (g/100g of DM)	21.01±0.10 a	20.54±0.61 a
Crude fat (g/100g of DM)	6.02±0.31 a	5.79±0.41 a
Crude fiber (g/100g of DM)	20.31±1.38 a	17.41±1.42 b
Total ash (g/100g of DM)	8.74±0.11 a	8.53±0.20 a
Ca (mg/g of DM)	3.42±0.13 a	2.82±0.10 b
Fe (mg/g of DM)	0.13±0.12 a	0.01±0.11 b

* Dry matter (DM) basis
** Values within a row followed by different letters are significantly different according to t-test at p = 0.05.
*** Based on fresh weight basis.

Banana blossom are the flower of Musa acuminate variety of Methanol, Gallic acid, Folin's – Ciocalteu reagent, Copper sulphate, Sodium hydroxide, Sulphuric acid, Sodium carbonate, DPPH (2, 2-diphenyl-1-picrylhydrazyl), Ammonium sulphate, Methyl indicator, Petroleum ether etc.[7]Physicochemical properties of fresh and processed banana bloosom : [8]

Phytoconstituent present in banana blossom

The typical composition of banana blossom powder is (moisture, protein, fat, ash, and total dietary fibre). It has a very high moisture content that is nearly above 90%, indicating short shelf life of it. It has a significant and substantial amount of protein and a very small quantity of fat. It includes many the presence of both macro and microelements, and the amount of ash value. Such a good source of is found in the banana blossoms.[9] minerals including copper, iron, manganese, and magnesium. It an extremely high grade protein due to its balanced essential amino acid composition. Because it also has a high Because of the high amount of fibre, it is also possible to consume. as dietary fibre replaces it. Due to all of these factors It is regarded as powder with nutritional value. [10] Banana blossom extracts are valuable for Banana bloosom extract are valuable for industry because of their high phenolic and flavonoid content [11]. In fact, research has shown that the best he extraction can result antioxidantactivity if carried out 60 °C with an ethanol concentration of 50% for the duration of 30 minutes while stirring the extraction not utilising ultrasound[12].

