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Personal Information

Name Dr Saiyed Irfan Anwar	
Designation	Principal Scientist
Division/Section	Agricultural Engineering
Research Area	1. Farm Machinery & Power 2. Energy 3. Sugarcane processing for jaggery

Patent Details

External Funded Projects

- Storability assessment of value-added jaggery prepared using *aonla* as a natural source of vitamin C (PI) funded by Council of Science and Technology, U.P.
- Development of process technology (protocol) for manufacturing of protein rich jaggery using natural source (PI) funded by Council of Science and Technology, U.P.

Publications

A) Papers published

i) **Anwar, S.I.**, Ali, Y. and Mathur, A.N. 1989. Development of a forced convection solar dehydrator for fruits and vegetables. Proc. XII National Workshop on Solar

Drying. Himanshu Publications, Udaipur. pp 140-150.

i) Vijay, V.K. and **Anwar, S.I.** 1989. Prospects of Solar Drying in Udaipur. Proc. Proc. XII National Workshop on Solar Drying. Himanshu Publications, Udaipur. pp 151-156.

ii) Baboo, B. and **Anwar, S.I.** 1994. Recent Developments in Jaggery (Gur) Research. Tech. Bull. No. IISR/JKS/94/9.

iii) **Anwar, S.I.** and Singh, J. 1997. Manufacturing of raw sugar by open pan system - Constraints and prospects for improvement. *Indian J of Sugarcane Technology*, 12(2):89-96.

iv) **Anwar, S.I.**, Banerji, R., Chaudhary, S.K., Baboo, B., Kumar, R. and Madan, V.K. 2000. Assessment of comparative hardness of sugarcane varieties at nodes and internodes. Journal of Agricultural Engineering. 37(3):7-10.

v) **Anwar**, **S.I.** and Tiwari, G.N. 2001. Evaluation of convective heat transfer coefficient in crop drying under open sun drying conditions. Energy Conversion and Management (An **International Journal**) 42:627-637.

vi) **Anwar**, **S.I.** and Tiwari, G.N. 2001. Heat and mass transfer coefficients in a four tray crop drying system. **International** Journal of Ambient Energy. 22(1):48-56.

vii) **Anwar**, **S.I.** and Tiwari, G.N. 2001. Thermal analysis of a multi-tray crop drying system using solar energy. SESI Journal 10(2):79-94.

viii) **Anwar**, **S.I.** and Tiwari, G.N.2001. Convective heat transfer coefficient of crops in forced convection drying - an experimental study. Energy Conversion and Management (An **International Journal**) 42:1687-1698.

ix) **Anwar**, **S.I.** and Tiwari, G.N. 2001. Performance of a two-tray reverse absorber cabinet dryer. SESI Journal 11(1):1-13.

x) **Anwar**, **S.I.** and Tiwari, G.N. 2001. Performance prediction of two-tray reverse absorber cabinet dryer having glass cover. Proc. of the 25th National Renewable Energy Convention (NREC01) held at Hyderabad during Dec. 27-29, 2001.

xi) **Anwar**, **S.I.** and Tiwari, G.N. 2002. Thermal modelling of a two-tray reverse absorber cabinet dryer with glass cover. **International** Journal of Ambient Energy. 23(2):69-78.

xii) Jain, P.C. and **Anwar, S.I.** 2003. Surface tension of sugarcane juice. *J. Agril. Engng,* 40(1): 69-72.

xiii) **Anwar, S.I.** 2005. xM+ ,o [k.M lkjh dh [kkbZ d+ Å"eh; eku dk vkdyu ,o fujFkd Å"ek iR;uku i.kkyh dk fodkl AProc. jk"Vªh; lx k"Vªh&phuh feyksa e ijkbZ l=k d+ ikjEHkd dky e phuh ijrk c<ku dh xUuk mRiknu rduhdA it 209&211A

xiv) **Anwar, S.I.** 2008. Waste heat recovery system for open pan jaggery furnaces.*Agricultural Engineering Today. 3*2(4): 19-22.

xv) Tiwari, Arvind; Dubey, Swapnil; Sandhu, G.S.; Sodha, M.S. and **Anwar, S.I.** 2009. Exergy analysis of integrated photovoltaic thermal solar water heater under constant flow rate and constant collection temperature modes. Applied Energy

(International Journal), 86:2592-2597.

xvi) Singh, R.D., Baboo, B., Singh, A.K. and **Anwar, S.I.** 2009. Performance Evaluation of Two Pan Furnace for Jaggery Making. *Journal of Institution of Engineers (India)*, 90: 27-30.

xvii) **Anwar, S.I.** Singh, R.D. and Singh, J. 2009. Value addition of jaggery (*gur*) through natural source of vitamin C. *Indian J of Sugarcane Technology*, 24 (1 & 2): 48-51.

xviii) **Anwar, S.I.** 2010. Fuel and energy saving in open pan furnace used in jaggery making through modified juice boiling/concentrating pans. *Energy Conversion and Management*, 51: 360-364.

xix) **Anwar, S.I.** 2010. Calorific value of jaggery bagasse as affected by its composition. *Agricultural Engineering Today*, 34(1):47-49.

xx) **Anwar, S.I.** 2010. Determination of moisture content of bagasse of jaggery unit using microwave oven. *Journal of Engineering Science and Technology*, 5(4):472-478.

xxi) **Anwar, S.I.**, Singh, R.D. and Singh, J. 2011. Process development for production of jaggery (*gur*) with *aonla* as a natural source of vitamin C. *Journal of Institution of Engineers (India*), 92(1):33-35.

xxii) Singh, J., Singh, R.D., **Anwar, S.I.** and Solomon, S. 2011. Alternative sweeteners production from sugarcane in India: Lump sugar (Jaggery).*Sugar Tech*, 13(4):366–371.

xxiii) **Anwar, S.I.** and Singh, R.D. 2012. Convective heat transfer coefficient of Indian gooseberry (Emblica officinalis) dried in three different forms under forced convection mode. *Journal of Engineering Science and Technology***(International Journal)**, 7(5):670-678.

xxiv) Banerji, R, Singh,P. and **Anwar, S.I.** and Solomon, S. 2012. Effect of reducing sugars on nonenzymic browning during thermo-evaporation of sugarcane juice for making jaggery and its storability. *Sugar Tech* **(International Journal),** 14(4):428–431.

xxv) **Anwar, S.I.** 2015. Improving thermal efficiency of open pan jaggery furnaces – A novel concept. *Indian J of Sugarcane Technology*, 29(1):32-34.

xxvi) **Anwar, S.I.,** Singh, R.D., Pandey, V.K. and Pandey, P.R. 2015. Storage studies of natural vitamin C enriched jaggery. *Agricultural Engineering Today*, 39(1):8-10.

xxvii) **Anwar, S.I.** 2017. Development of modified jaggery moulding frame for cubical shape jaggery. *Agricultural Engineering Today*, 41(1):44-47.

xxviii) **Anwar, S.I.** 2017. Experimental identification of best fin configuration for pans of jaggery making furnace. *E-Souvenir-cum-Proc.* SOLARIS-2017:410-414.

xxix) Singh, A.K., Singh, J., Kumar, D., Singh, R.D., **Anwar, S.I.,** Singh, S. and Gupta,R. 2017. Design and development of a forced air drier for drying of jaggery. *Indian Journal of Sugarcane Technology*, 32(01):07-12.

xxx) **Anwar, S.I.,** Sharma, K., Lal, A. and Singh, P. 2017. Development and quality evaluation of bagasse fibre mixed jaggery based cookies. *Food Science Research*

Journal, 8(2):223-229.

xxxi) **Anwar, S.I.** 2018. Innovative approaches for improving productivity and quality of nutritive sweetener from sugarcane. In: Souvenir of National Conference on Promoting Entrepreneurial Growth through Innovative Approaches in Food Processing Sector held at CIPHET, Ludhiana during March 16-17. :114-118.