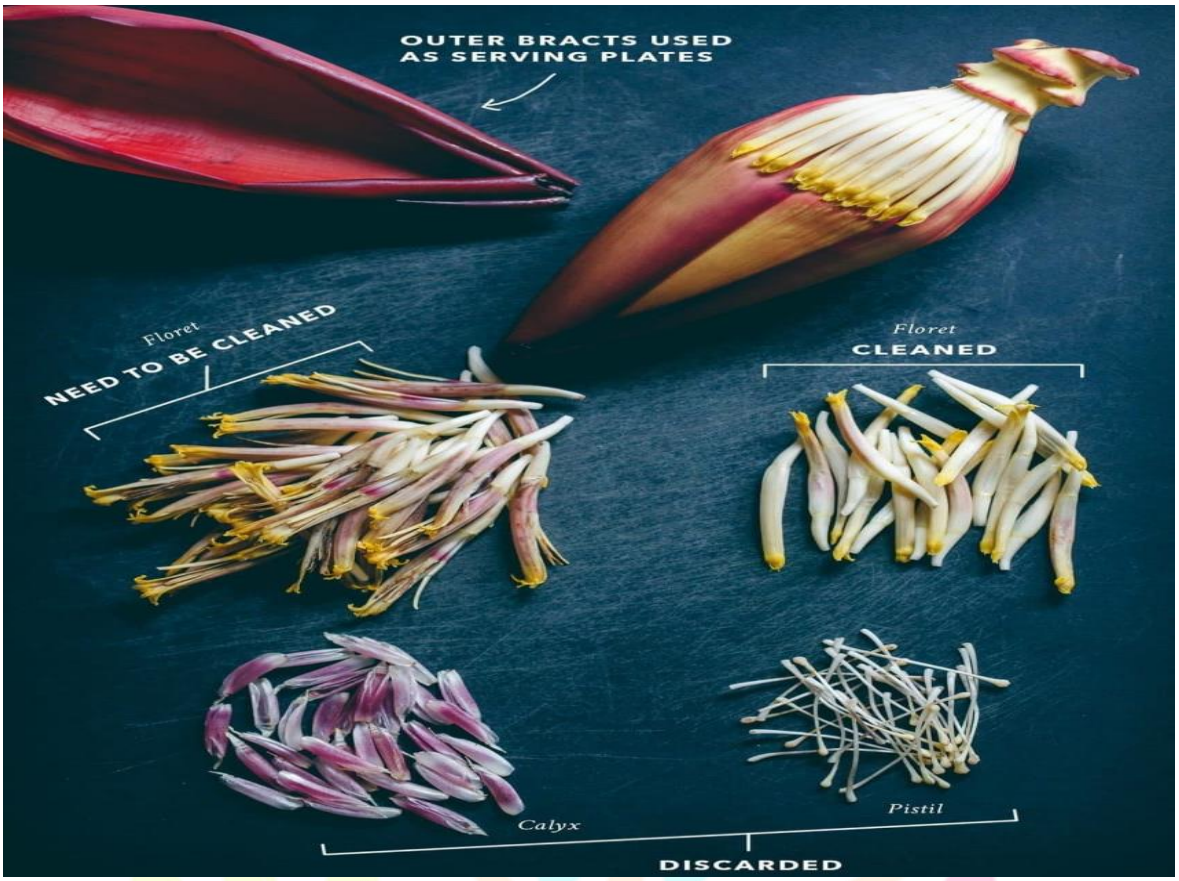


Fig. 2 Banana floral parts

Traditional importance of banana blossom :

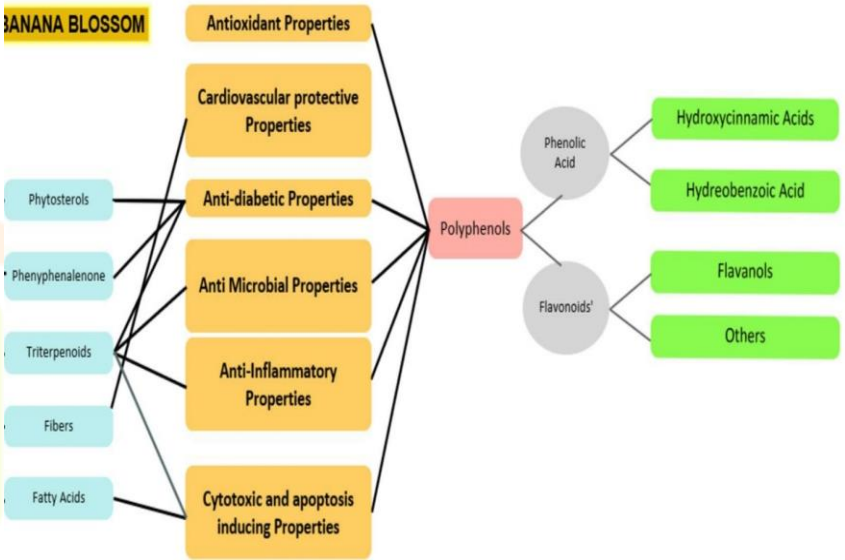


Fig .3 Traditional importance of bloosom

In traditional medicine, the flower plays a crucial role in the treatment of bronchitis, constipation, and ulcer issues. It controls menstrual blood flow [13]. The portions of Antioxidant qualities are found in banana blossoms. It functions as a Veggie is occasionally ingested in raw form, Some Asians consume in cooked form. Plantain blossoms aid in healing Especially helpful in the treatment of severe stomach ulcers Throat ulcers. When eyes are inflamed, it might treat them as Well. Additionally, it can aid in the treatment of vata disorders . [14]

Antibacterial activity : Banana blossom extract has been discovered to be quite effective at treating the infection naturally due to its antibacterial properties.[15] It was shown that specific bioactive chemicals derived from banana blossoms purport antibacterial activity against the bacteria Bacillus during a study on the antimicrobial activity of ananda blossom extract.[16] The research also notes that Escherichia coli, Bacillus subtilis, and Bacillus cereus appear to be more resistant to the antibacterial effects of the bioactive component malic acid found in blossom[17].