xxxii) **Anwar, S.I.** 2018. Entrepreneurship potential in jaggery and value added products from cane juice. In: Compendium of 10-days training course on Entrepreneurship in sugarcane sector to double farmers' income held at IISR, Lucknow during March 19-28: 118-123.

xxxiii) Sahu, T., Khokhar, D., **Anwar, S.I.**, Paikara, D. and Paikra, S.S. 2019. Performance Evaluation of Sugarcane Cleaner-cum-Washer for Jaggery Production. *Int J of Current Microbiology and Applied Sciences*, 9:78-84.

xxxiv) Anwar, S.I., Singh, R.D. and Singh, Pragati. 2020. Protein Enrichment of Jaggery through Natural Source. *Indian Journal of Sugarcane Technology*, 35(2):129-137.

Books or Chapter Published

Book

Srivastava, S. **Anwar, S.I.**, Verma, P., Kumar, D., Swapna, M., Singh, R.D., Prakash, B., Ashfaque, M. and Singh, A.K. 2014. Jaggery: Evolution to Revolution, IISR, Lucknow, p. 193.

Book chapters

i. **Anwar, S.I.** and Tiwari, G.N. 2001. Performance prediction of two-tray reverse absorber cabinet dryer having glass cover. In: Energy Security for India: Role of Renewables. TL Setharama Rao, S. Subramanyam, Anil Misra and AV Narsimha Rao (eds.). Allied Publishers Limited, Hyderabad, India, p 64-70.

ii. **Anwar, S.I.** 2008. Cane Crushing Systems and Development of Crushers: A Scenario. In: Processing, Handling and Storage of Sugarcane Jaggery. IISR, Lucknow, pp 61-64.

iii. **Anwar, S.I.** 2008. Waste Heat Recovery from Open Pan Heating System. In: Processing, Handling and Storage of Sugarcane Jaggery. IISR, Lucknow, pp 76-78.

iv. **Anwar, S.I.** 2008. Value Addition of Jaggery with Vitamin C. In: Processing, Handling and Storage of Sugarcane Jaggery. IISR, Lucknow, pp 91-94.

v. **Anwar, S.I.** 2008. Design and Development of Jaggery Storage Godown. In: Processing, Handling and Storage of Sugarcane Jaggery. IISR, Lucknow, pp 115-121.

vi. **Anwar, S.I.** 2010. An experimental study for optimizing fins provided to jaggery pan for improved efficiency. In: Energy Conversion and Management. S.K. Shukla and J.V. Tirkey (Eds). Narosa Publishing House, New Delhi, p 191-196.

vii. dekj] Mh- ,o vuoj] ,l- vkbZ- 2014- xM m|kx&,d vkfFkZd fo'ys"k.kA In "[k| ilLdj.k m|fe;k d fy, Lojktxkj dh lHkkouk," Eds R.K. Gupta, Mridula, D. and S.N. Jha, CIPHET, Ludhiana pp 157-162.

viii. **Anwar, S.I.**, Kumar, D. and Verma, P. 2014. An overview of jaggery research at IISR, Lucknow. In: Jaggery: Evolution to Revolution, IISR, Lucknow. pp 36-44.

ix. **Anwar, S.I.** 2019. Processing technologies for jaggery manufacturing. *In*: Improved Sugarcane Mechanization Technologies. Eds. Sukhbir Singh, A.K. Singh and A.D. Pathak. IISR, Lucknow:157-161.

x. Singh, P., **Anwar, S.I.**, Singh, M.M. and Sharma, B.L. 2022. Organic jaggery production. In: Organic Crop Production Management. Eds. D.P. Singh, H.G. Prakash, M. Swapna and S. Solomon. Apple Academic Press and CRC Press.

Policy Brief

Gangwar, L.S., Solomon, S. and **Anwar, S.I.** 2015. Technological and Policy Options for Modernization of Jaggery Industry in India. Policy Brief. IISR, Lucknow.

Awards

- **ISAE Team Award** (2007-08) for the work on value-addition
- **ISAE Distinguished Services Award** (2008-09)
- **Commendation Medal** of Indian Society of Agricultural Engineers (ISAE)
- **Fellow**, Institution of Engineers (India)