Antimalarial activity :[18]

The flower extract is also extremely beneficial for treating wounds, especially in youngsters, and stopping the growth of the malarial parasite, Plasmodium falciparum. Additionally to growing within the body, Health benefits of banana flowers for children. [19]

Antidiabetic properties :

Both in vitro and in vivo addresses have been used in studies of the banana blossom's anti-diabetic properties to far.[20] A calculated consumption of banana flowers can lower blood sugar levels (Bhaskar et al., 2011a). Likewise this consumption raises the body's overall haemoglobin level.[21] In a study, the total phenolics were detected and profiled using HPLC, and the extracts from Ehrlich ascites tumour cells showed varied degrees of stimulation of glucose absorption. According to research on the anti-diabetic effects of banana blossom, oral treatment at a specific dose in rats resulted in a strong antihyperglycemic effect. [22]

Gastroprotective effect :

It reduces menstrual blood loss Banana flowers have been used for treating excessive blood loss during the menstrual cycle since ancient times.[23] Because blossom has the capacity to control the progesterone hormone, which can lessen difficult bleeding, it is puseful in reducing muscle cramps.[24]

Polycystic ovarian disease :

Among women who have reached puberty, polycystic ovarian syndrome (PCOS) is one of the most common hormonal diseases.[25]The multiple PCOS-related cysts that are present in a woman's ovaries are not expelled when Immature follicles continue to grow as they should because of this. Result in the development of many cysts.[26] PCOS, which affects 5 to 10% of the population, is responsible for the bulk of hormonal abnormalities affecting women of reproductive age.[27]PCOS can be identified by at least two of The following crucial traits, per the diagnostic standards of the incidence of oligo- or anovulati in the Androgen Excess Society On, clinical hyperandrogenism (hirsutism), biochemical hyperandrogenism Also a polycystic ovarian morphology, eventually Obesity, insulin resistance, Infertility and problems with lipid metabolism are also common in many people.[28]

They can treat PCOS and control menstural bleeding. Eating a cup of cooked banana flowers with yoghurt is said to boost progesterone levels and stop heavy blooding Ayurveda Additionaly its thought that banana blossom can benefit women with polycystic ovarian syndrome (PCOS)

Well cooked banana blossom might lessen heavy menstrual bleeding and help manage pain. It works best when taken with yoghurt to increase progesterone hormone in the body ,Which will calm the stomach offer immediately relief.

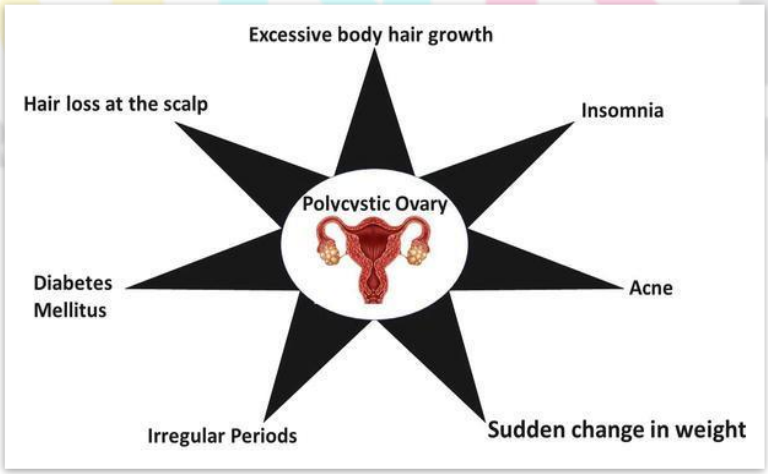
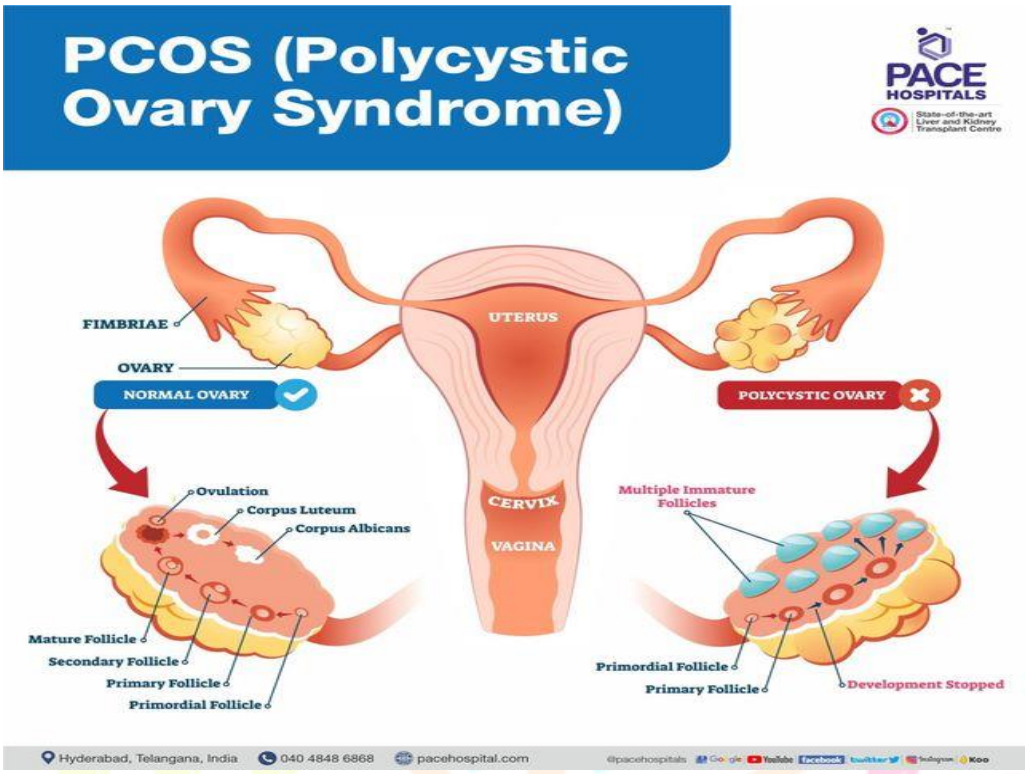


Fig 4: polystic ovarian disease

Female Reproductive system Disease [28]



There is no specific treatment for this issue, although it can be managed by modifying the sugar levels and By using the forming medication, i.e First medication that sensitised insulin and it can also Gonadotropin is used as the initial kind of treatment.[29] Ovulation-inducing chemicals. Very little of Progesterone can overstimulate a person. The greater immune system that produces Oestrogen and it will eventually result in the Production of autoantibodies. such as anti-thyroid Anti-ovarian, anti-spermatic, anti-nuclear, etc. [29]There is a study where we arrive at Understand that several proteins are utilised in PCOD.[30]

Symptoms :

A number of clinical symptoms, including irregular menstruation, infertilitty androgen increase, hirsutism, and insulin resistance, are linked to PCOS.[31] Resistance, ovarian cyst, acne, and weight gain Sleeplessness, seborrhoea, alopecia And weight gain.[32]

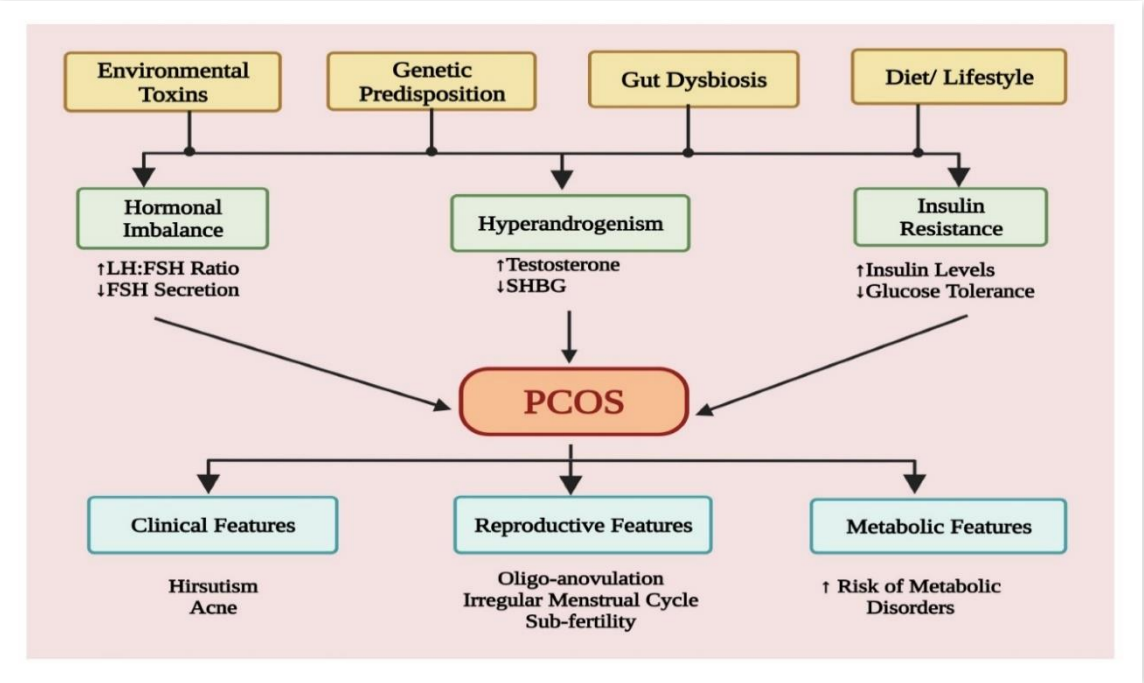


Fig.5 Common symptoms of polycystic ovarian disease (PCOD).(33)

Aetiology :

A variety of clinical and biochemical phenotypes that are determined by the oligogenic disorder PCOS, which is marked byInteractions between various genetic and Environment-related factors.[34]a family tree PCOS is rather common, although it is unknown if This relates to the genetics of the illness Origin. There cannot be a formal segregation study. Conducted because there is not enough Data on phenotypes. But based on the majority of Accord to recent studies, PCOS seems to cluster in In a way that's similar to an autosomal Dominant style.[35]Pollutants and infectious diseases may also have an effect. Poor eating habits and inactivity might enhance environmental factors associated with PCOS (such as obesity)[.36]The reproductive and metabolic symptoms of PCOS can occasionally be reversed with a change in lifestyle, such as decreasing weight and exercising more Despit the fact that genetics may play a crucial role, the precise cause of PCOS is uncertain.[37] According to some ideas, women with PCOS may have inherited the condition. Imbalance in hormone production, where the ovaries generate more Androgensthe norm, is a serious problem, as was As previously stated.[38]

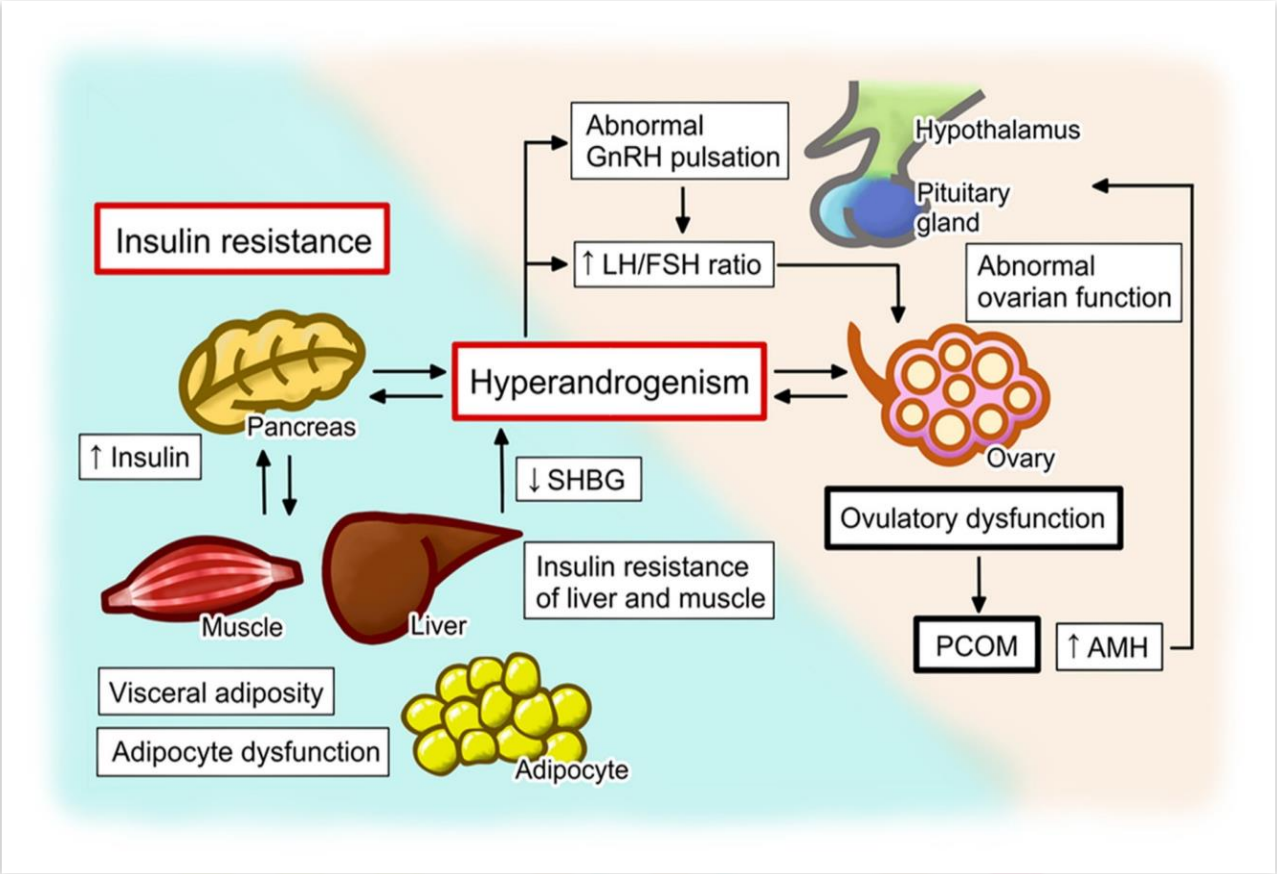


Fig .6 Aetiology of polycystic ovarian disease

The aetiology of PCOS involves primary abnormalities in the hypothalamic pituitaraxis, insulin secretion and action, and ovarian function. Insulin resistance and obesity have been connected. Despite the fact that the precise cause of PCOS Uncertain. Because too much insulin damages the ovaries To generate androgens,which can The relationship between anovulation and insulin production To be anticipated. Insulin controls the ovarian LH, or luteinizing hormone, and Function of the gonadotropin-releasing hormone. The Follicular abnormalities are a sign of an ovarian abnormality. Stoppage of maturation. Increased androgen synthesis occurs in cells as a result of increased GnRH. Follicular arrest is treated by boosting endogenous FSH.

To balance sex hormone-binding globulin, treatment therapies aim to reduce insulin levels and ovarian androgen production. Levels of (SHBG). The signs of PCOS can include With the aid of this increase in SHBG Levels. Studies show that PCOS patients' More testosterone is produced by the cells, 17 hydroprogesterone, progesterone, and Patients in general do. PCOS patients who have Large concentrations of cytochrome P450 (CYP) Genes 11A, 3-HSD2, and CYP17 have changed.

Causes of PCOD

1.Poor dietary decision – Eating junk food raises the chance of developing ://youtube.com/shorts/X7YY9zte2SA?si=mGt9DnYzZ9Dr7_g7PCOS since it contains excessive amounts of fat, sugar, and simple carbs obesity.

2. Insulin resistant -The pancreas produces the hormone insulin. It makes it possible for cells to utilise sugar, the body's main source of energy. Your body may produce excessive the male hormone androgen as a result of taking in too much insulin. Ovulation, the process through which eggs are released from the ovary, may cause you problems.

3.Inflametion and oxidative -Glutathione, haptoglobin, and antioxidant levels are all decreased in PCOD women. These situations make people more susceptible to DNA damage brought on by oxidative stress. Oxidative Numerous disorders in the reproductive system, including Abnormalities in oocyte quality, anovulation, infertility, and endometriosis.

4.Low-grade inflammation – In response to infection or injury, white Blood cells produce substances. This is referred to a slow-grade Inflammation. According to research, people with PCOS have a type of Chronic, low-grade inflammation that causes polycystic ovaries to produce Androgens. This can result in heart and blood vessel issues

5.Weak immune system – This is the most frequent cause of menstruation irregularity since PCOS's low progesterone levels allow the immune system to become excessively stimulated and produce too

6.Excess androgen – When you have PCOS, your ovaries may create a lot of androgens. An excessive amount of androgen prevents ovulation. This indicates that eggs aren't regularly produced and released. From their growing follicles. Added androgen can also result in Acne with hirsutism.

7.Obesity- Obesity is linked to insulin resistance and high blood insulin levels, both of which promote the generation of ovarian androgen. Additionally, obesity increases the risk of a number of malignancies, including Endometrial cancer and breast cancer.

Role of banana blossom in PCOD

Reduces menstrual blood loss:

Banana blossoms have been used to cure excessive menstrual blood loss since ancient time.Lowering the muscle spasms brought on by Blossom's capacity to control progesterone Hormone, which in turn may lessen the uncomfortable bleeding. In addition, it contains magnesium, which might lessen anxiety. Throughout the time. It is also thought to benefit women who Have polycystic ovarian syndrome,Benefits of banana flowers for your overall health .Increase nursing mothers' milk production Banana flower consumption increases milk output in Lactating mothers. Thus, it can be advantageous for newcomers. Women who have difficulty breastfeeding their newborns.

Conclusion :

The conclusion the presence of phytochemical such as phenol , flavonoids ,diatory fiber, saponin,tannin and vitamin in the banana bloosom extracts had contribud to the various beneficial properties of the plant ,such as antioxidant,anti-hyperglycemi,anti inflammatory,and antimicrobial,and many other potentials that are yet to be explored. Further studies on the quantitative analysis of bioactive compounds and other significant medicinal benifits of banana bloosom can be explored more to expand the knowledge of this functional food.

Reference

1.perrier xet al. Proceedings of the national academy of science USA 2011,108.11311[PMID]

2.pari.L Uma Mageshwari J (2000) . Antihyperglycemic activity DRDPIFR Darwin, northern Territory Government (2008).fact sheet about banana plantain.

3.Hi Tech banana production practice by Jain irrigation system Ltd.(2003).

4.Banana- crop Genebank knowledge Base http:/cropgenebank.sgrp.cgir.org...

5.Anderson. J w.Baird, p,Davis R.H . Ferrari.s C. L. (2009) Health benifits of diatory fiber nutritional reviews 67(4).188-205

6.Jahan et al journal of chemical and pharmaceutical Research. Concentration influence on film.2010

7. Nelson SC,Ploetz RC, keplerAK,Musa species (banana and plantains), ver.2 In: Elevitch.CR.species profile for Pacific Island Agroforestry.2006

8.Trease and Evans pharmacognosy, sixteenth Rd. Sandurs, New York

9.Qiang Jin et al.Investigation of diatory fiber, protein, vitamin E and other nutritional compound of banana flower of two cultivars grown in china Africa journal of Biotechnology.2010:9(25):3888-3895.

10.Ndefo, Uche Anadu, Angie Eaton, and Monica Robinson Green. "Polycystic ovary syndrome: a Review of treatment Options with a focus on pharmacological Approaches." Pharmacy and therapeutics 38.6 (2013):336

11.National Institutes of Health Department of Health and Human Services. Beyond Infertility: Polycystic Ovary Syndrome (PCOD) NIH Pub. No. 08 – 5863, April 2008.

12.Soni, Thomson, and Pranav Kumar Prabhakar. "Pathophysiology of Poly Cystic Ovarian disorder (2022)

13.Xita N, Georgiou I, Tsatsoulis A. The genetic Basis of polycystic ovary syndrome. Eur JEndocrinol. 2002; 147:717 –725.

14.Diamanti-Kandarakis E, Kandarakis H, Legro RS. The role of genes and environment in the Aetiology of PCOD Endocrine. 2006; 30:19–26.

15.Legro RS, Strauss JF: Molecular progress in Infertility: polycystic ovary syndrome. Fertil Steril.

2002, 78: 569 -576.10.1016/S0015 -0282(02)03275 -2.

16.Shannon M, Wang Y. Polycystic ovary Syndrome: A common but often unrecognized Condition. J Midwifery Women's Health. 2012; 57:221 – 230) –Kandarakis, Evanthia, Helen

17.Kandarakis, and Richard S. Legro. "The role Of genes and environment in the etiology of PCOD." Endocrine 30.1(2006)

18.Urbanek M. The genetics of polycystic ovary Syndrome. Nature Clinical Practice Endocrinol Metab. 2007; 3:103 –111.

19.Strauss JF. Some new thoughts on the Pathophysiology and genetics of polycystic ovary

Syndrome. Annals New York Academy Sci. 2003; 997:42 –48

20.Pathophysiology of Poly Cystic Ovarian Syndrome." (2022). Anand Swaroop, Amrita Sarkari Jaipuriar, and Debasis Bagchi.

21.Franik S, Kremer JA, Nelen WL. Et al. Aromatase inhibitors for sub fertile women with

Polycystic ovary syndrome;Summary of a Cochrane review. Fertil Steril. 2015;103(2):353 –5.[45] Cahill DJ, O'Brien K. Polycystic ovary disorder (PCOD): Metformin. BMJ Clin Evid; 2015. Pii1408 .

22.Natural Medicines Comprehensive Database. Available online at:http://www.naturaldatabase.com/monoGraph.asp?Mono_id=733&hilite=1(AcCessed May 26. 2013) .

23.López A, MotilvaV, Alarcon de la Lastra C, Martín MJ and La Casa C. The role of gastric mucosal sulfhydrylin The Ulcer-protecting effects of cisapride. The Journal of Pharmacy and pharmacology 1996; 48(1): 37 -40.

24.Rao, U. S. M., Abdurrazak, M., & Mohd, K. S. 2016. Phytochemical Screening, Total Flavonoid and Phenolic Content Assays of Various Solvent Extracts of Tepal of Musa Paradisiaca. Malaysian Journal of Analytical Science. 20(5): 1181-1190.

25.Sandjo, L. P., dos Santos Nascimento, M. V., de H Moraes, M., Rodrigues, L. M., Dalmarco, E. M., Biavatti, M. W., & Steindel, M. (2019). NOx-, IL-1β-, TNF-α-, and IL-6-inhibiting effects and trypanocidal activity of banana (Musa acuminata) bracts and flowers: UPLC-HRESI-MS detection of phenylpropanoid sucrose esters. Molecules, 24(24), 4564.

26. Sitthiya, K., Devkota, L., Sadiq, M. B., & Anal, A. K. (2018). Extraction and characterization of proteins from banana (Musa Sapientum L) flower and evaluation of antimicrobial activities. Journal of food science and technology, 55(2), 658-666.

27.Thaweesang, S. (2019). Antioxidant activity and Total Phenolic compounds of Fresh and Blanching Banana blossom (Musa ABB CV. Kluai "Namwa") in Thailand. In IOP Conference Series: Materials Science and Engineering (Vol. 639, No. 1, p. 012047). IOP Publishing.

28.Tin, H. S., Padam, B. S., Vairappan, C. S., Abdullah, M. I., & Chye, F. Y. (2015). Effect of preparation and extraction parameters of banana (Musa balbisiana cv. Saba) inflorescence on their antibacterial activities. Sains Malaysiana, 44(9), 1301-1307.

29.Vilhena, R. O., Figueiredo, I. D., Baviera, A. M., Silva, D. B., Marson, B. M., Oliveira, J. A., ... & Pontarolo, R. (2020). Antidiabetic activity of Musa x paradisiaca extracts in streptozotocin-induced diabetic rats and chemical characterization by HPLC-DAD-MS. Journal of ethnopharmacology, 254, 112666.

30.Ranganna S (1986) Hand Book of Analyses of Quality Controlfor Fruits and Vegetables, pp 931-2. Tata McGraw HillPublishing Co. Ltd., New Delhi

31.Top 10 banana producing countries in the world. Retrieved From http://worldknowing.com/top- 10-banana-producers -in-the-World/Ware M. Bananas: Health benefits, facts, research. Retrieved From http://www.medicalnewstoday.com/articles/271157 .php

32.The multiple benefits of the banana plant and its parts.Retrieved from http://banana.ezinemark.com/the-multiple -Benefits-of-the-banana-plant-and-its-parts-7d33f9fce659.html Timsina B. And Nadumane VK. Anti-cancer potential of banana Flower extract: An in vitro study. Bangladesh Pharmacology, 2014, 9(4):628 -635.

33.Sheng ZW, Ma Wei-Hong, Jin Zhi-Qiang, Bi Yang, Sun Zhi Gao, Dou Hua-Ting, Gao Jin-He, Li Jing-Yang and Han Li Na. Investigation of dietary fibre, protein, vitamin E andother Nutritional compounds of banana flower of two Cultivars grown in China. African Journal of Biotechnology,2010, 9(25):3888 -3895.

34.Health benefits of banana flower for children: Parenting Healthy babies. Retrieved from http://www.parentinghealthybabies. Com/health-benefits-of-banana-flower-for-children/